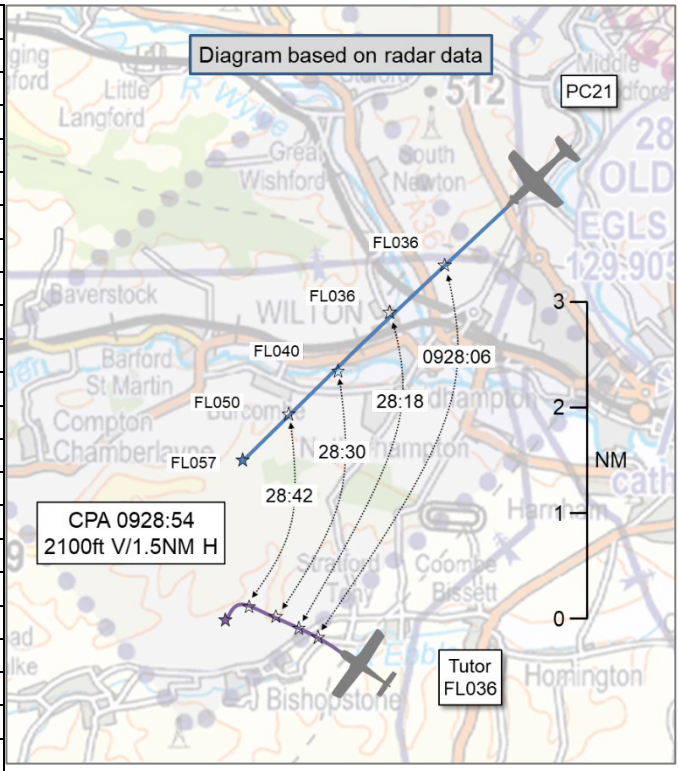
AIRPROX REPORT No 2023145

Date: 27 Jun 2023 Time: 0929Z Position: 5103N 00154W Location: 8.5NM SW Boscombe Down

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	PC21	Tutor
Operator	MoD ATEC	HQ Air (Trg)
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Traffic
Provider	Boscombe	Middle Wallop
Altitude/FL	FL057	FL036
Transponder	A, C, S+	A, C, S
Reported		
Colours	White/blue	White/blue
Lighting	HISL, nav	HISL, landing, nav
Conditions	VMC	VMC
Visibility	5-10km	NR
Altitude/FL	3500ft	NR
Altimeter	QFE (NK hPa)	QNH (NK hPa)
Heading	230°	NR
Speed	190kt	NR
ACAS/TAS	TCAS I	TAS
Alert	TA	NR
Separation at CPA		
Reported	0ft V/3NM H	Not reported
Recorded	2100ft V/1.5NM H	



THE PC21 CAPTAIN reports conducting a training sortie with a student test-pilot PF in the front seat and flight-test instructor Captain in the rear seat (PM). Prior to take-off they received a 3500ft QFE height restriction. After take-off they requested a Traffic Service. Whilst levelling at 3500ft they were given Traffic Information on a contact in the 11 o'clock position, 200ft below, climbing, at a range of 7NM. During this period they had not been given 'own navigation' and were therefore restricted to runway track and altitude. The conflicting traffic could be seen on TCAS as it levelled co-altitude at 5NM and directly in the 12 o'clock position. They asked ATC for a climb but there was no reply so, at 3NM separation, the Captain instructed the student to start an immediate full-power climb. They transmitted to ATC that they were climbing for a traffic confliction but there was no reply. Passing about 5800ft in a climb they received an 'immediate avoidance climb' from ATC, and subsequently Traffic Information on a pair of Typhoons some 7000ft above and behind by 6NM. During their manoeuvre they received a TA warning from the TCAS. Whilst they were in receipt of a Traffic Service, and traffic avoidance responsibility rested with them, they were nevertheless departing with height and heading restrictions which resulted in a direct confliction with known traffic. Had they not taken avoiding action, the Captain believed they might have flown very close to the conflicting traffic.

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

THE TUTOR INSTRUCTOR reports conducting an elementary training flight. They were unable to recall details of that particular flight and, until notified by the UK Airprox Board, were unaware of anything untoward that may have occurred.

THE BOSCOMBE RADAR CONTROLLER reports the [PC21 pilot] was given take-off with a climb-out restriction of 3500ft QFE due to a pair of Typhoons that were [operating] in D123 and D125 and transiting through the climb-out lane not below FL050 [with a service from Boscombe LARS]. After identification and Traffic Service given, they called traffic that was 5 miles away, crossing left-to-right in

front and indicating similar level; this was crossing through the climb-out lane at 8 miles. At 3 miles the pilot then asked for a climb to get above; at this time the controller had not given 'own navigation' because they believed [the PC21's] track would have allowed them to pass behind the other aircraft. Off-frequency the controller was making sure the Typhoons would not be descending any time soon so they could issue a climb. The [PC21] pilot then came through and told them they were climbing to avoid the traffic. The controller then gave a climb into the block FL050-190 because the Typhoons were not descending and would not affect. As the pilot read this back they asked for a Deconfliction Service to which the controller gave them an avoiding action climb to FL070 to avoid the traffic in the climb-out lane, which by this time had turned back south and was 3 miles and 2000ft below. After the pilot commented on the close call they asked for a Traffic Service and continued with their sortie. With the benefit of hindsight, the controller believed they could have given more situational awareness to the pilot as to the Typhoons, which were not below FL050 and which was why they were restricted to [3500ft]. They could also have given a turn to the south to avoid this situation altogether.

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

THE BOSCOMBE SUPERVISOR reports they were dealing with a separate issue at the time [of the Airprox and] so did not directly witness the event. [They felt] the comments of the controller covered the event well and potentially how differing actions could have influenced the outcome. With fast-jets in the area the air picture was particularly dynamic [which] sadly does not occur as often these days and therefore experience of dealing with situations like this can be lacking. A previous trend had highlighted that vertical separation was the preferred method of separation used by most controllers and a Standards Bulletin was issued to highlight the value and effectiveness of lateral separation, which this event further highlighted.

THE MIDDLE WALLOP APPROACH CONTROLLER reports they did not recall the event but reviewed the recordings and established the following: the Tutor pilot was conducting general handling in Class G airspace to the southwest of Middle Wallop, VFR and in receipt of a Traffic Service. At approximately 0927 the controller passed Traffic Information on traffic north, 3 miles, tracking southwest indicating similar level (FL036 indicated). The Tutor pilot acknowledged the traffic and then, 5-6sec later, reported traffic in sight and that they were turning southbound. At this point the traffic was approximately 2-2.5NM from the Tutor, still tracking southwest and appeared to be climbing. The traffic subsequently passed north of the Tutor by 0.5-1NM now indicating 2500ft above (FL061). The traffic continued to climb and track away to the southwest. No Airprox was reported at the time on any Wallop frequency or subsequently via landline.

Factual Background

The weather at Boscombe was recorded as follows:

```
METAR EGDM 270920Z 26009KT 9999 FEW024 SCT060 BKN080 18/12 Q1022 NOSIG RMK BLU BLU=
```

Analysis and Investigation

Military ATM

An Airprox occurred on 27 Jun 23 at approximately 0930Z, in the Boscombe Down RW23 departure lane. The PC21 was conducting a test pilot training sortie in receipt of a Traffic Service from the Boscombe Down Radar controller. The Tutor was conducting a grading exercise flight in receipt of a Traffic Service from Middle Wallop Approach.

Utilising occurrence reports and information from the local investigation, outlined below are the key events that preceded the Airprox. Where available they are supported by screenshots to indicate the positions of the relevant aircraft at each stage. The screenshots are taken from NATS Radars only and as NATS Radars are not available to the controllers they may not be entirely representative of the picture available.

As had occurred the previous day, a pair of Typhoons was operating in the vicinity of Boscombe Down in support of an Air-Land Integration exercise at Salisbury Plain Training area. As part of a local agreement, the Typhoon pilots were conducting oval patterns entering and exiting the Salisbury Plain Training Area through the RW23 departure lane (Figure 1) operating in the block FL050–FL190. Whilst working with ground personnel, the Typhoon pilots were also in receipt of a Traffic Service from Boscombe Down Lower Airspace Radar Service. To ensure vertical separation between the Typhoons and RW23 departures a standing climb-out restriction of not above height 3500ft had been established for all departures. The Boscombe Down Radar controller responsible for the departure of the PC21 applied the climb-out restriction iaw this local agreement.

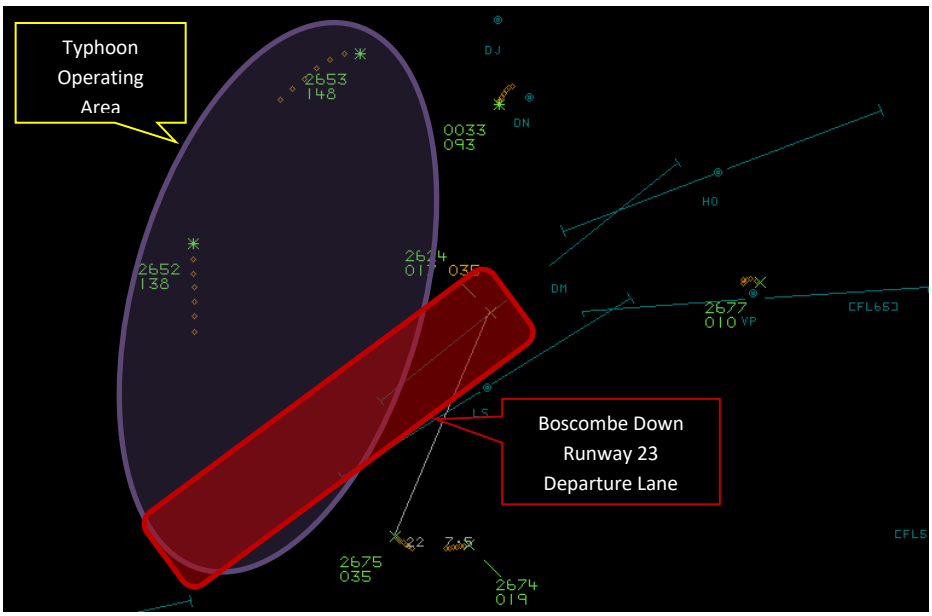


Figure 1. Position of Typhoon Operations

The PC21 departed Boscombe Down RW23 maintaining runway track climbing to 3500ft QFE. On departure the PC21 pilot reported passing 1400ft and re-confirmed the climb-out restriction. The Boscombe Down Radar controller identified the PC21, provided a Traffic Service and instructed the PC21 pilot to climb to height 3500ft.

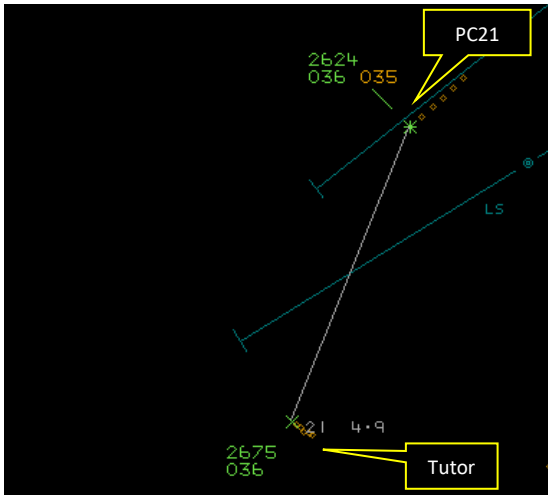


Figure 2 (09:27:48). Traffic Information provided to PC21 pilot (Separation: 4.9NM)

At 0927:48, the Boscombe Down Radar controller provided Traffic Information to the PC21 pilot on the Tutor *"traffic, left 11 o'clock, 5 miles, crossing left to right ahead, indicating similar level*". The PC21 pilot, responded with "*not sighted*".

At 0928:08, the PC21 pilot, now aware of the Tutor's position through both Traffic Information and TCAS, informed the Boscombe Down Radar controller that they could climb to resolve the confliction. This suggestion was not responded to by the Boscombe Down Radar controller, as simultaneously they were liaising with the Boscombe Down Lower Airspace Radar Service controller to ascertain the intentions of the Typhoon pilots.

At 0928:17, the PC21 pilot informed the Boscombe Down Radar controller that they were climbing following a pilot decision to resolve the confliction through an immediate full power climb.

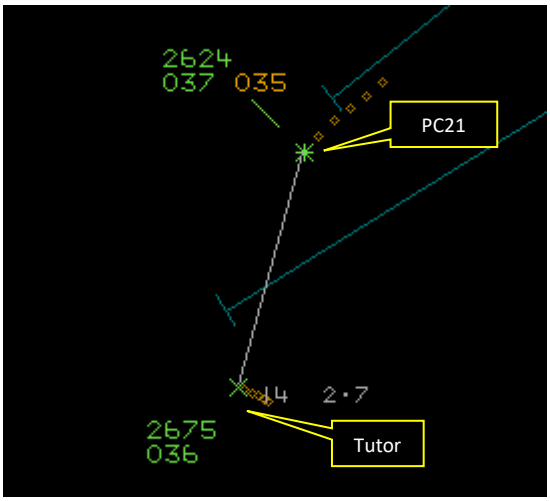


Figure 3 (0928:28). Traffic Information provided to PC21 pilot (Separation: 2.7NM)

At 0928:28, following confirmation of the Typhoon pilots' intentions, the Boscombe Down Radar controller provided the PC21 pilot with a climb into the operating block FL050–190. The PC21 pilot acknowledged the operating block and subsequently requested a Deconfliction Service.

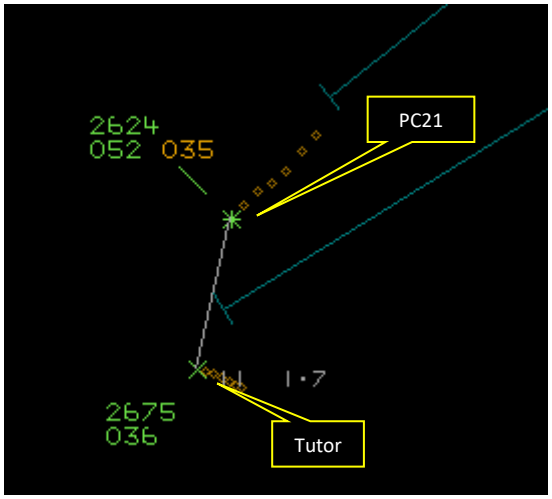


Figure 4 (0928:46). Avoiding Action issued to the PC21 pilot (Separation: 1.7NM)

At 0928:46, in response to the Deconfliction Service request the Boscombe Down Radar controller issued the PC21 pilot with an Avoiding Action climb, "*avoiding action climb immediately FL70, previously called traffic is south 3 miles manoeuvring, indicating 2000ft below*".

The local investigation conducted by MOD Boscombe Down identified the cause of the Airprox as a Loss of Safe Separation through an inappropriate heading/height restriction by the Boscombe Down Radar controller. Several BM related causal/aggravating factors were identified that were believed to have contributed to the Airprox:

1. The Boscombe Down Radar controller [did not] adequately update the pilot of the PC21 with an accurate traffic picture. This included a lack of justification for the climb-out restriction and

delay in response to the PC21 [pilot's] suggestion of a climb. The combination of these resulted in a diminished traffic picture for the PC21 pilot and ultimately confusion.

2. The Boscombe Down Radar controller was only recently endorsed and lacked experience to resolve a complex scenario with multiple conflictors present.

As a result of the local investigation Boscombe Down Air Traffic Control issued a Standards Bulletin highlighting the importance of lateral separation utilisation in addition to vertical separation. Additionally, the Airprox was both debriefed to the Boscombe Down Radar controller and discussed within the unit to emphasise the alternate separation options.

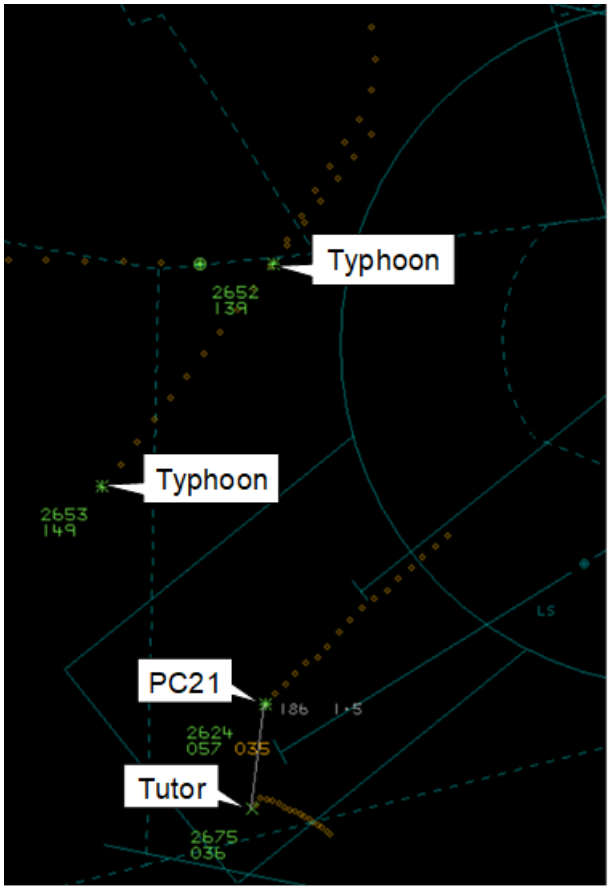
Analysis

Whilst the climb-out restriction provided a suitable procedural separation between the Typhoons and RW23 departures, it did significantly restrict the options for further vertical separation against other conflicting traffic. As identified in the local investigation, whilst the Boscombe Down Radar controller correctly identified the conflicting tracks of the PC21 and Tutor, and then subsequently provided Traffic Information, they were slow to provide a suitable deconfliction plan. The [subsequent] actions taken by Boscombe Down Air Traffic Control were suitable and will ensure lessons are learnt from a relatively complex scenario.

UKAB Secretariat

The PC21 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] If the incident geometry is considered as converging then the Tutor pilot was required to give way to the PC21[2].

At CPA, a Typhoon of the Typhoon pair was 4NM northwest of the PC21 (right 3 o'clock), tracking 215° at FL149, having rolled out of a right-hand turn about 1min beforehand, with the other Typhoon in 4NM trail, tracking 220° at FL139.



[1] MAA RA 2307 paragraphs 1 and 2.
[2] MAA RA 2307 paragraph 12.

Boscombe Down Occurrence Investigation

Background Narrative: Two Typhoons were operating in Salisbury Plain Training Area (SPTA), working with JTACs on the ground and receiving a radar service from Boscombe LARS. They were operating in a block between Flight Level (FL) 050 and FL190. Due to the nature of their exercise, they were flying circular patterns into SPTA, which meant they were crossing the climb-out lane for RW23. Therefore, a climb-out restriction of 3500ft QFE was in place. While they were cleared to operate between FL050 and FL190, they were only observed as operating around FL140 for the majority of their sortie.

Sequence of Events: Before departure [PC21 C/S] was passed a climb-out restriction of 3500ft QFE by the Aerodrome Controller (ADC). This was acknowledged and they were then given take-off clearance. Once airborne [PC21 C/S] switched to Boscombe Radar. On initial contact with Boscombe Radar, [PC21 C/S] was identified and given a Traffic Service as requested. The height restriction was not cancelled at that time. The Typhoons were operating high level around FL140 and FL150, but still cleared down to FL050 in their block. Approximately 47sec and 2 track miles after this initial contact, Traffic information was passed to [PC21 C/S], about the Tutor operating in the climb-out lane at 8NM from the Boscombe overhead. This was also displayed on the aircraft TCAS. After this Traffic Information was passed the controller began to liaise with the LARS controller, who was working the two Typhoons, in order to see if they were remaining high level and whether they could cancel the climb-out restriction of 3500ft QFE. The LARS controller sat next to the Radar controller and this was therefore not completed over the landline but verbally. 10sec after the initial traffic call and approximately 1 track mile later, [PC21 C/S] said they could climb above the previously reported traffic if required. The controller, still liaising with the LARS controller, did not reply and was waiting to see if they could cancel the height restriction. 9sec after this transmission and approximately 3NM away from the conflicting traffic, [PC21 C/S] broadcast that they were climbing above the traffic, therefore breaking both height and heading restrictions imposed on climb-out. While already in the climb [PC21 C/S] received a TCAS TA warning. As they were under a Traffic Service, ultimately the responsibility for avoidance of conflicting traffic remained with the pilot. 10sec after the above broadcast, the controller, having confirmed that the height restriction could be cancelled and the Typhoons were remaining high level, gave [PC21 C/S] a climb into their required operating block above the traffic and the climb-out restriction. After this [PC21 C/S] then requested a Deconfliction Service and was given an avoiding action climb to FL070 by the controller to avoid the conflicting Tutor. Once clear and established in the block [PC21 C/S] downgraded to Traffic Service and their sortie continued without further occurrence. Traffic Information was later passed about the two Typhoons and, while not relevant, was passed to increase situational awareness and to try and explain why the height restriction wasn't cancelled sooner. However, this only added to the ambiguity. As acknowledged by the controller, better situational awareness could have been afforded to the pilot, in passing the information about the two Typhoons, the block they were operating in and why the climb-out restriction was in place. Also, better positive control in giving a turn south to avoid the conflicting Tutor, while still keeping them below the height restriction, may have led to a more desirable outcome. As outlined by the Supervisor, the benefit of lateral separation over vertical separation had been issued in a Standards Bulletin and would continue to be monitored by the Standards Team. This was declared as an Airprox later, after a phone conversation between the pilot and the afternoon ATC Supervisor.

The Boscombe Down Occurrence Investigation identified the following cause and causal factors:

Cause: Inappropriate heading and height restriction from ATC, meaning pilot had to take own avoiding action against conflicting traffic, busting the height restriction. Aircraft under a Traffic Service and therefore pilot ultimately remains responsible for collision avoidance against conflicting traffic.
Mitigation/Local Action: The use of lateral against vertical deconfliction outlined in Standards Bulletin dated May 23. This has been re-affirmed to all controllers as a result of this occurrence. Extract from the Standards Bulletin below:

1. Lateral Separation for inbound traffic. Although stopping descent above conflicting traffic can be a viable CoA lateral separation should not be overlooked and can often be a safer and more efficient way to get ac inbound. Especially when recovering to Rwy05, Tutor traffic to the SW can be problematic. Asking Tutor traffic to be no further South than present position and vectoring West and South of these tracks could be a better recovery profile than risking Tutors climbing above initially observed level and a steep descent once clear of the Tutor traffic.

Causal Factor: Lack of communication from the controller to the pilot on the air picture at the time. Long pauses/no replies to the questions of the pilot, while fixated on liaising with the LARS controller, in order to cancel the climb-out restriction to solve the developing confliction rather than thinking of other ways to give deconfliction advice. Pilot was not aware of the air picture at the time, [which] led to ambiguity and confusion.
Mitigation/Local Action: As stated above in the Cause, use of lateral rather than vertical deconfliction outlined in a Standards Bulletin.

Causal Factor: Controller had only recently gained their Radar endorsement. One of the first few sessions where they were controlling solo. Fast-movers operating in SPTA have reduced in recent years and so has the experience in dealing with this situation and how it affects Boscombe departures. An unusual situation which can only be discussed in training sessions prior to gaining your endorsement, can be very different to doing it real life.
Mitigation/Local Action: Controller was de-briefed by the Supervisor at the time and later by the [standards officer] after listening to the tapes. With the benefit of hindsight, they realised what other methods could have been employed to make the occurrence less likely. This is reflected in their DASOR comments. The Standards Team continues to monitor and will publish anything else if necessary in future bulletins and has passed this information to the whole Squadron as a result.

Comments

HQ Air Command

This was subject to a Local Investigation and, whilst no formal recommendations were made, a Standards Bulletin was published, reminding controllers to consider lateral separation in addition to, or as an alternative to, vertical deconfliction. After this occurrence the climb-out restriction that was in place due to the Typhoons was removed as it was too restrictive to BDN aircraft on climb-out. A more appropriate restriction was put in place depending on the Typhoons' activities. The Typhoons operated in SPTA for the rest of the week and no further occurrences were reported. For the PC21 crew, this must have been a very uncomfortable situation in the cockpit. The crew attempted to gain SA on the conflicting traffic via ATC, but when this was not forthcoming they took immediate and appropriate action, based on their knowledge and perception of the situation at the time to resolve the confliction. In situations like this it is better to take action first and ask questions later, which this crew did.

Summary

An Airprox was reported when a PC21 and a Tutor flew into proximity 8.5NM southwest of Boscombe Down at 0929Z on Tuesday 27th June 2023. Both pilots were operating under VFR in VMC, the PC21 pilot in receipt of a Traffic Service from Boscombe Down and the Tutor pilot in receipt of a Traffic Service from Middle Wallop.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

Members first discussed the PC21 pilot's perception of the conflicting traffic and agreed that they could not have known that the Tutor pilot had been passed Traffic Information and had the PC21 in sight. In

the event, the climb-out restriction had placed the PC21 into a situation where a conflict could occur, and the PC21 pilot had correctly acted on the basis of their situational awareness, but safety had not been reduced because the Tutor pilot had acted to prevent the potential conflict and had achieved an appropriate lateral separation at CPA, notwithstanding the vertical separation generated by the PC21 pilot. The following factors were felt to be contributory to the Airprox:

CF1: The Boscombe Radar controller did not update the Traffic Information.

CF2: The Boscombe Radar controller was unable to respond to the PC21 pilot due to their liaison with the Boscombe LARS controller.

CF3: The track and height climb-out restriction placed the PC21 into a situation where a conflict could occur.

CF4: The PC21 pilot was concerned by the proximity of the Tutor.

CF5: The PC21 pilot reported receiving a TCAS TA.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2023145			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Situational Awareness and Action			
1	Human Factors	• ANS Traffic Information Provision	Provision of ANS traffic information	TI not provided, inaccurate, inadequate, or late
2	Human Factors	• Task Monitoring	Events involving an individual or a crew/ team not appropriately monitoring their performance of a task	Controller engaged in other tasks
3	Human Factors	• Traffic Management Information Provision	An event involving traffic management information provision	The ANS instructions contributed to the Airprox
	Flight Elements			
	• Situational Awareness of the Conflicting Aircraft and Action			
4	Human Factors	• Unnecessary Action	Events involving flight crew performing an action that was not required	Pilot was concerned by the proximity of the other aircraft
	• Electronic Warning System Operation and Compliance			
5	Contextual	• ACAS/TCAS TA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system traffic advisory warning triggered	

Degree of Risk: E.

Safety Barrier Assessment[3]

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 **ineffective** because the climb-out restriction created a potential confliction with the Tutor and the Boscombe Radar controller

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

was engaged in liaison with the Boscombe LARS controller and hence did not update Traffic Information or provide timely deconfliction advice.