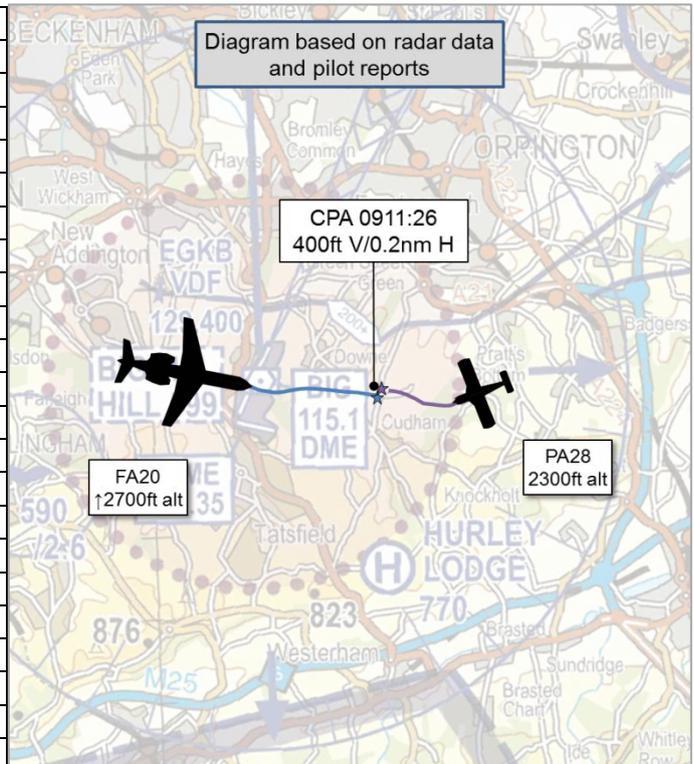


AIRPROX REPORT No 2017169

Date: 22 Jul 2017 Time: 0911Z Position: 5119N 00004E Location: 1.5nm E Biggin Hill

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

| Recorded | Aircraft 1 | Aircraft 2 |
|-------------|-----------------|-------------|
| Aircraft | FA20 | PA28 |
| Operator | Civ Comm | Civ Pte |
| Airspace | London FIR | London FIR |
| Class | G | G |
| Rules | IFR | VFR |
| Service | None | Basic |
| Provider | (Thames Radar) | Biggin |
| Altitude/FL | 2700ft | 2300ft |
| Transponder | C, S | S |
| Reported | | |
| Colours | Not Reported | Red, White |
| Lighting | Not Reported | Strobe, Nav |
| Conditions | VMC | VMC |
| Visibility | Not Reported | >10km |
| Altitude/FL | 2500ft | 2200ft |
| Altimeter | QNH | NK |
| Heading | 110° | 260° |
| Speed | 180kt | 128kt |
| ACAS/TAS | TCAS II | Unknown |
| Alert | RA | Unknown |
| Separation | | |
| Reported | 400ft V/500m H | Not seen |
| Recorded | 400ft V/0.2nm H | |



THE FA20 PILOT reports that he was cleared for the Biggin SAM2 departure from RW20 [UKAB note: in fact RW21] climbing to 2400ft. Just after overflying the airfield at 2400ft, he was handed over to Thames Radar who immediately informed him of VFR traffic in the opposite direction at 2200ft (he had been vectored onto heading 110° climbing to 4000ft). He had visual contact with the traffic when he received a TCAS RA ‘monitor vertical speed’. The PIC, who was PF, disconnected the autopilot and continued the climb. The traffic crossed 400ft below and about 500m behind them.

THE PA28 PILOT reports that he called Biggin at about 12nm to request a transit through their overhead; this was granted and he reported overhead. He saw a jet on departure from Biggin but was not aware there had been an Airprox.

THE BIGGIN CONTROLLER reports he was working Tower and Approach combined. The IFR departing FA20 had been released by Thames Radar to 2400ft to follow the SAM2 SDR from RW21. While this aircraft was in the right turn back to the BIG VOR, he placed a call to LTC SE to request release on his next IFR jet departure. While he was speaking to the TC sector the PA28 pilot freecalled with an easterly DF bearing. After concluding the call, he spoke to his taxiing jet to explain that there may be a few minutes delay to their departure as he was awaiting a call back with their release. He then took the details of the freecaller, which was a PA28 east of the airfield routing westbound at 2200ft. He placed the aircraft under a Basic Service, passed the Biggin QNH and conspicuity squawk, and instructed the aircraft to report at 5nm for onward clearance, as is standard practice. The PA28 pilot stated that they were at 5nm now. He instructed the aircraft to report overhead not below 2000ft, and in the next transmission passed traffic information on the FA20, which was by now almost back in the overhead about to establish inbound to DET VOR. The PA28 pilot reported level at 2200ft. He then gave taxi instructions to a light aircraft which had just landed and then passed Traffic Information to the FA20 pilot on the PA28, which was acknowledged. The FA20 was then instructed to contact Thames Radar. Another aircraft then called him and engaged

him in a discussion lasting approximately 30 seconds regarding the latest weather conditions and whether the ATIS would be updated to reflect the significant improvement on the last METAR. This discussion drew his attention away from the traffic situation as he made an ad-hoc assessment of the prevailing visibility and cloud base. Following this, another IFR aircraft called requesting start to which he responded. He then checked with the PA28 pilot that they had the FA20 in sight, which they reported that they did. He was subsequently informed that the FA20 pilot had received a TCAS RA (Monitor Vertical Speed) in relation to the PA28.

[UKAB Note: Biggin gave the controller access to the R/T recordings prior to writing this report. Biggin Hill also said that they will be introducing advanced use of the ATM for the ATCOs in the not too distant future, which they believe should assist controllers should this situation arise again].

Factual Background

The weather at Biggin was recorded as follows:

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METAR EGKB 220850Z 22007KT 190V270 4000 +SHRA FEW015 SCT020 14/11 Q1008 RESHRA  
METAR EGKB 220920Z 20008KT 170V230 9999 SCT015 16/13 Q1008 RESHRA
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Analysis and Investigation

CAA ATSI

ATSI had access to reports from both pilots, the Biggin Hill and Thames Radar controllers, the area radar and R/T recordings. ATSI also received a copy of the ATC unit investigation reports from Biggin Hill and NATS Swanwick. Screenshots in the report are taken from the area radar. All times UTC.

The FA20 was conducting an IFR flight from Biggin Hill and although flying in Class G airspace in the moments running up to the Airprox, no ATS had been formally agreed. The FA20 was subsequently provided with a Radar Control Service from Thames Radar once the aircraft entered the London TMA in the climb. The PA28 pilot was in receipt of a Basic Service from Biggin Hill Tower/Approach.

The FA20 pilot was cleared for take-off from RW21 by the Biggin Hill Tower/Approach controller at 0906:44, and was following a "Southampton (SAM 2)" Standard Departure Route, which required the aircraft to turn right at 1nm and continue that right turn to pass over the BIG VOR. The aircraft had been cleared to climb initially to 2400ft.

At 0908:35 the PA28 pilot called the Biggin Hill controller, but, being busy with other aircraft at the time, the controller did not call them back until 0909:00.

The PA28 pilot reported his point of departure and destination, being level at altitude 2200ft, and requested to transit the Biggin Hill area at that level. The controller offered the PA28 pilot a Basic Service, and passed the Biggin Hill QNH and a transponder code. The controller requested that the pilot report at 5nm for onward clearance. The pilot advised that they were approaching 5nm at that time and gave an incorrect readback of the QNH [UKAB note: in fact the PA28 was more than 5nm east at this time]. The controller repeated the transponder code and instructed the PA28 pilot to report the Biggin Hill overhead, and to continue not below 2200ft.

At 0909:32, the controller passed Traffic Information on the FA20 to the PA28 pilot, and advised that the aircraft was passing back through the Biggin Hill overhead, eastbound, maintaining 2400ft. This was acknowledged by the pilot of the PA28 who was 7.3nm east of the Biggin Hill overhead at that time (Figure 1).

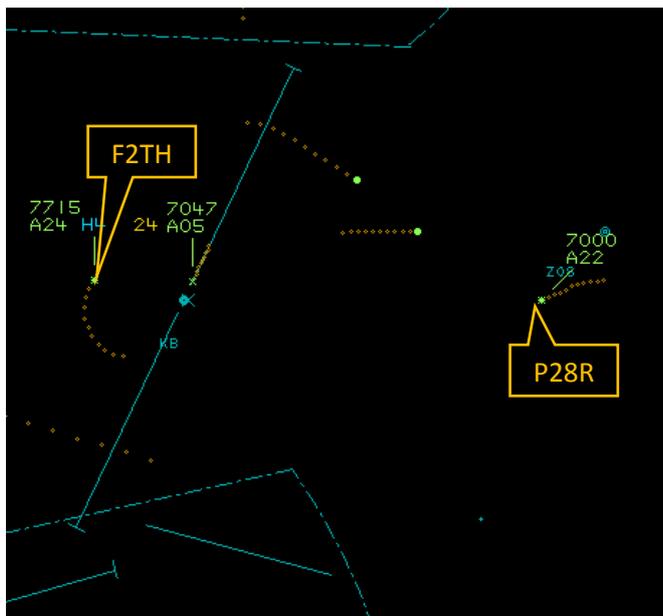


Figure 1 – 0909:32

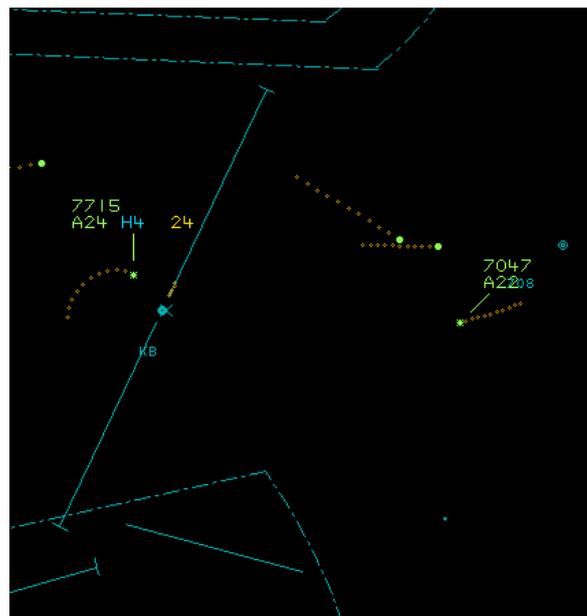


Figure 2 – 0910:00

At 0909:48, the Biggin Hill controller passed Traffic information on the PA28 to the FA20 pilot, advising them that there was a VFR aircraft 5nm east of the airfield, routing to the overhead at 2200ft, which was acknowledged by the pilot of the FA20

At 0910:00, the Biggin Hill controller instructed the FA20 pilot to contact Thames Radar. The aircraft were 7.2nm apart at this time (Figure 2).

At 0910:32 the FA20 pilot called the Thames Radar controller and advised that they were on the SAM2 departure at 2400ft (Figure 3).

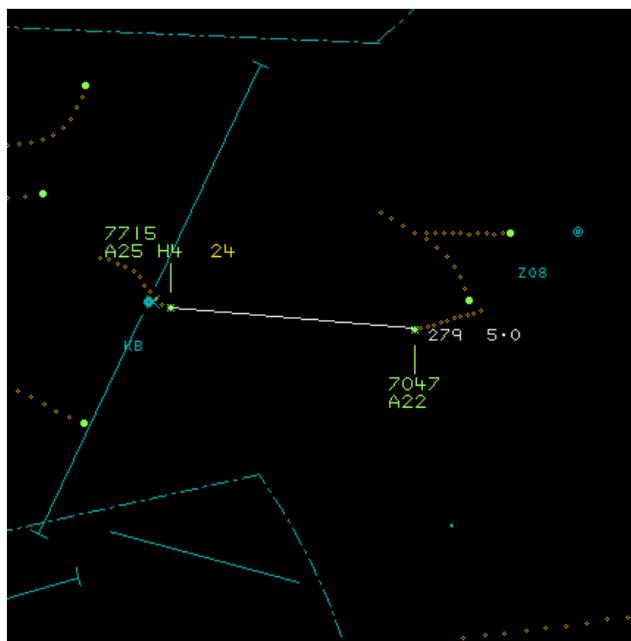


Figure 3 – 0910:32

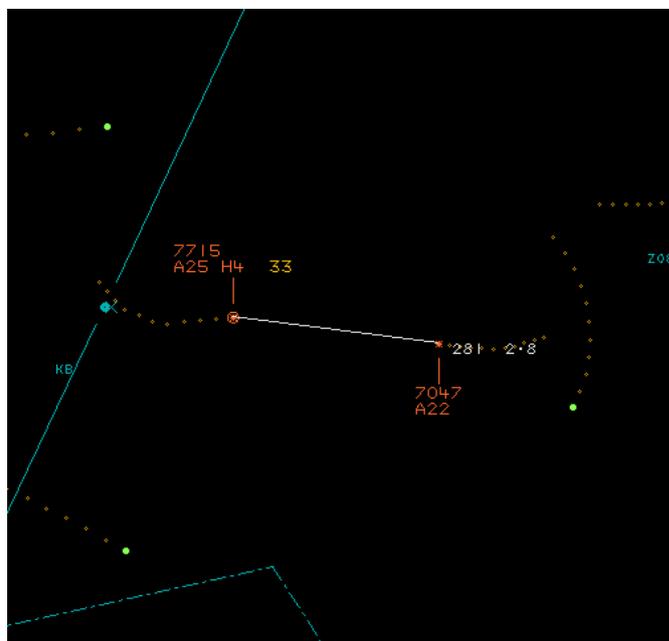


Figure 4 – 0910:55

The Thames Radar controller acknowledged this, instructed the pilot to squawk ident, cleared them to climb to altitude 4000ft and to fly a heading of 110°. On the area radar replay, STCA activated at 0910:47 and, at 0910:55, the Thames controller advised the FA20 pilot that they had traffic in their 12 o'clock at 2nm, opposite direction 200ft below, working Biggin Hill (Figure 4).

At 0911:00 the pilot of the FA20 reported being visual with the PA28, (Figure 5). 5 seconds later the Thames Radar controller advised them that they had just entered controlled airspace and that it was a Radar Control Service.

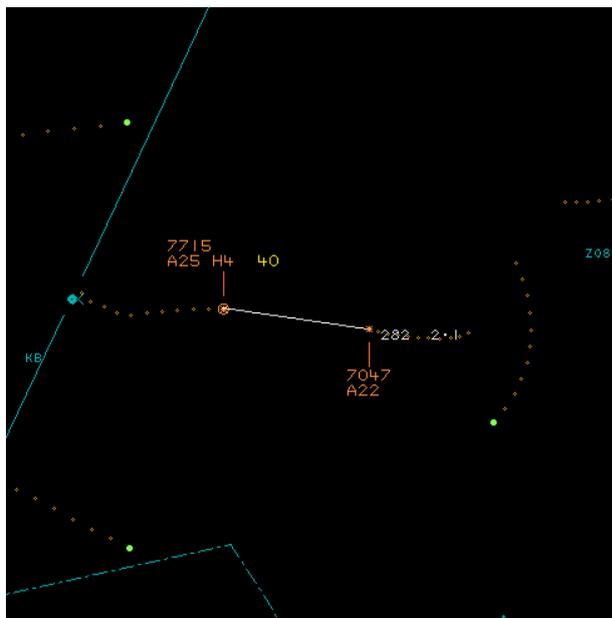


Figure 5 – 0911:00

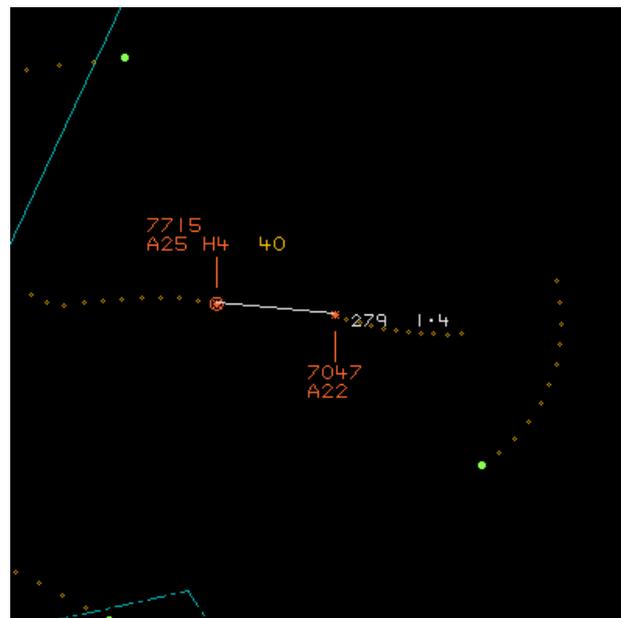


Figure 6 – 0911:11

At 0911:08 the Biggin Hill controller asked the pilot of the PA28 if they were visual with the FA20.

The pilot of the FA20 reported a TCAS RA to the Thames Radar controller at 0911:10, and, at 0911:11 on the Biggin Hill frequency, the pilot of the PA28 reported being visual with the FA20 (Figure 6).

CPA took place at 0911:26, with the aircraft separated by 0.2nm laterally and 400ft vertically (Figure 7).

Biggin Hill does not provide surveillance-based ATC services. The unit does have an ATM but it is only approved for:

- *Determining the landing order, spacing and distance from touchdown of arriving aircraft,*
- *Assist in applying longitudinal separation for departing aircraft,*
- *Enable the controller to confirm that the initial track of a departing aircraft conforms with the clearance issued,*
- *Provide information to aircraft on the position of other aircraft in the circuit or carrying out an instrument approach.¹*

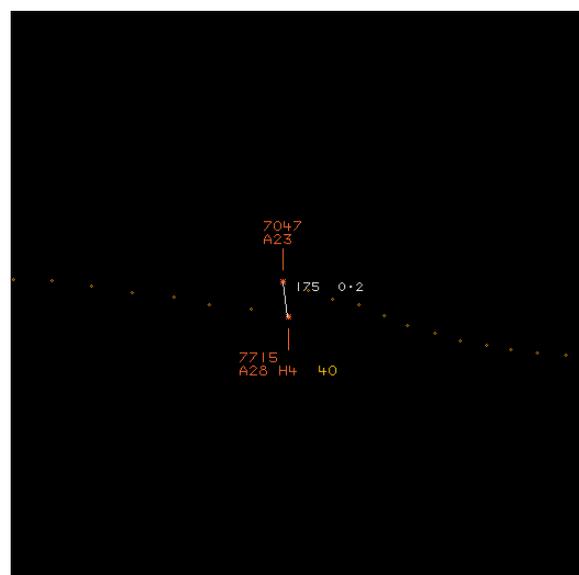


Figure 7 – 0911:26

Thames Radar can provide an approach surveillance service to Biggin Hill IFR arrivals, and for IFR departures wishing to enter controlled airspace. The departure of the FA20 was subject to both a clearance and a release from Thames Radar. For aircraft normally entering controlled airspace, Thames Radar would issue a climb clearance to 3000ft. However on this occasion,

¹ Biggin Hill MATS Part 2

because of traffic departing ahead of the FA20, and to de-conflict against other IFR traffic inbound to Biggin Hill, the clearance issued included a climb to only 2400ft to keep it outside of controlled airspace. (The base of the London TMA is 2500ft in this area. Biggin Hill is located directly beneath). It is likely that had the FA20 received the more usual clearance to climb to 3000ft, the Airprox might not have occurred.

Options available to the Biggin Hill controller, who was aware of the potential conflict between the FA20 at 2400ft, and the PA28 at 2200ft, could have been to coordinate further climb with Thames Radar for the FA20, or to request the PA28 pilot to descend. However, the controller elected to transfer the FA20 in anticipation of the aircraft receiving further climb. The Biggin Hill controller might have identified and sought to resolve the potential conflict earlier, but because the FA20 was already airborne before the PA28 pilot established communications, the window of opportunity was small, and the controller was reasonably busy with other inbound and outbound traffic at the time. There was no requirement for the Biggin Hill controller to separate the aircraft, and comprehensive Traffic Information had been passed to both pilots whilst the aircraft were still separated by over 8nm laterally.

In the NATS Swanwick investigation report, the Thames Radar controller stated that they would normally establish a radar service with the outbound prior to issuing executive instructions, (in this case, the allocation of a heading). However it was their plan, having seen the PA28 and identified the potential conflict, to climb the FA20 out of conflict, and so they issued a further climb instruction to 4000ft during the initial communications with the FA20 pilot. The controller had also assumed that the aircraft were already visual with each other prior to the transfer of the FA20 to them. They believed that Biggin Hill might have called to coordinate if this was not the case. The controller further felt that having passed the Traffic Information to the FA20 pilot on the PA28, and received a sighting report from the FA20 pilot, that there was no requirement for any further advice.

After the climb instruction was issued by the Thames controller, there was a delay of about 20sec before the Mode S Selected Flight Level for the FA20 evidenced the action of the crew, when the data changed from 24 to 33 and then ultimately 40.

The conflict was initiated whilst both aircraft were in Class G airspace, where pilots are responsible for their own separation. Adequate traffic information had been passed, initially by the Biggin Hill controller and then by the Thames Radar controller. A combination of the further climb instruction issued by the Thames Radar controller and the TCAS RA received, and responded to, by the FA20 pilot helped to resolve the conflict.

UKAB Secretariat

The FA20 and PA28 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard². If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right³.

At the closest point of approach (CPA) the FA20 was within the London TMA, Class D airspace (base 2500ft), he entered the London TMA, climbing to 4000ft, when the aircraft were separated by 1.1nm and 300ft .

The FA20 departed RW21 on the Biggin Standard Departure Route (SDR) SAM 2 which incorporates Note 1 in the procedure to depart via the Biggin overhead at 2400ft alt; as below:

² SERA.3205 Proximity.

³ SERA.3210 Right-of-way (c)(1) Approaching head-on.

Standard Departure Routes - via Airways

| Departure to | Designator | Via | Route |
|--------------|----------------------------|----------------|---|
| N | Brookmans Park 2 (BPK 2) | N57/L10 | DET - BPK |
| NE | Clacton 2 (CLN 2) (Note 5) | L620 | DET - SND - CLN |
| SE | Dover 2 (DVR 2) | L9/L10/W71 | DET - DVR |
| S | Lydd 2 (LYD 2) | M189 (Y803) | DET - LYD |
| SW | Southampton (SAM 2) | L620/Q41 | DET - LYD - M189 - WAFFU - Y8 - GWC - SAM |
| W | Compton 2 (CPT 2) | L9 | DET - BPK - HEN - CPT |

Note 1: Departures from Runway 21, follow Noise Abatement Procedure turning right to pass overhead BIG VOR at 2400 ft ALT.

Note 2: Departures from Runway 03, after noise abatement, turn right to intercept DET VOR RDL 275° to DET.

Note 3: When established on DET VOR RDL 275°, not above 2500 ft ALT until 9 DME DET, then to 4 DME DET at 4000 ft ALT.

Note 4: For positioning flights to London Luton/London Stansted, follow BPK 2 SDR to BPK then join LOREL 2Q STAR, at altitude as directed by ATC, in its appropriate place under the table.

Note 5: Cross DET VOR/DME fix 017°/7 nm at 5000 ft ALT..

Summary

An Airprox was reported when a FA20 and a PA28 flew into proximity at 0911 on Saturday 22nd July 2017. The FA20 pilot was operating under IFR in VMC and the PA28 pilot was operating under VFR in VMC, the FA20 pilot was not under a Service, he was changing frequencies from a Procedural Service from Biggin and had just established contact with Thames Radar. The PA28 pilot was in receipt of a Basic Service from Biggin.

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.

The Board firstly looked at the actions of the FA20 pilot. They noted that although IFR departures from Biggin Hill normally climb to 3000ft, the Thames Radar controller had only initially cleared the FA20 pilot to climb to 2400ft (below controlled airspace), to separate the FA20 from aircraft in the London TMA. When the FA20 changed frequency to Thames Radar, the controller both informed the FA20 pilot of the PA28 and issued a climb instruction. Members commented on the FA20 pilot's delay of 20secs or so in establishing the climb, and wondered whether he had been distracted by trying to visually sight the PA28. Had he established an immediate climb then it was thought likely that the geometry might not have resulted in an RA at all, especially given that the RA generated was only a 'monitor' RA as opposed to an 'action' RA. A pilot Board member with business jet experience highlighted that, due to the noise abatement procedures at Biggin Hill, the pilot's workload on departure when joining controlled airspace can initially be quite high, which could account for the FA20 crew not spotting the PA28 until they were prompted by the Traffic Information they received.

The Board then turned to the actions of the PA28 pilot. Members agreed that the pilot had contacted Biggin Hill in plenty of time and had followed the instructions from Biggin Hill. Some members wondered if the pilot was familiar with the Biggin Hill departure procedures, and whether he would be aware that the level he chose to fly through the overhead was likely to conflict with aircraft departing Biggin IFR. Unfortunately, it wasn't known how familiar the PA28 pilot was with Biggin local area procedures, and GA members commented that the airspace was very constrained in that area such that it was likely that he may have transited at the level he did simply to remain near the top of the Biggin ATZ and below the controlled airspace of the London TMA (base level of 2500ft).

The Board then looked at the actions of the Biggin controller. Although noting that he had passed Traffic Information to the FA20 and PA28 on each other, which was the minimum he was required to do, ATC members were surprised that he didn't provide a greater level of deconfliction between two aircraft that he knew were coming into proximity before handing the FA20 to Thames Radar. Acknowledging that he had no radar display *per se*, they opined that the Biggin controller could have employed his ATM to gain more situational awareness, and may have been relying too much on

Thames Radar to resolve the conflict by providing an expected further climb instruction to the FA20 pilot. Although he could not give the FA20 a higher altitude, he could have asked the PA28 to descend or deviate away from the overhead to prevent their tracks coming into proximity.

The Board noted that, at CPA, the FA20 was inside controlled airspace and the PA28 was outside. As a result, they were deemed technically separated, but the separation was only achieved as a result of the FA20 pilot’s and Thames Radar controller’s involvement. The Board praised the Thames Radar controller for his quick reactions to the developing situation, and particularly for passing Traffic Information and a climb instruction before he had technically established two-way communication and agreed an ATS with the FA20 pilot. It had been the actions of the controller that had materially increased the separation, supplemented by the FA20 TCAS RA warning to continue the climb.

The Board then looked at the cause and risk of the Airprox. The FA20 pilot had seen the PA28 after receiving Traffic Information and a TCAS alert, and had climbed to increase the separation. Likewise, the PA28 pilot had probably seen the FA20 as early as practical and had judged that there was no risk of collision due to the FA20’s climbing vector. As a result, the Board agreed that the incident was probably best described as a conflict in Class G resolved by the FA20 pilot. The Board noted that both pilots had received Traffic Information on each other, that the FA20 pilot also had information from onboard sources, and that both pilots were visual with each other well before CPA. Accordingly, the Board agreed that there had been no risk of collision and the degree of risk was assessed as Category C.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A conflict in Class G resolved by the FA20 pilot.

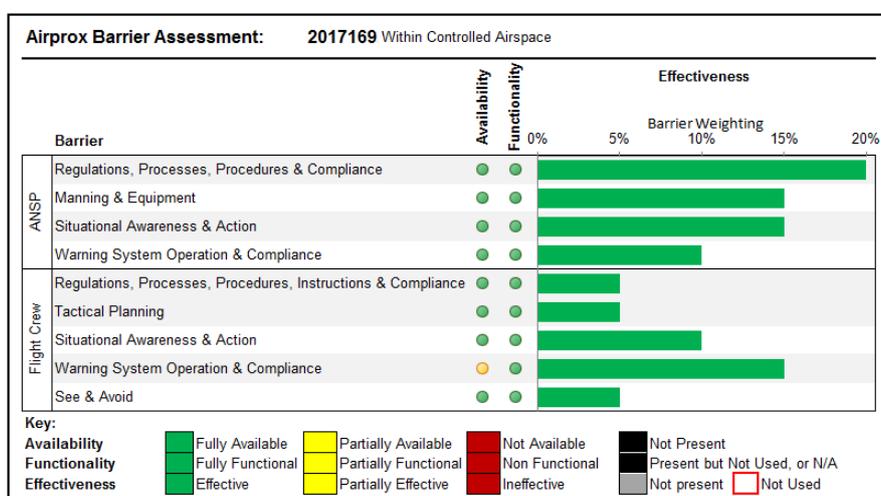
Degree of Risk: C.

Safety Barrier Assessment⁴

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

Flight Crew

Warning System Operation and Compliance was assessed as **fully effective** but only **partially available** because only one aircraft was fitted with an electronic warning system, which functioned correctly and instructed the FA20 pilot to continue his climb.



⁴ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).