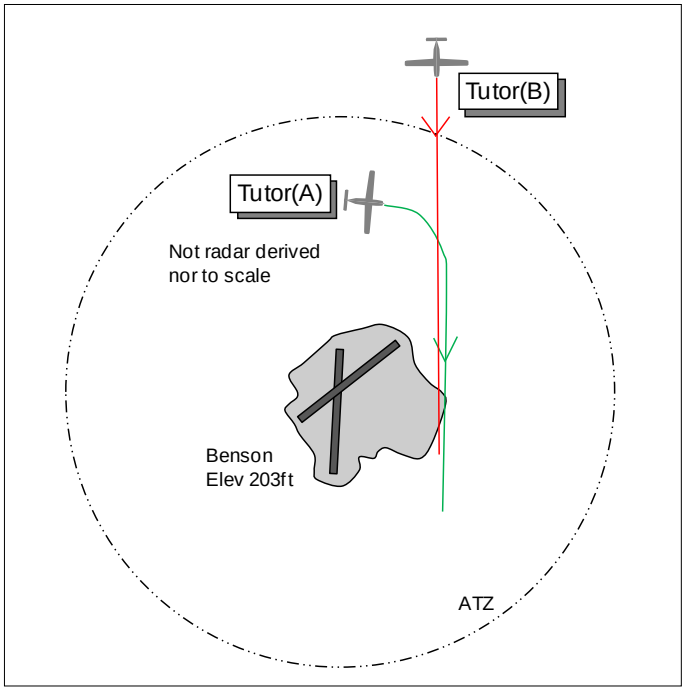
AIRPROX REPORT No 2011052

Date/Time:	2 Jun 2011 1322Z (Saturday)	
Position:	5137N 00105W (0·5nm ESE Benson - elev 203ft)	
Airspace:	ATZ	(*Class: G*)
	Reporting Ac	*Reported Ac*
Type:	Tutor(A)	Tutor(B)
Operator:	HQ Air (Trg)	HQ Air (Trg)
Alt/FL:	800ft (QFE)	850ft↓ (QFE)
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	10km
Reported Separation:	100ft V/150ft H	50ft V/75m H
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TUTOR(A) PILOT reports flying a solo cct consolidation exercise at Benson, VFR and in communication with Benson Tower on 127·15MHz; the ac's transponder was switched off. The visibility was 10km below cloud in VMC and the ac was coloured white with HISLs and nav lights switched on. He was late making a downwind call on RW01 because when he was ready, about a third of the way down the RW, he was unable to call owing to other traffic communicating with ATC. Heading 190° at 800ft QFE and 80kt he made a routine lookout to the R, by now he was two-thirds of the way down the RW, he noticed another Tutor, Tutor(B), about 100ft higher and 150ft away in his 4 o'clock. He believed that both he and the Tutor(B)'s pilot saw each other at the same time because the other Tutor initially broke R as its pilot called ATC before then conducting a LH orbit. During this period he maintained straight and level flight and watched to see what Tutor(B) was doing. Once Tutor(B) was clear he was able to call "downwind" and was cleared for a touch and go after another Tutor, Tutor(C) that was already on final. He assessed the risk as high.

THE TUTOR(B) PILOT reports flying a dual sortie from Benson VFR and in communication with Benson Tower on 127·15MHz, squawking 3611 with Modes S and C, he thought. The visibility was 10km below cloud in VMC and the ac was coloured white with HISLs and nav lights switched on. He was recovering to the visual cct RW01 RH from the N at 2000ft and 110kt. He called Tower about 3nm N of Benson and requested a high downwind join (for noise abatement) which was approved. The frequency was busy initially and it took him a short while before he could make the call so it may have been a bit closer. On reaching the visual cct the only ac he saw was a helicopter hovering over the RW on final approach. Another AEF Tutor flight, Tutor(C), then called long final for a straight-in approach which was approved. Very shortly afterwards he called high downwind, abeam the upwind threshold at 2000ft and a little wider than normal, and was told by Tower "one ahead". He asked Tower if that was the straight-in approach traffic on long final and was told affirmative. He commenced a gentle idle power descent on the downwind leg heading 190° at 80kt. At this point no mention had been made by ATC of any other cct traffic and no other calls were heard to indicate that there were any other ac present in the visual cct. He had the Traffic Advisory System (TAS) on and there were no contacts showing apart from the 2 ac he already knew about. As he descended downwind his main attention was therefore in the direction of the aerodrome and towards the approach area to try and make visual contact with Tutor(C) in order to turn final, positioning at a correct distance behind it. Approaching 800ft at 80kt and just before the abeam point with the RW

threshold his cadet alerted him to an ac on his (L) side and out to the front (in his blind spot- 11 o'clock slightly low). He immediately manoeuvred his ac to make visual contact and saw Tutor(A) in very close proximity, 75m ahead, slightly to the L and 50ft below. He turned hard L and made an S turn to fit in behind Tutor(A). As he did this ATC asked if it was his ac breaking L, and he responded that he was positioning behind another Tutor he hadn't known was there. This was greeted by silence from ATC followed by the solo student in Tutor(A) calling "late downwind" and the student was told to go-around. He continued downwind normally and landed after Tutor(C). Later on during a conversation, Tutor(C) pilot told him that he also had no idea that a Tutor flown by a solo student was in the cct downwind when the incident occurred. He assessed the risk as medium.

UKAB Note (1): Tutor(B)'s SSR disappears as the ac enters the ATZ 2nm NNE of Benson before the ac fades from primary whilst in the downwind leg, passing 0·5nm E of the aerodrome.

THE BENSON TOWER CONTROLLER reports that at the time of the incident Tower was bandboxed with Ground owing to a brief lull in traffic. The instructor for the solo student in Tutor(A) was observing his performance from the VCR. The cct rapidly became busy with station-based helicopter departures, fixed-wing arrivals and the Helimed on scramble. Tutor(A) flight elected to go around from an approach and climbed on the deadside. Tutor(B) flight called to join declaring it would be a high and wide downwind join and was informed of the 2 ac in the cct [Tutor(A) and helicopter departing]. A further Tutor flight, Tutor(C), called to join through initials, requesting a straight-in approach which was approved. Tutor(B) flight called wide downwind and was advised of 1 ahead (Tutor(C) on a straight-in approach) as he believed Tutor(B) to be the 1st Tutor downwind. After descending downwind Tutor(B) pilot became visual with another Tutor in close proximity, which was identified as Tutor(A), and conducted an orbit. Tutor(B) pilot was asked if he was in the Tutor which had conducted the orbit so as to establish the new order of the Tutors downwind. Tutor(B) pilot was then told there were now 2 ac ahead; both Tutor(A) and Tutor(B) completed their ccts safely.

HQ 1GP BM SM reports that this Airprox occurred downwind in the visual cct at RAF Benson between 2 Tutors. Tutor(A) was flown by a student established within the cct, with Tutor(B) flown by a QFI recovering from a high, wide downwind position, following an air experience flight.

Given the height at which the Airprox occurred, no radar replay was available; consequently, the investigation has been based upon the reports of those involved and a transcript of the audio-tapes.

All stated heights are based on the RAF Benson QFE of 1027mb published at the time of the incident.

The relatively inexperienced ADC reported that he had been operating in the GRD position for approximately 70min prior to giving a trainee ADC and instructor a break "due to a brief lull in traffic." He then operated in the bandboxed TWR and GRD position for approximately 20min prior to the occurrence. The trainee's instructor had also been scheduled to conduct a standardisation check on the subject ADC later in the week but took the opportunity of the increasing traffic load to conduct the ADC's check. On the DFSOR, the Supervisor had assessed the ADC's workload as medium to low; however, the Supervisor was not present within the VCR during the incident sequence and the controller has subsequently stated that he would assess their workload as having been medium to high. The ADC reported the Wx as being unlimited visibility in nil weather and FEW cloud at 3800ft.

At 1319:06, Tutor(B) pilot called to join the visual cct and was informed that there were 2 ac in the cct – one was Tutor(A) and the other a Rotary Wing ac departing the airfield. Tutor(B) pilot then stated that he was positioning for a "*high wide downwind join*" which was acknowledged by TWR. There is no recognised procedure at RAF Benson for a "high wide downwind join"; the light ac visual cct is at 800ft.

At the time of the Airprox, regulation and guidance for the conduct of visual joins was contained in JSP 552.320.105.4, which has since been carried forward into MAA RA 3020 and associated MAA MATM Chapter 20 Para 11. These documents state that the 'NATO standard visual aerodrome cct

and landing patterns '…are to be implemented, except for the authorised single-Service procedures' and that 'clearance from ATC for the aircraft to enter the pattern **should** include items of essential information regarding the circuit direction, runway in use and number and position of all aircraft ahead which have not touched down.' That said, there are no single-Service variations contained within either JSP 552.320.105 or MAA RA 3020 and associated MAA MATM Chapter 20 Para 11. Moreover, the only UK variation to the NATO procedure that is germane to the current investigation is that the 'downwind call is required to be made when abeam the upwind threshold of the RW in use.' No variation is listed for the operation of an oval cct. Whilst the NATO cct pattern at Figure 1 is predicated on a rectangular cct, rather than the oval cct in common use by the UK military, the information relating to downwind join ground tracks and the ATM aspects appear to be able to be carried across to UK mil ATM procedure. However, based upon a quick straw-poll, current mil ATM practice sees controllers pass position information to ac joining through Initial, rather than all ac conducting a visual join.

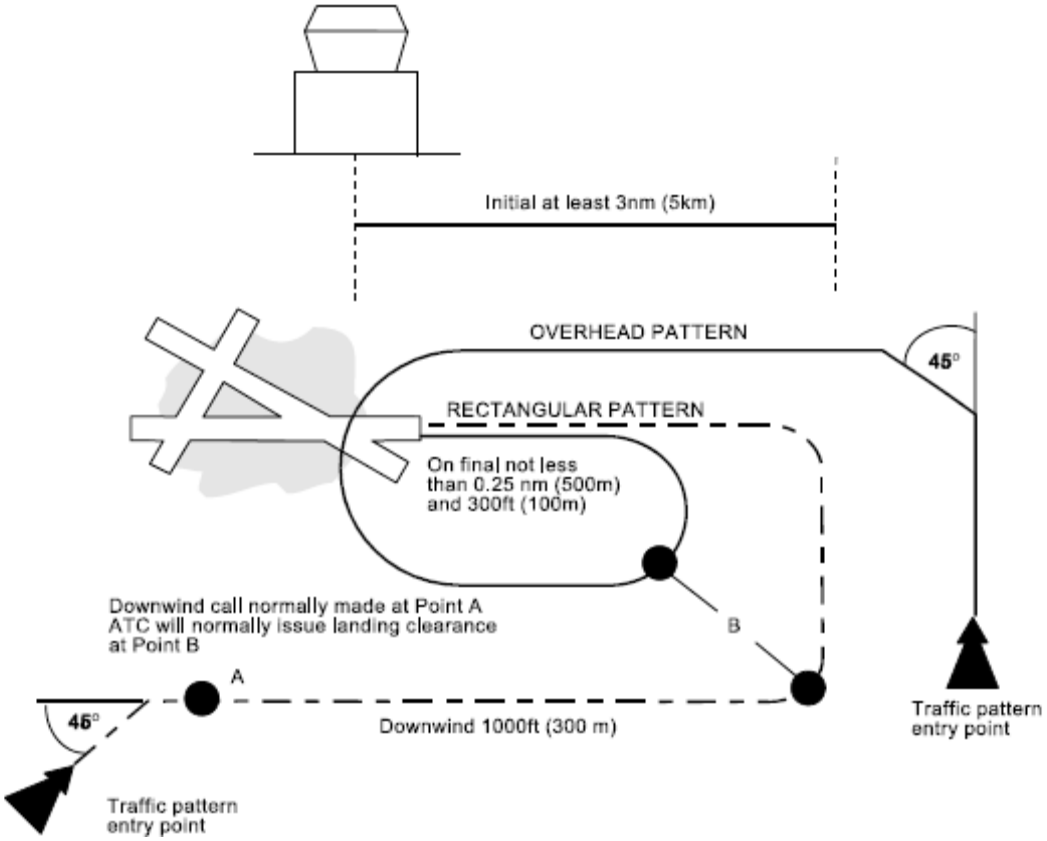


Figure 1: NATO Standard VFR Traffic Landing Pattern – Fixed Wing

At 1319:22 the departing Rotary Wing ac left the frequency. At 1319:29, a third, unrelated Tutor flight, Tutor(C), called to join and at 1320:28 declared his intention to make a straight-in approach to land. Thirty-seven seconds later at 1321:05, Tutor(B) flight reported being, "abeam the upwind threshold at 2000ft and a little wider than normal" and transmitted, "*high downwind full stop*." This was acknowledged by TWR who replied that there was "*one ahead*" of Tutor(B). Tutor(B)'s pilot then requested clarification as to whether the "*one ahead*" was Tutor(C), which was confirmed by TWR. At this point, TWR was speaking to 4-speaking units; 3 Tutors operating in the visual cct and one air ambulance on start for a scramble departure. It was also at around this point that Tutor(B) commenced their gentle idle descent from 2000ft to cct height of 800ft. The ADC later stated that he observed Tutor(B) descending on the downwind leg with what appeared to be a relatively "*high rate of descent for a Tutor*." The pilot of Tutor(B) reported that as he descended downwind, his "main attention was...in the direction of the airfield and towards the approach area to try to make visual contact with" Tutor(C).

Tutor(A) pilot reported that, at the point when he would routinely report downwind, he was unable to make the transmission due to frequency congestion. This is borne out by the transcript with the only breaks in the R/T being between 1320:02 to 1320:28 and 1321:15 to 1321:24. Whilst it has not been possible to determine where Tutor(A) was in the cct between these times, based on Tutor(B) pilot's transmissions and subsequent events, it is reasonable to suggest that Tutor(A) was crosswind between 1320:02 and 1320:28 and downwind between 1321:15 and 1321:24.

The ADC later stated that from the point when Tutor(B) called downwind neither he nor the QFI for the pilot of Tutor(A), nor the controller conducting the standardisation check, nor the TWR assistant were able to sight Tutor(A) as a result of background cloud and the Tutor's colour scheme.

At 1321:37, Tutor(A) pilot reported late downwind with TWR replying that there are 2 ac ahead of them; these being Tutor(B) and Tutor(C). At 1321:58 TWR asked Tutor(B) flight whether they were conducting an orbit, which accorded roughly with the pilot's report of their actions following the CPA. Moreover, the pilot of Tutor(B) reported that they first became visual with Tutor(A) "just before the abeam point with the runway threshold" as they approached cct height and that Tutor(A) was in their "visual blind spot: eleven o'clock, slightly low."

Tutor(A)'s pilot reported that their SSR transponder was turned off. Tutor(B)'s pilot reported that both their transponder and TAS were turned on and that there were "no contacts showing apart from the 2 that I knew about."

DSATCO RAF Benson has stated that the Tutors' colour scheme makes them difficult to sight and track whilst within the visual cct. Moreover, SATCO RAF Benson has stated that it is impossible to utilise the Hi-Brite VRD to provide information on the position of Tutors within the visual cct because they do not paint satisfactorily on primary radar. Whilst there has been discussion at RAF Benson about mandating that Tutor ac squawk SSR Mode 3A and C whilst within the visual cct, to both aid controllers in sighting the ac and to facilitate the operation of the Tutor's TAS, this has not yet been implemented.

There are 3 distinct aspects to this incident which require assessment: the actions and decision making of the pilot of Tutor(B); the actions of the ADC and regulation regarding the provision of TI whilst in the cct.

At the time that Tutor(B) joined the cct at 1319:06, he was correctly advised that there were 2 ac in the visual cct and, based upon his report and the transcript, was aware of Tutor(C) when he reported downwind. The purpose of the RT transmissions made by all speaking units operating within a visual cct environment is to maintain situational awareness. On the basis that the pilot of Tutor(B) stated that he was not aware of Tutor(A), it appears reasonable to suggest that he had not assimilated the cct state information given to him. This caused Tutor(B) to descend into the cct, without being visual with all known traffic, specifically Tutor(A). Moreover, his decision to join high downwind warrants further attention.

Based upon the report of the pilot of Tutor(B) and the transcript (loss of 1200ft in 53sec between 1321:05 and 1321:58), Tutor(B) averaged an approximate ROD of 1300fpm from abeam the upwind threshold to abeam the RW threshold, which does not seem to accord with the reported "gentle idle descent." This is supported by the statement made by the ADC about the Tutor's ROD. During this descent, the pilot of Tutor(B) focussed his attention towards the airfield, arguably to maintain the correct lateral spacing for their height relative to the airfield, and towards the approach area to facilitate their sequencing behind Tutor(C). Whilst his incorrect mental picture of the cct state will have lulled him into solely focussing his visual scan in these areas, this focus specifically excluded the area beneath the ac, which is contrary to the CFS taught procedure for the visual scan whilst descending. Furthermore, the purpose of a downwind join is to facilitate the expeditious recovery of an ac, whilst simplifying the task of sequencing into the cct. Routinely, an ac joining downwind would be expected to be at cct height by a position abeam the crosswind position, thereby simplifying the pilot's visual acquisition task. In this case by joining 1200ft above cct height, the pilot of Tutor(B) was

increasing the difficulty of his task to visually acquire the other cct traffic and reducing the possibility of being able to safely integrate himself into the cct.

The key ATM aspect to this Airprox is the transmission made by TWR at 1321:08 to Tutor(B) flight that there was 1 ac ahead of them, confirmed by TWR at 1321:12 as being Tutor(C). ADCs are trained to utilise eyesight to maintain track of all ac within the visual cct and to reinforce this using a "pin board." In this case, the ADC has stated that whilst he was utilising a visual scan to acquire and track the ac, his ability to do this was compromised by the Wx conditions and the Tutor's colour scheme. "Best-practice" might suggest that the Hi-Brite VRD could have been utilised to assess the position of Tutor(A) at the time that Tutor(B) flight called downwind; however, the ADC was unable to do this as the Tutor does not paint consistently on primary radar. Moreover, it is also reasonable to argue that the ADC should have expected that Tutor(B) flight would sequence itself with the existing visual cct traffic, given that he was aware of the number of ac within the cct.

This Airprox has highlighted that the provision of more specific cct TI to the pilot of Tutor(B), on the positions of all ac operating within the cct, may have facilitated his integration and thus mitigated against this Airprox. However, the details of regulation pertaining to this are not well known nor, seemingly, practised within the mil ATM community. Moreover, the examples given in CAP413 of phraseology to be used for visual joins only include guidance for joins through the O/H and initials, with only the latter example providing cct position information.

In conclusion, the pilot of Tutor(B) flew a join which compromised his ability to sequence his ac with the existing cct pattern, having not assimilated the cct state information passed to him which, as a result, reduced the separation between his ac and that of Tutor(A) significantly. Moreover, the ATM related safety barrier was compromised by the ADC's inability to sight Tutor(A) and to identify it on the Hi-Brite VRD.

RECOMMENDATION

BM SM has requested that MAA review the regulation regarding the provision of TI to ac joining the visual cct.

OUTCOME

RAF Benson has instigated a requirement for Tutor ac operating within the RAF Benson visual cct to squawk on SSR.

HQ AIR (TRG) comments that whilst there is a paucity of regulation of cct procedures within the MRP and ANO, there is much sensible guidance within the Take-off, Circuit, Approach and Landing chapter of the Airmanship section of AP 3456 (Vol 5-2-1-2 pages 6-8). This states:

> "To reduce congestion and the risk of collision, aircraft should enter the airfield circuit in a planned and systematic manner. To achieve this, a standard circuit procedure is taught."

Circuit joining procedures detailed in the AP aim to allow ac to join 'without causing any disturbance to other circuit traffic' but they are not totally prescriptive. In this case the standard joining procedures were not followed, but the plan to join "wide" downwind should still have been safe had it been flown sufficiently wide to remain clear of any potential cct traffic. The AP goes on to emphasise the importance of lookout during any join, but it is also made clear that the standard joins are designed to facilitate good lookout, which remains the primary means of avoiding collisions in the visual cct.

The execution of Tutor(B)'s non-standard plan did not provide enough separation to allow an effective lookout to be carried out. Equally, the solo student in Tutor(A) does not appear to have assimilated Tutor(B)'s intentions or his potential as a threat; indeed, he is likely to have been approaching from high and behind. Events conspired to create a false impression for Tutor(B) pilot of the position of the cct traffic, thus removing another potential means of avoiding this incident. The

inability of the controllers and supervisors in the tower to see both ac removed another mitigation, as did the lack of a timely downwind call from Tutor(A) flight, and the lack of consistency over the use of IFF and TAS. In the sure knowledge that these safety measures are not infallible, emphasis on lookout at all stages, in order to discharge pilots' responsibilities for avoiding collisions, must be emphasised. The use of standard joining procedures can only aid lookout but Airfield Operators are also free to be more directive about joining procedures in their station flying order books (and AIP entries) if they so wish.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Tutor(B) crew had requested to join 'high and wide' downwind and was told by ATC of 2 ac in the cct: Tutor(A) and a helicopter departing. Had the pilot of Tutor(B) positioned the ac high and wide this would had allowed the crew to see other ac that were in the visual cct during their descent. However, the radar recording revealed Tutor(B) tracking just 0·5nm E of the aerodrome before fading O/H the normal Tutor cct. The Tutor(B) crew did not assimilate the cct state information as they reported seeing the helicopter but did not mention the other ac, Tutor(A), 'in' the cct. After calling 'downwind', the ADC passed inaccurate TI to Tutor(B) crew advising that there was *"one ahead",* Tutor(C) flight that had, shortly before, declared its intention to join for a straight-in approach. ADC was cognisant of Tutor(A) being in the cct but could not see it when Tutor(B) crew called *"downwind",* so he had moved Tutor(B) up the sequence order. Meanwhile Tutor(A) pilot had been unable to make his call downwind, owing to frequency congestion, and had not assimilated Tutor(B)'s presence or intentions from the RT exchanges. Military Members agreed that when Tutor(B) flight called for join, the ADC should have given it specific TI on the position of cct traffic to help build the pilot's SA. Tutor(B) crew was unaware of Tutor(A)'s position but was responsible for integrating safely into the cct. Members agreed that Tutor(B) crew had not discharged their responsibilities and their non-standard join placed Tutor(B) into conflict with Tutor(A) causing the Airprox.

Turning to risk, Tutor(A) pilot only saw Tutor(B) when late downwind, immediately prior to making his position report, as it was behind his ac in his 4 o'clock. Tutor(B) student saw Tutor(A) and alerted his instructor to its presence, in their 11 o'clock low. Tutor(B) instructor manoeuvred his ac and after visually acquiring Tutor(A), he turned sharply L to pass behind it before following it in the cct to land. The Board agreed that this sighting and subsequent robust avoiding action taken by Tutor(B) flight had been enough to prevent the ac colliding; however, the 2 Tutors had passed in such close proximity that safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: In the absence of specific TI, Tutor(B) crew conducted a non-standard join and did not integrate safely into the cct pattern.

Degree of Risk: B.