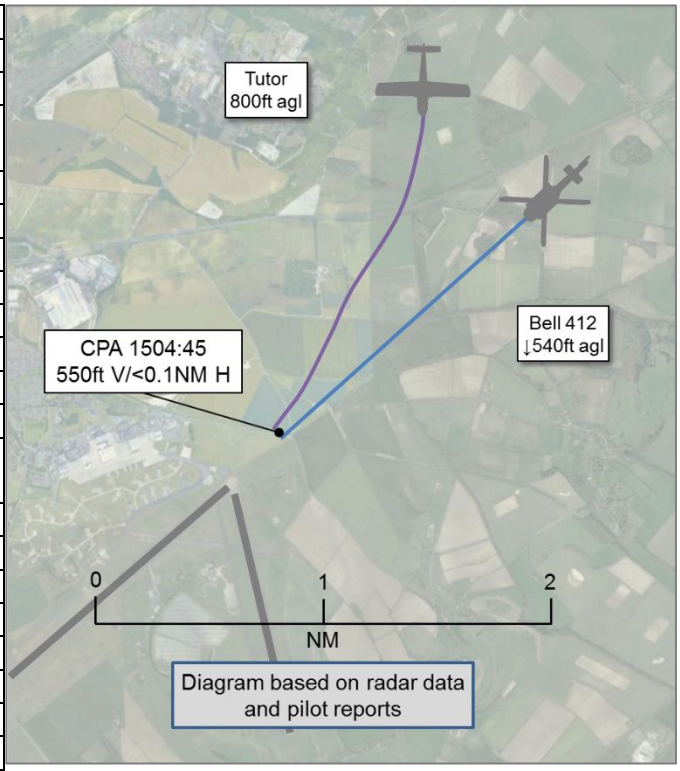
AIRPROX REPORT No 2019318

Date: 19 Nov 2019 Time: 1505Z Position: 5110N 00144W Location: Boscombe Down

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Bell 412	Tutor
Operator	Civ Comm	HQ Air (Trg)
Airspace	Boscombe Down ATZ	Boscombe Down ATZ
Class	G	G
Rules	IFR	VFR
Service	Traffic	ACS
Provider	Boscombe Down	Boscombe Down
Altitude/FL	630ft	1180ft
Transponder	A, C, S	A, C, S
Reported		
Colours	Black/Yellow	White
Lighting	Landing, Strobes	Landing, Strobe, Navigation
Conditions	VMC	VMC
Visibility	25km	
Altitude/FL	400ft	800ft
Altimeter	QFE	QFE
Heading	231°	231°
Speed	80-90kt	80kt
ACAS/TAS	TAS	TAS
Alert	TA	TA
Separation		
Reported	400ft V/0m H	200ft V/NK H
Recorded	550ft V/<0.1NM H	



THE BELL 412 PILOT reports being on an instrument approach (PAR) to RW23 at Boscombe Down, expecting to go-around for a further radar approach. The handling pilot was in the right-hand seat under an instrument visor. In the latter stages of the approach (at an estimated 500ft QFE), visual circuit traffic was called by ATC as a Tutor going-around at circuit height and they were asked if they were visual. The Tutor was identified by the flying and non-flying pilots in its base turn, to their right, and they called that they were visual. They were concerned by its flightpath and a TAS alert sounded at some stage. The Tutor continued the turn and established on the approach to RW23 only slightly ahead of them and above, maintaining height. At 80-90kts IAS, they had overtake on the Tutor and were now beginning to underfly it and, to keep visual with it, they were having to use the roof transparency. At this stage in their approach they had limited scope to decelerate (flying on instruments) and had too much energy to land on the threshold without making an aggressive manoeuvre. They were also mentally expecting a go-around for a further radar approach. Uncertain of the Tutor's intentions, and losing visual with it as it passed directly above, the pilot elected to remain predictable by maintaining his flightpath along the runway, and he communicated his intent to remain low-level (sub-200ft) until the upwind threshold. He only intended to climb once he and the non-flying pilot were certain that they were clear of conflict. This resolution worked, but was uncomfortable to fly, especially as they lost visual on the traffic behind and above them. It should be noted that, due to the positioning and speed of the conflicting aircraft and the timing of the situation, had the pilot gone-around at decision height (normal action) or carried out a missed approach procedure (due to the unusual situation), there would have been an extremely high likelihood of collision. The pilot opined that the circumstances surrounding this occurrence will no doubt be complicated and he has deliberately omitted paraphrasing radio calls and ATC clearances because he cannot be 100% sure of all of them, given the pressing nature of the conflict at the time. However, he arrived in the final phases of an instrument approach under an IF visor that restricted his vision, directly in conflict with visual circuit traffic where the normal go-around procedures would have caused

an Airprox. A similar situation arose 1 hour earlier between a Tutor and a Squirrel helicopter that was also submitted as an Airprox [UKAB Note – Airprox 2019319]. Since arriving at Boscombe Down in January 2016, this is not the first time he has been in conflict with the visual circuit at the bottom of the approach, despite it being identified by ATC, particularly traffic on finals for RW05/23N, with which he has found himself conducting a parallel approach in the past due to differing approach speeds. Even if northern circuit traffic is in visual contact with him, he finds that visual traffic tends to fly uncomfortably close for the IFR pilot, often in a belly-up attitude where, in his opinion, it is unlikely that the visual traffic can maintain visual contact. Given the nature of instrument approaches is such that the IFR aircraft does not have to be on the runway centreline, it is possible to 'legally' fly within the approach to RW05/23N or the channel on the south-side. The pilot wondered whether VFR pilots in the northern circuit and ATC account for this.

The pilot assessed the risk of collision as 'High'.

THE TUTOR PILOT reports that, while conducting a low-level circuit consolidation syllabus sortie, he turned downwind and heard radar traffic called at 7.5 miles. As he had just had another close encounter with rotary traffic on an instrument approach, he opted to go-around at light-aircraft circuit height (800ft) as he had before, noting that radar traffic was not visually sighted neither was it on the TAS because the range was approximately 10NM. He conducted his checks as normal, while scanning the TAS and maintaining a visual lookout. However, despite his best efforts, he was still unable to make visual contact with radar traffic despite it now showing on the TAS. He reported to ATC that he was not visual as he made his level upwind turn to RW23. Approximately 2/3 of the way through his upwind turn, he established visual contact with a Bell 412 in his 8 o'clock. It appeared to be below and behind him as he levelled out of his turn. Noting that a collision risk was present, he requested permission to climb to 1000ft above runway track in order to increase vertical separation from the Bell 412. After a brief delay, ATC cleared him for a glide circuit, the procedure for which included a climb to 1000ft, preparing for a climbing upwind turn to 1500ft. He then climbed to 1000ft above the runway as per the glide circuit procedure.

The pilot assessed the risk of collision as 'Low'.

THE TUTOR PILOT'S SUPERVISOR reports that he flew the previous syllabus sortie with the Tutor captain involved in this incident and was observing his solo from the ATC tower. MOD Boscombe Down is surrounded by ranges to the north and these ranges particularly affect RW23 and prevent Tutor aircraft extending downwind, while maintaining the standard downwind spacing. For this reason, students are briefed not to extend downwind so as not to enter the range. Whilst an instructor might consider an orbit, such activity is not recommended for students, particularly since another Tutor in the circuit could make this a hazardous option. Helicopters operate south of the main runway with no RT; for this reason there is no dead-side at Boscombe Down. 'The Channel', a small gap between the main runway and the helicopter operations south-side, does exist to allow faster aircraft to overtake slower aircraft, but not for slow aircraft to use in a go-around. At the time of the incident, the Tutor captain had been made aware of approaching instrument traffic and he had made the decision to go-around at circuit height. Part of the EFT syllabus includes a 'Safe Circuits' mass brief. This brief was given on 4th November 2019 and emphasized the dangers of turning finals towards instrument traffic when not visual. The student pilot made, the supervisor believes, a sensible decision to go-around at circuit height rather than continue towards the instrument traffic. He was not visual with the instrument traffic for the majority of the time when initiating the go-around; however, the conditions were hazy and extending downwind to visually acquire the instrument traffic is not recommended at Boscombe Down due to the reasons listed above. He viewed the go-around from the ATC tower and it appeared that the Tutor pilot maintained approximately 800ft. His view from the tower meant it was not possible to judge lateral distance from the runway; however, vertical separation was judged to be close to 500ft. He understands that the decision to submit an Airprox is purely subjective, however, from his view from the Tower, at no point did he consider there was a risk of collision with the flightpaths involved. The Tutor pilot, with low experience (20 hours), conducted a pre-emptive go-around to remain clear of instrument traffic. Notwithstanding that he was mostly not visual, he feels that the Tutor pilot's actions were consistent with his training so far. He maintained a predictable flightpath and informed ATC that he was not visual. He was aware of the previous aircraft declaring an Airprox earlier in the sortie. However, from his point

of view, at least 500ft separation had been maintained and the student had not made any obvious errors. As such, he did not see any reason to force him to land off the next circuit. In hindsight, the fact that the Tutor pilot had heard the declaration of the Airprox on the RT might have affected his state of mind and could have resulted in a lower performance for the remainder of the sortie. He was not plugged into the RT and presumed the Airprox had been transmitted on the Talkdown frequency.

THE BOSCOMBE DOWN TALKDOWN CONTROLLER reports that the talkdown for the [Bell 412 C/S] was conducted as any other talkdown and that it was standard throughout. After the 4-mile clearance, the phrase "*Tutor going-around circuit height*" was relayed to the pilot and the Tower controller simultaneously.

The controller perceived the severity of the incident as 'Low'.

THE BOSCOMBE DOWN TOWER CONTROLLER reports that there was a Tutor in the circuit and a Bell 412 inbound on radar to conduct a low-approach and then further approaches. The Tutor climbed out from an approach and the pilot said he would be going-around at circuit height. At 4NM, clearance was given for the Bell 412 to 'Low Approach, one in, north-side'. A transmission was made '*Bell 412, 4 miles, Low-Approach, Further*' and the Tutor pilot reported that he was going-around at circuit height. The Talkdown controller was informed via the Radar Clearance Line of 'Tutor going around circuit height'.

The controller perceived the severity of the incident as 'Low'.

Factual Background

The weather at Boscombe Down was recorded as follows:

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METAR EGDM 191520Z 14008KT 9999 FEW015 BKN040 BKN220 07/06 Q1014 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

The Bell 412 was conducting multiple PAR approaches to RW23 at Boscombe Down, with the pilot in the right-hand seat operating under an instrument visor in receipt of a Traffic Service from Boscombe Talkdown. The Tutor was a solo Elementary Flying Training student conducting circuit flying in VFR conditions and receiving an Aerodrome Control Service from Boscombe Tower.

The Tutor pilot reported that, as they turned downwind, they were informed of instrument traffic (the Bell 412) at 7.5NM ahead of them and, because extending downwind or orbiting is prohibited for students at Boscombe Down due to local airspace constraints, there was no option for the Tutor pilot except to conduct a go-around at circuit height (800ft). The Tutor pilot reported not being visual with the Bell 412 until approximately 2/3 of the way through their upwind turn. Once visual with the Bell 412, the Tutor pilot requested permission to climb to 1000ft to increase separation.

The Bell 412 pilot reported that they were informed that the Tutor was conducting the go-around and both pilots were visual with the Tutor on its base turn. The Bell 412 was conducting a low-approach with the intention of conducting further instrument approaches and, at decision height, was visual with the Tutor almost directly above them and therefore elected to delay the climb for their next approach.

Figure 1 shows the Bell 412 (red circle) at 1.7NM from the runway threshold, in receipt of a clearance, aware of and visual with the Tutor (green circle). This is the first point at which the Talkdown controller would have seen a radar return on the Tutor (although he was aware that it was conducting a go-around).

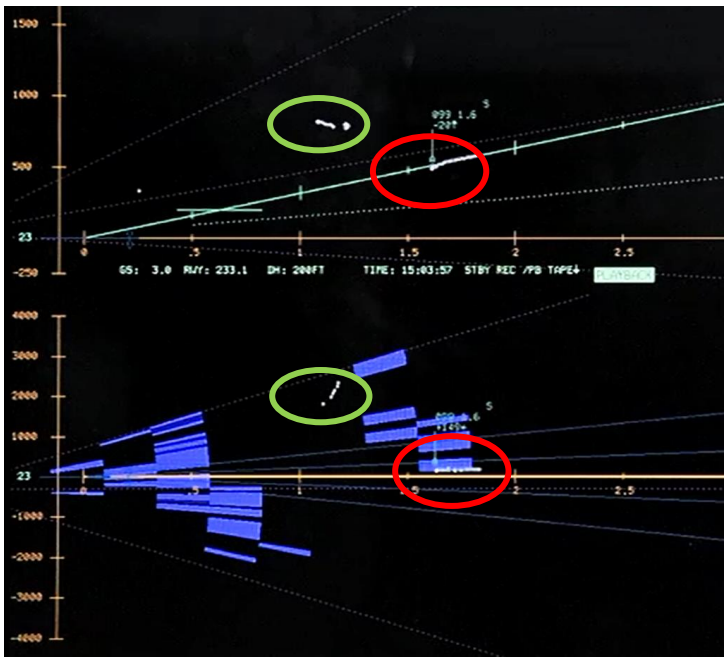


Figure 1 – Tutor first shows on PAR

The Tutor radar return disappeared from radar (in elevation) shortly after this and did not reappear until the Bell 412 was 0.75NM from touchdown and approaching decision height. The Bell 412 pilot reported being visual with the Tutor throughout.

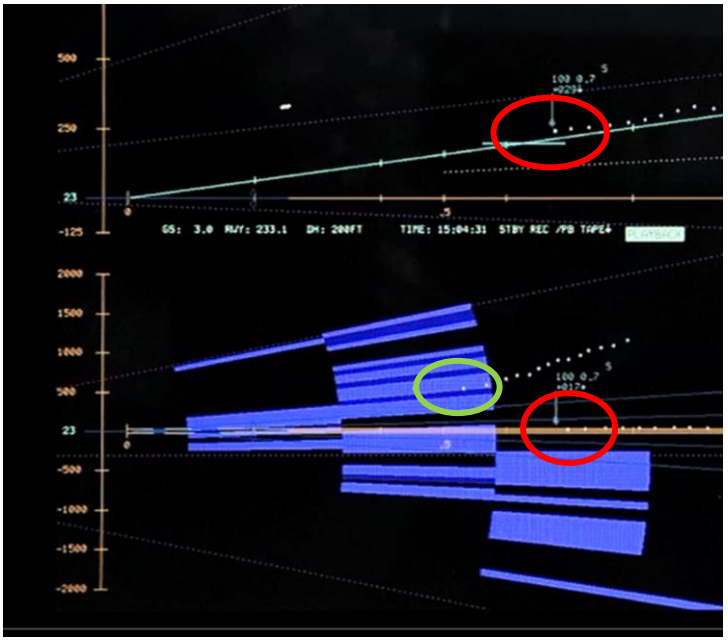


Figure 2 – B412 approaching decision height

The Bell 412 pilot reported not initiating a climb at decision height due to the proximity of the Tutor, and this is shown on the radar replay. The last point both aircraft show on radar gives a CPA of 0.1NM and 550ft, although allowing the replay to run-on shows a lateral separation of 200ft.

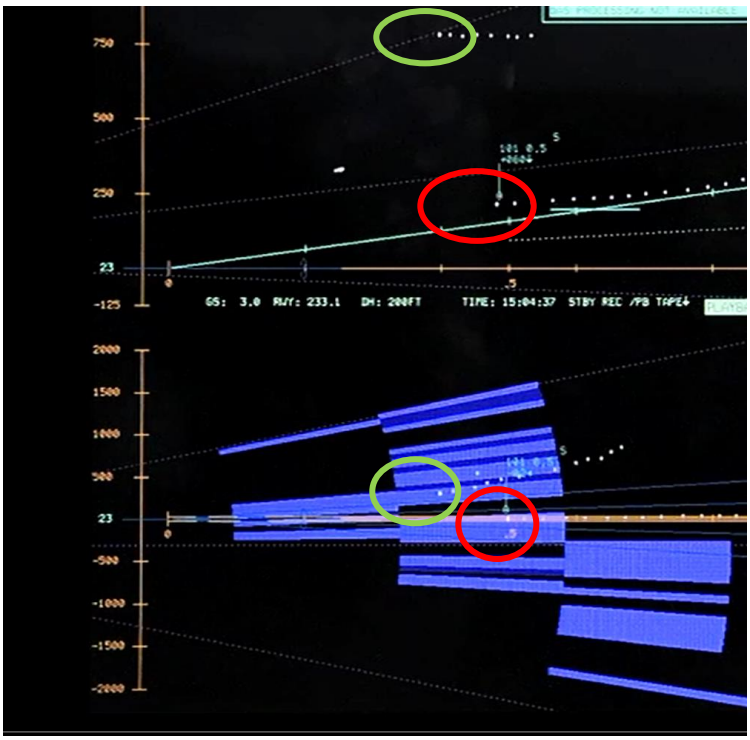


Figure 3 – Radar CPA

Appropriate liaison calls were conducted between both controllers concerned, and it was not until the Tutor pilot turned upwind that the Tower Controller was aware that the Tutor pilot was not visual with the Bell 412. Notwithstanding, it is evident from the reports submitted by the pilots that they were aware of each other and, in the case of the Bell 412 pilot, was visual with the Tutor as it turned onto base leg.

UKAB Secretariat

The radar trace from the PAR has been used to deduce the ground track of both aircraft as depicted in the diagram at the top of page 1 of this report. The Bell 412 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 hazard.[1] 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.[2]

Occurrence Investigation

QinetiQ/MOD Boscombe Down

[The Bell 412] was crewed with two experienced military pilots from RWTES[3] flying under a QCFO[4] Specialised Operation and the ANO CAP 393 - Section 145 exception. As part of routine Continuation Training the crew was conducting an instrument approach to RW23. [The Tutor] was in the circuit conducting circuit consolidation training to RW23.

Figure 4 below shows the vertical and horizontal approach to RW23; [the Bell 412] (identified in green) can be seen on its instrument approach tracking the vertical and horizontal glidepaths, at 400ft and 1.25NM and [the Tutor] (identified in yellow) at 800ft circuit height and approximately 0.5NM ahead, turning in front of [the Bell 412] to align with RW23.

[1] SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.
[2] SERA.3225 Operation on and in the Vicinity of an Aerodrome. MAA RA 2307 paragraph 15.
[3] Rotary Wing Test and Evaluation Squadron.
[4] QinetiQ Civil Flying Organisation.

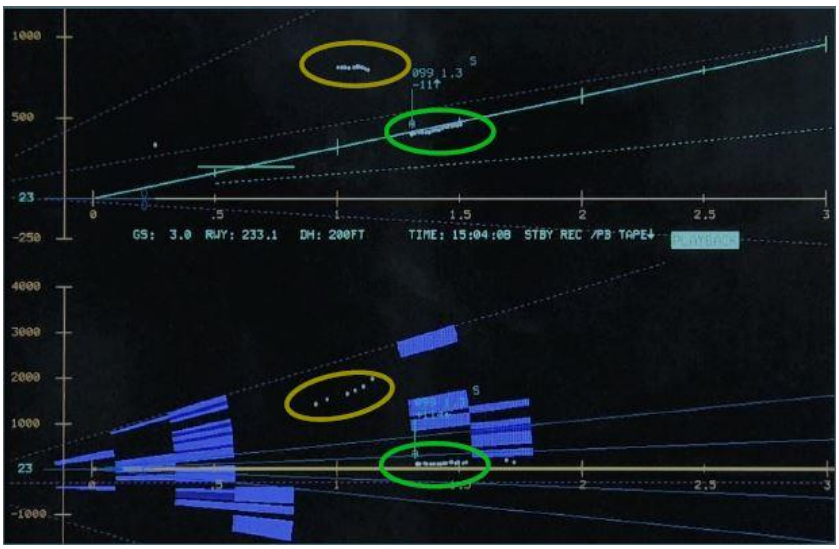


Figure 4

The 3FTS 'Safe Circuits' training module lists the "Dos and Don'ts" when operating within the circuit; "do not turn in front of declared traffic" is a specific item. When questioned on this, [The Tutor pilot] stated they were concerned about impinging into the Salisbury Plain Danger Area if they went to the limit of their downwind leg. Students in 6FTS are taught to utilise distinctive features as ground identification markers, such as trees, buildings and roads etc. These features are used to inform the initiation of actions in flight, such as turn onto base leg. As a low-hours student, missing these markers could potentially make the situation worse by being out-of-routine and in an unknown position relative to their landing configuration.

During interview with [the Bell 412 pilot], they stated they did not know who was number 1 for landing and received no instruction or communication from ATC post-notification of traffic. In discussion with [the Bell 412 pilot], there was a distinct feeling of having been delivered into a situation of conflict and then being left to resolve it themselves.

[The Bell 412 pilot] believes there is an expectation from ATC, and other traffic, of a perfect centreline approach to the RW threshold when individuals are conducting an instrument approach, or that as they are training approaches they can simply revert to a visual approach when traffic is declared. This is not always the case and, depending on other factors including weather conditions and how well the approach is flown, the aircraft could be displaced vertically and/or laterally.

During interview with [the PAR controller], both events were discussed as well as procedures and practices operated by ATC. [The PAR controller] stated Boscombe Down was the third-busiest RAF station in the UK and probably one of the more complex in terms of different users. Through further questioning, [the PAR controller] discussed ATC procedures and practices and how instrument and visual traffic are not treated any differently within the circuit. [The PAR controller] believed that, because [company] call-signs were being used, the operations were under military rules. However, this is incorrect as call-signs transfer with the individual crew member; this does bring the continued validity of call-sign use over aircraft tail number into question.

During the interview, many ATC operational elements were briefed and referenced back to the Flying Order Book (FOB). However, in some instances the written procedure does not fully cover the practices stated and currently being operated. This was mentioned by [the PAR controller] and [the Tower controller] during discussions.

[The Tower controller] was asked about how students and inexperienced pilots are handled by Controllers; ATC does not have any written procedures to handle these individuals any differently; however, they understand the issues and additional complexities this brings and try to support where they can, but it is down to the experience and discretion of the controller.

In his report, [the Tutor pilot] touches on the lack of a dead-side to the airfield. This was discussed with [the PAR controller] who stated that there was a dead-side to the airfield but only at 1200ft due to south-side airfield operations. They further went on to describe the use of 'The Channel', which is to be used at lower altitudes up to 500ft. This strip of airspace, running parallel to RW05/23 on the south-side, is kept clear for any aircraft to use in an emergency situation.

With the information available to them, all crews took what they believed to be the most appropriate action at the time in order to increase safety and avoid conflict; these actions followed current procedures.

Whilst the airspace at Boscombe Down is Class G, it is also a Military Air Traffic Zone (MATZ) and an Aerodrome Traffic Zone (ATZ); as such permissions from ATC must be sought to enable the flight to be conducted safely within the ATZ, and any instructions given to flight crews are to be followed. During the event, all controllers involved followed current ATC procedure; it is permissible in current procedure that additional instruction and control of the situation could have been provided in both events, however, the decision to provide this instruction is based on the experience of the individual controller.

The Flying Order Book Section A6-1.C details 'The Channel' and states "…This airspace should always be clear of aircraft; it can therefore be used by any aircraft in an emergency requiring a 'low-approach' or 'go- around' with a slower aircraft ahead...". In this event, the relative speeds of the different platforms were not significantly different enough to improve the outcomes had 'The Channel' been used by either party. There was no instruction to use 'The Channel' issued by ATC to any of the crews; the decision to use 'The Channel' was left to the individual crews, which could potentially lead to a situation where the pilots of both aircraft make the decision to move into 'The Channel', further increasing the risk of MAC. As a concept, 'The Channel' has real benefit when deconflicting fast-jet platforms from other traffic in the circuit, given the airspeed differentials involved. However, for anything other than fast-jet platforms, the aircraft are likely to be in a situation where vertical and lateral separation are within 500ft with the aircraft flying parallel to each other down the RW at subtly different airspeeds.

The procedures and practices in current operation allow for visual and practise instrument traffic to come together in close proximity with no external control applied to maintain safety levels during critical stages of their approaches.

Comments

HQ Air Command

The circumstances surrounding this Airprox are very similar to 2019319. This Airprox was subject to the same investigation and Duty Holder review as 2019319 and, as such, the following comments are intentionally almost the same as those for 2019319.

The Tutor pilot complied with the requirements of the relevant orders and, as the situation developed, had no option but to continue at circuit height and communicate their intentions over RT while looking out for the other aircraft. The Bell 412 pilot chose a sensible option in maintaining his flight path and remaining at low-level, rather than fly the low approach and continue into conflict with the Tutor. ATC did a good job in informing each aircraft of the other, aiding in their situational awareness. This Airprox serves to highlight the circumstances that can develop at an airfield where a VFR circuit pattern is combined with an instrument approach pattern, with no dead-side and when neither pattern has priority over the other in these specific circumstances.

The QinetiQ-led investigation into this Airprox made six recommendations, for QCFO, the Aerodrome Operator, Aerodrome Individual Operator Units and the Tutor Operating Organisation, to reduce the likelihood of a similar occurrence in the future. The establishment of a Boscombe Down User Community, as recommended, should increase collective awareness of the complexities and constraints of each individual unit operating at Boscombe Down. A recommendation to review

the procedures surrounding practise instrument approaches within the visual circuit at Boscombe Down is welcomed.

Summary

An Airprox was reported when a Bell 412 and a Tutor flew into proximity in the Boscombe Down circuit at 1505hrs on Tuesday 19th November 2019. The Bell 412 pilot reports operating under IFR in VMC and the Tutor pilot was operating under VFR in VMC; the Bell 412 pilot in receipt of a Traffic Service from Boscombe Down Talkdown and the Tutor pilot in receipt of an Aerodrome Control Service from Boscombe Down Tower.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities. Relevant contributory factors mentioned during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors table displayed in Part C.

Due to the exceptional circumstances presented by the coronavirus pandemic, this incident was assessed as part of a 'virtual' UK Airprox Board meeting where members provided a combination of written contributions and dial-in/VTC comments. Although not all Board members were present for the entirety of the meeting and, as a result, the usual wide-ranging discussions involving all Board members were more limited, sufficient engagement was achieved to enable a formal assessment to be agreed along with the following associated comments.

The Board first considered the actions of both pilots and members quickly agreed that, although the IFR approach had had priority for use of the runway, it had been for the Bell 412 pilot to integrate with the Tutor already established in the visual circuit. The Board discussed the particular constraints at Boscombe Down with respect to airspace and parallel runway operations with no dead-side, and concluded that the local procedures for the integration of instrument approaches with visual circuit traffic were lacking in some respects and had therefore contributed to the Airprox (**CF2**). Notwithstanding the fact that both pilots had been acting in accordance with extant procedures, members felt that, given the constraints on the Tutor pilot (his only option had been to go-around at circuit height), the Bell 412 pilot's decision to continue with his approach on sighting the Tutor had placed his aircraft in a situation where he had essentially become trapped beneath the Tutor (**CF3**), had become concerned by its position relative to his flight-path (**CF6**) and, therefore, limited his options for resolution of the conflict. For his part, members considered that the Tutor pilot had acted in accordance with his training when, having received Traffic Information and a TAS warning of the presence of the Bell 412 (**CF4**) and having been unable to acquire the aircraft visually (**CF5**), he had gone-around at circuit height.

Turning to the actions of the controllers involved, the Board heard from a military member that the integration of practise IFR approaches and visual circuit traffic is commonplace at military airfields. However, Boscombe Down has its own particular constraints which mean that deconfliction options that are used at other military airfields are not available at Boscombe Down – in particular, there being no dead-side. The Board was heartened to hear that, as a result of this Airprox and another incident on the same day (Airprox 2019319), the integration procedures at Boscombe Down were being reviewed. The Board considered that the Tower controller had not had the awareness that the Tutor pilot was not visual with the Bell 412 (**CF1**) and had therefore not felt it necessary to issue further instructions to the Tutor pilot. Nevertheless, members agreed that the controllers involved had acted in accordance with extant procedures and that there was little more that either of them could have done to prevent the Airprox occurring.

When considering the risk of this event, the Board took into account the fact that the Bell 412 pilot had been visual with the Tutor in its base turn and that this had effectively removed any risk of collision. However, members felt that the constraints of the visual circuit pattern left pilots in that pattern without the options of extending downwind/upwind or, in the case of student pilots, conducting an orbit

downwind, which degraded the safe integration of IFR and VFR traffic. Consequently, the Board assigned a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2019318		
CF	**Factor**	**Description**	**Amplification**
	Ground Elements		
	• Situational Awareness and Action		
1	Contextual	• Situational Awareness and Sensory Events	Generic, late, no or incorrect Situational Awareness
	Flight Elements		
	• Regulations, Processes, Procedures and Compliance		
2	Organisational	• Flight Operations Documentation and Publications	Inadequate regulations or procedures
	• Tactical Planning and Execution		
3	Human Factors	• Insufficient Decision/Plan	Inadequate plan adaption
	• Electronic Warning System Operation and Compliance		
4	Contextual	• ACAS/TCAS TA	TCAS TA / CWS indication
	• See and Avoid		
5	Human Factors	• Monitoring of Other Aircraft	Non-sighting or effectively a non-sighting by one or both pilots
6	Human Factors	• Perception of Visual Information	Pilot was concerned by the proximity of the other aircraft

Degree of Risk: C

Safety Barrier Assessment[5]

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

Ground Elements:

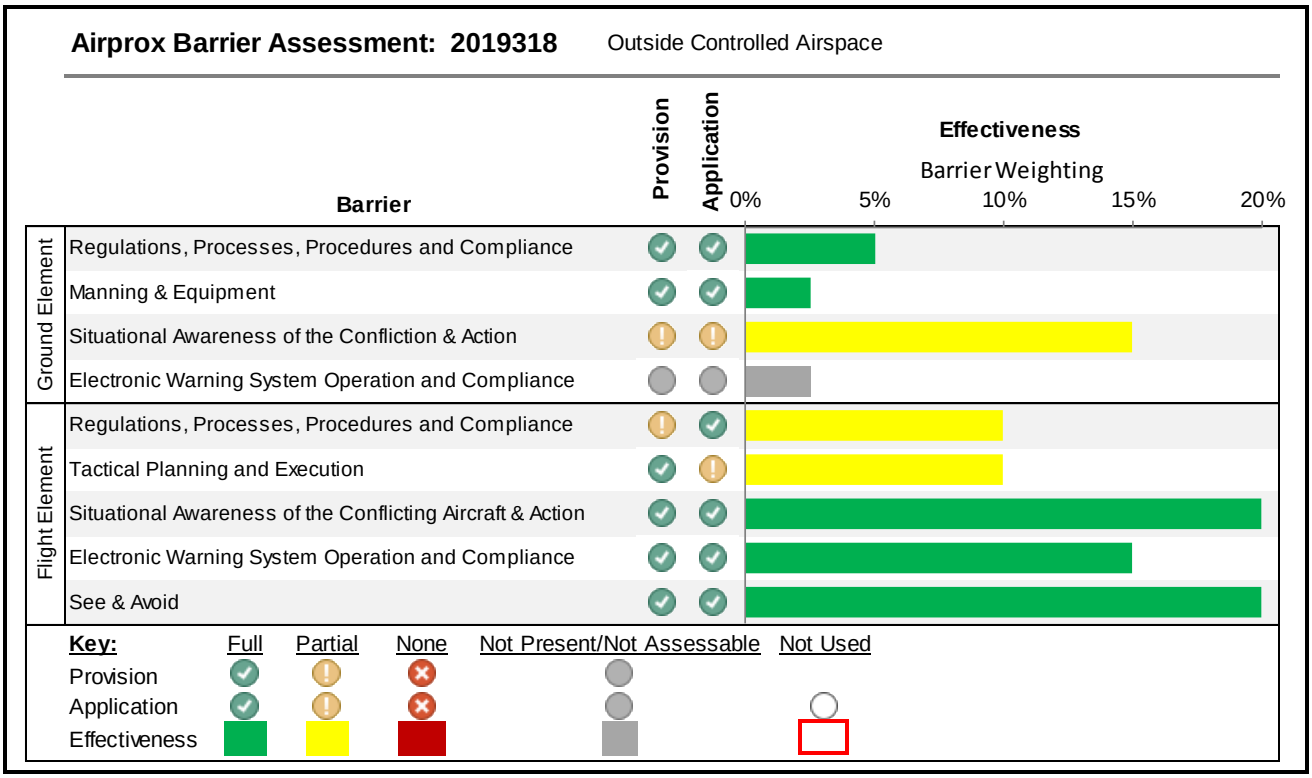
Situational Awareness of the Confliction and Action were assessed as **partially effective** because the Tower controller was unaware that the Tutor pilot was not visual with the Bell 412.

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the local procedures at Boscombe Down do not fully account for the integration of practise instrument approaches with visual circuit traffic.

Tactical Planning and Execution was assessed as **partially effective** because the Bell 412 pilot, having been informed of the Tutor's presence by ATC and after becoming visual with the Tutor, continued his approach to the point where he underflew the Tutor.

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


Airprox Barrier Assessment: 2019318
Outside Controlled Airspace
Barrier
Provision
Application
Effectiveness
Barrier Weighting
0%
5%
10%
15%
20%
Ground Element
Regulations, Processes, Procedures and Compliance
Manning & Equipment
Situational Awareness of the Confliction & Action
Electronic Warning System Operation and Compliance
Flight Element
Regulations, Processes, Procedures and Compliance
Tactical Planning and Execution
Situational Awareness of the Conflicting Aircraft & Action
Electronic Warning System Operation and Compliance
See & Avoid
Key:
Full
Partial
None
Not Present/Not Assessable
Not Used
Provision
Application
Effectiveness