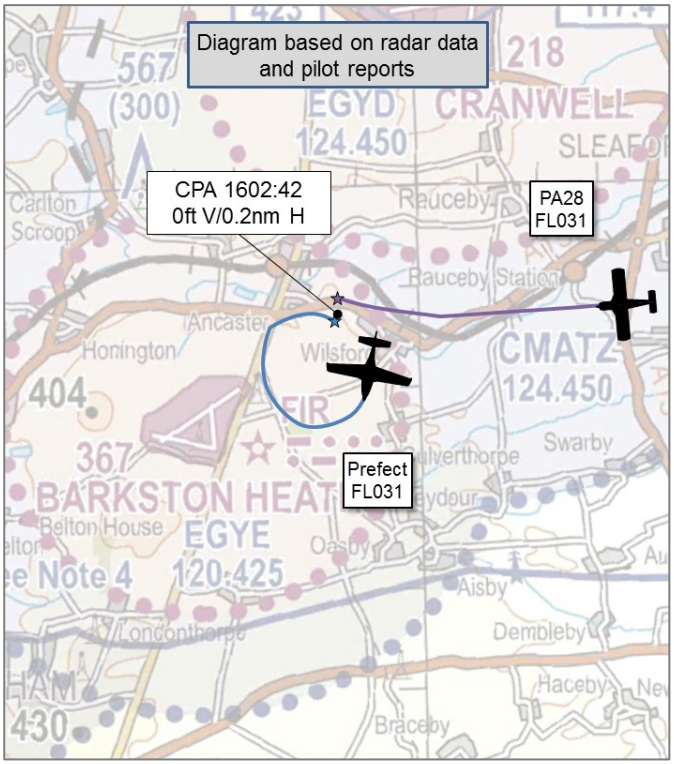
AIRPROX REPORT No 2019170

Date: 02 Jul 2019 Time: 1602Z Position: 5258N 00031W Location: Barkston Heath overhead

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Prefect	PA28
Operator	HQ Air (Trg)	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	ACS	Basic
Provider	Barkston Heath	Waddington Zone
Altitude/FL	FL031 (3100ft QFE)	FL031 (3340ft RPS)
Transponder	A, C	A, C
Reported		
Colours	White, Blue	Burgundy, White
Lighting	Not reported	HISL, LED, Landing, Nav
Conditions	NK	VMC
Visibility	>10km	>10km
Altitude/FL	3000ft	3500ft
Altimeter	QFE (1013hPa)	RPS (1021hPa)
Heading	200°	262°
Speed	NK	120kt
ACAS/TAS	TCAS II	Not fitted
Alert	TA	N/A
Separation		
Reported	100-200ft V/300m H	0ft V/200-300m H
Recorded	0ft V/0.2nm H	



THE PREFECT PILOT reports that they were operating in the Barkston Heath circuit and were cleared to climb to High Key from the normal circuit in order to fly a PFL pattern from 3000ft QFE. As the aircraft was levelled at 3000ft in a banked turn within 0.5nm of Hi Key, a TCAS TA sounded with a height difference of +200ft. Shortly afterwards, a civil light-aircraft was seen to the left-hand side in a turn away from the Prefect at an estimated distance of 200-300m and slightly high. The Prefect crew continued to complete the PFL to Barkston Heath. The Prefect crew were unaware of the presence of the GA traffic otherwise the PFL exercise would have been delayed until the transiting traffic had departed.

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

THE PA28 PILOT reports that he was receiving a Basic Service from Waddington Zone and a request to transit just above the MATZ had been coordinated with the controller. He was initially instructed to report south of Coningsby and, when he reported south of Coningsby, he was informed that a transit over Cranwell and Barkston Heath was acceptable. He believed the Waddington controller had contacted Cranwell with no reported traffic to affect. He was advised to remain at 3500ft on the RPS 1021hPa and this was agreed. The controller informed him that traffic was climbing for a PFL/Glide approach and advised the traffic would climb to 2500ft inside the MATZ. Shortly afterwards he reported the Barkston traffic in sight. The PA28 pilot recalls observing a Prefect climbing in a Westerly direction and assessed this was the traffic that was expected to climb to 2500ft. He briefly lost visual with the Prefect and when next sighted the Prefect was in a right-hand climbing turn towards him. He completed an immediate turn (about 60AOB, 90° right). At the time he assessed the Prefect as becoming co-level with a closest point of approach of 200-300m and reported this to the Waddington Zone controller. After landing he contacted the Waddington Supervisor to discuss the event. The pilot and ATC acknowledged that he was flying in Class G airspace, about 150ft above the MATZ and it remained the responsibility of both aircraft captains to see and avoid each other. The Waddington Supervisor stated that the request

to transit at 3500ft 1021hPa had been passed to Cranwell as traffic information. He confirmed that he had expected the Prefect to stop climb at 2500ft and he would not normally seek to cross above the Barkston MATZ in close proximity. He believes that the initial information that there was no traffic to affect contributed to an erroneous mental picture that Cranwell and Barkston Heath had finished flying for the day, which is also why he did not seek a handover to Cranwell ATC from Waddington Zone. By the time traffic information was passed, indicating a Prefect climbing to 2500ft, his proximity to the CMATZ led him to believe it was safest to remain predictable in accordance with his coordinated altitude and heading. Unfortunately, a brief loss of visual contact led to a more dynamic avoiding manoeuvre than would have otherwise been required.

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

THE WADDINGTON CONTROLLER reports that he was the Approach controller working LARS due to no station traffic to affect. He worked a PA28 picked up south-east of Coningsby to Nottingham, reported at 3500ft on the Barnsley RPS (1021). The PA28's projected track took it through the Barkston Heath (BKH) overhead and, although outside the MATZ, he understood the potential for aircraft to frequently join BKH via PFL or overhead join and so opted to provide Traffic Information to Cranwell (CWL) prior to the crossing; CWL reported nothing to affect. As the transit aircraft approached the BKH overhead he received a call from CWL informing him that circuit traffic at BKH was climbing to high key in the circuit, he acknowledged and understood that high key was 2500ft and still inside the MATZ, so not really a factor, but he called the traffic within the BKH MATZ to the PA28 pilot informing him that it was climbing to high key, expected to be 2500ft; the PA28 pilot reported visual. As the PA28 continued into the overhead the Mode C information on the circuit traffic appeared to be higher than expected and he called the traffic again to the transit aircraft. The PA28 pilot became visual again and took avoiding action to the north to maintain separation, then shortly after continued his track to Nottingham. He asked the pilot if he could call Waddington ATC on landing to discuss how close the circuit traffic had been. The next day he was informed by the supervisor, who took the call later on, that the pilot was happy with the service provided, that he was visual with the circuit traffic on the initial calling of it, but lost sight of it until given further traffic information a second time, at which point he took an avoiding action turn to stay clear of the traffic. He was not concerned enough to put in an Airprox report. From the controller's point of view, he was expecting the pilot to report an Airprox at the time of the incident, and prepared to copy down the information on console, but was not passed any details or a confirmation of Airprox. He was watching the BKH traffic climb and, once above the expected 2500ft, he felt the need to pass Traffic Information a second time despite the pilot already reporting visual with the aircraft. The height information on his radar screen was such that the aircraft appeared almost level flight shortly after the second traffic call, though the Mode C tolerance of 200ft in either direction for both aircraft transponders meant there could have been up to 400ft between them, which is why he was not overly surprised that an Airprox was not reported by the transit at the time.

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

THE WADDINGTON SUPERVISOR reports that he was content that the LARS controller had provided adequate traffic information to the PA28 pilot and had passed traffic information to Cranwell as the transit route would overfly Barkston Heath. He observed the PA28 initiate avoiding action against traffic in the visual circuit at Barkston Heath so, once the PA28 was clear of traffic, he asked the LARS controller to ask the pilot to call Waddington after he had landed. When the pilot called he asked him if he had been visual with the Barkston traffic and whether he wished to file an Airprox report. The pilot declined stating that he was happy with the service he had received from Waddington; he had been visual with the traffic but had lost sight of it and, when he had re-acquired it, he decided to turn away from it.

THE BARKSTON HEATH CONTROLLER reports that he was OJTI to a student ATCO in ADC. He was working one Grob Prefect. The Prefect was in the visual circuit when the pilot requested a climb to High Key to carry out a Practise Forced Landing (PFL). The student requested the required airspace from Cranwell Radar Approach (CWL APP provide Barkston (BKH) Approach Services and have control of the upper portion of the BKH Military ATZ from 1800-3000ft BKH QFE), and this was approved by them. The student approved the climb and instructed the Prefect pilot to report high key with intentions.

Shortly after, the pilot reported that a civilian aircraft had flown past very close to him. The student confirmed the Prefect's height, which was reported as 3000ft on BKH QFE 1014hPa and asked if the pilot was declaring an Airprox. The pilot instructed the student to standby while he completed the PFL. The OJTI spoke to CWL APP, who stated that the civilian aircraft was under the control of Waddington, maintaining 3500ft on the Barnsley RPS 1023hPa, and that it had been passed traffic information on the Prefect. Once the Prefect landed, the Student passed the Prefect pilot the details of the transit traffic. The Prefect pilot stated on the radio that he would not be filing an Airprox. At about 1400UTC on 3 Jul 2019, when the OJTI was in position as the ADC OJTI, the Duty Aircrew Officer in ATC mentioned that he just seen on ASIMS that an Airprox had been submitted for the previous day's occurrence. SATCO BKH was informed.

THE CRANWELL CONTROLLER reports that he was bandboxing the App/Dir, Departures and Zone task. This was due to it being the end of the day with only a couple of aircraft airborne. Waddington passed Traffic Information to the Supervisor that there was a Waddington track transiting Cranwell and BKH at 'around 3500ft'. As this was assumed above the vertical dimensions of the MATZ they were happy for them to proceed. A few minutes later BKH called requesting the Slot [UKAB note: the 'Slot' is the height band 1800ft – 3000ft BKH QFE for a PFL]. He gave BKH the Slot and called Waddington to provide TI that the aircraft in the circuit would be climbing for a PFL. The tracks then proceeded to get closer than he expected to one another, he believes that the BKH track may have displayed about 3000ft on radar and the Waddington track was displaying around 3200ft. He expected the Prefect to level at 2500ft for its PFL and as the Waddington track was reported at 3500' (albeit pressure setting unknown), it would have given them 1000ft separation. At Cranwell, High Key is 2500ft QFE, he has checked the CWL/BKH FOB, CWL/BKH ATCOB and 3FTS orders and has found nothing amongst any of these documents which says they will climb above 2500ft QFE for a PFL when already in the circuit. Talking with other controllers, the general consensus is that they expect high key to be at 2500ft. The 3FTS Course Manual states that high key should be flown at 2500ft but can go up to 3000ft QFE. He believes this incident has highlighted that the FOB/ATCOB need updating for the procedure in order to eliminate ambiguity in the future. He realises that, in hindsight, he should have passed TI to the BKH Tower on the MATZ crossing traffic, so they could pass that information on to the Pilot. BKH do not have an Air Traffic Monitor so cannot see radar traffic. More positive control was required when initially receiving TI from Waddington to know exactly what the track was doing, at what height, and the pressure setting used in order to provide the most accurate information.

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

THE CRANWELL SUPERVISOR reports that when Waddington (WAD) called with Traffic Information the controller passed height information on a BKH overflight at around 3500ft, pressure unknown. The Mode C read out on the SSR feed indicated this track to be above 3000ft (about 3200ft) therefore not a factor for BKH because CWL was in possession of the 'Slot'. This was passed to the APP controller. He was working on the Supervisor's computer behind the APP controller when he heard the APP controller give BKH the slot for circuit traffic at BKH. Because this is a standard and frequent procedure at CWL, he thought nothing of it. The next information he heard was the APP controller discussing an aircraft from BKH getting close to another aircraft in the overhead. At this point the APP controller informed him that he (the APP controller) had passed TI to WAD but not mentioned anything to BKH when giving away the slot.

Factual Background

The weather at Barkston Heath was recorded as follows:

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METAR EGYE 021550Z 34010KT 9999 FEW045 BKN060 Q1013 RMK BLU
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Analysis and Investigation

Military ATM

The Prefect pilot was operating in the visual circuit at Barkston and had requested a climb for a PFL. Shortly after reaching their intended height (3000ft QFE 1013hPa) they received a TAS alert on an aircraft 200ft above them. Following the TAS alert, the Prefect pilot became visual with the PA28 200 to 300m away and 'slightly high'.

The PA28 pilot was in receipt of a Basic Service from Waddington Zone. The PA28 pilot had requested, and was given permission for, an overflight of the Cranwell/Barkston CMATZ at 3500ft RPS 1021hPa and was warned of an aircraft conducting a PFL to Barkston at 2500ft. Although initially visual with the Prefect, the PA28 pilot lost sight of the Prefect until it was in a climbing right hand turn toward him. The PA28 pilot reported taking an immediate turn to avoid, and estimated that the aircraft had come within 200 to 300m of each other.

Having ascertained that the PA28 pilot wished to overfly the CMATZ, the Waddington Zone Controller liaised with the Cranwell Approach Controller to seek approval for the transit. The initial approval was updated 5 minutes later with information on an aircraft (the Prefect) climbing to high key. This information was passed to the PA28 pilot, and it was stated that the aircraft would be climbing to 2500ft.

Figures 1-3 show the positions of the Prefect and the PA28 at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using the Debden Radar, which is not utilised by either RAF unit and therefore is not representative of the picture available to the controllers.

Cranwell approved the request by Waddington for the PA28 to overfly the CMATZ at 3500ft. At this point, separation between the aircraft was 11.5nm (Figure 1).

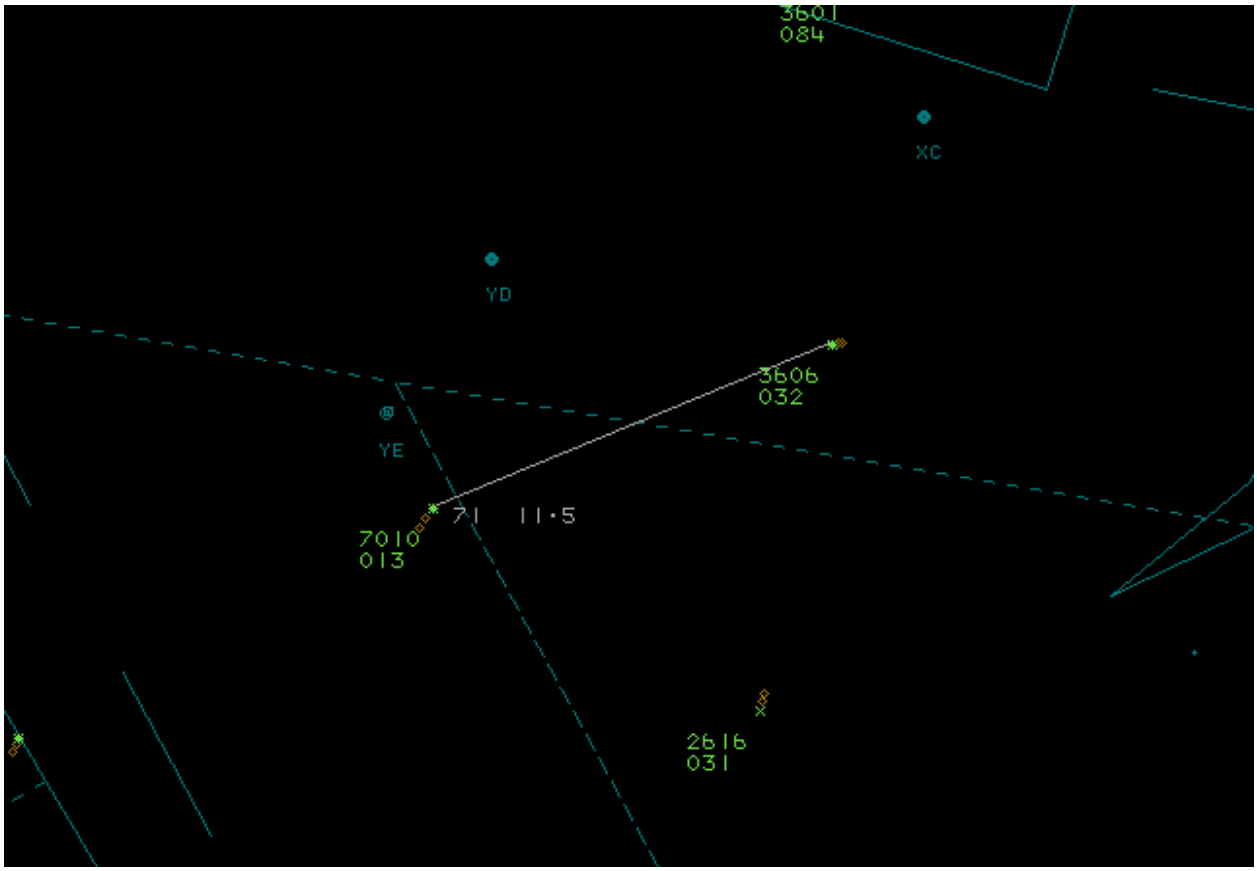

Figure 1

Six minutes after this agreement, Barkston requested the 'Slot' (a portion of airspace 1800-3000ft which Cranwell will avoid whilst active) for a PFL which was approved by the Cranwell Approach Controller. As PFLs at Cranwell were conducted from 2500ft and the available local orders did not indicate that an alternative height may be required, the Cranwell Approach Controller believed there would be sufficient separation between the Prefect and the PA28 and thus did not pass on the details of the PA28 to Barkston Tower. They did, however, inform Waddington Zone and, as High Key at Waddington is also 2500ft, the Waddington Zone Controller told the PA28 pilot that the Traffic would be at 2500ft. Having been passed this information, the PA28 pilot reported visual with the Prefect. At the point this information was passed to the PA28 pilot the Prefect had faded from radar (radar history still evident and shown in red circle below, Figure 2) and as such no estimate of separation can be given.

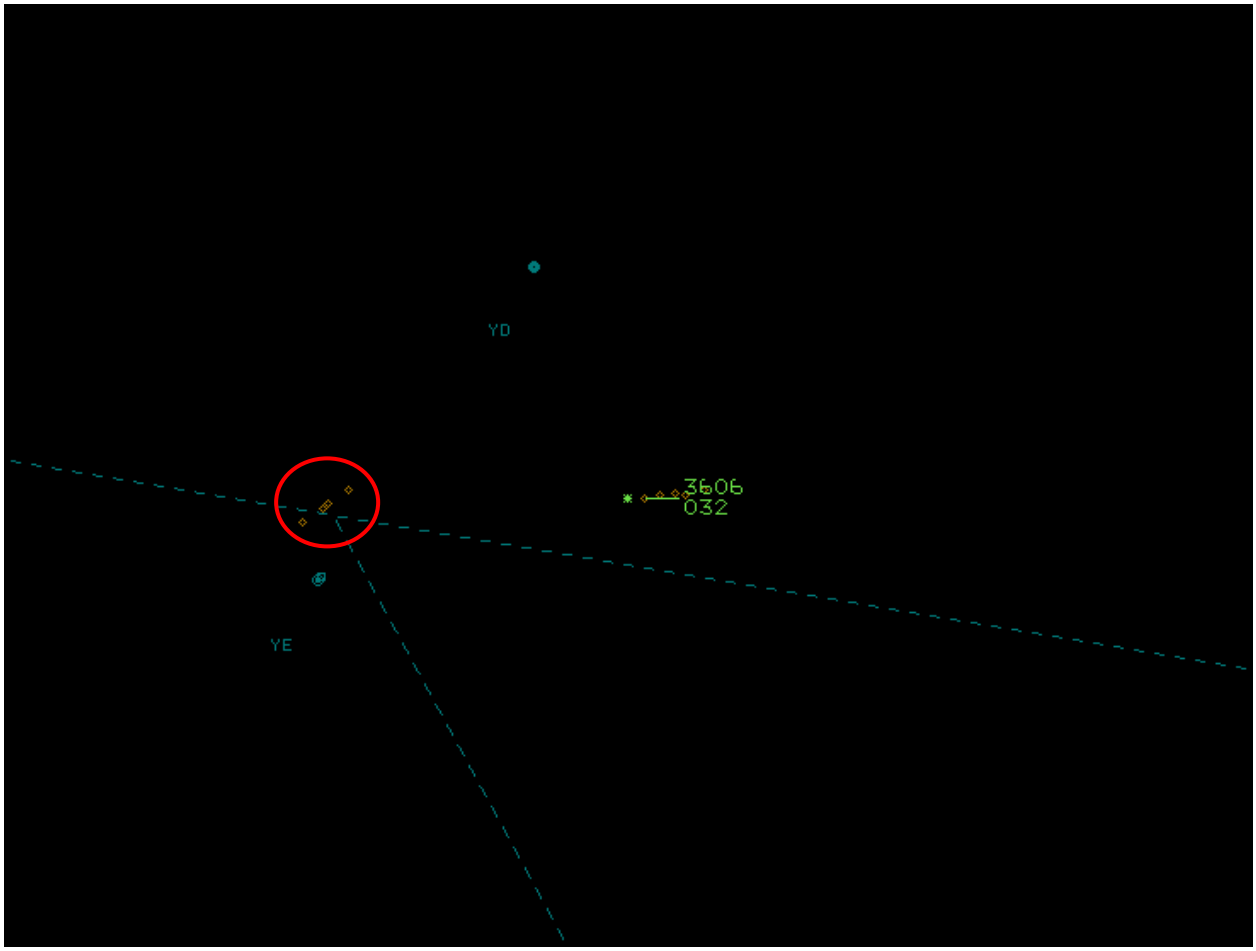

Figure 2

50secs after this initial information was passed, the Waddington Zone Controller passed Traffic Information to the PA28 pilot noting the Prefect was 12 o'clock, ½nm away indicating 200ft below. The PA28 pilot reported visual with the Prefect shortly before CPA, which was measured at 0.2nm lateral and no vertical separation (Figure 3).

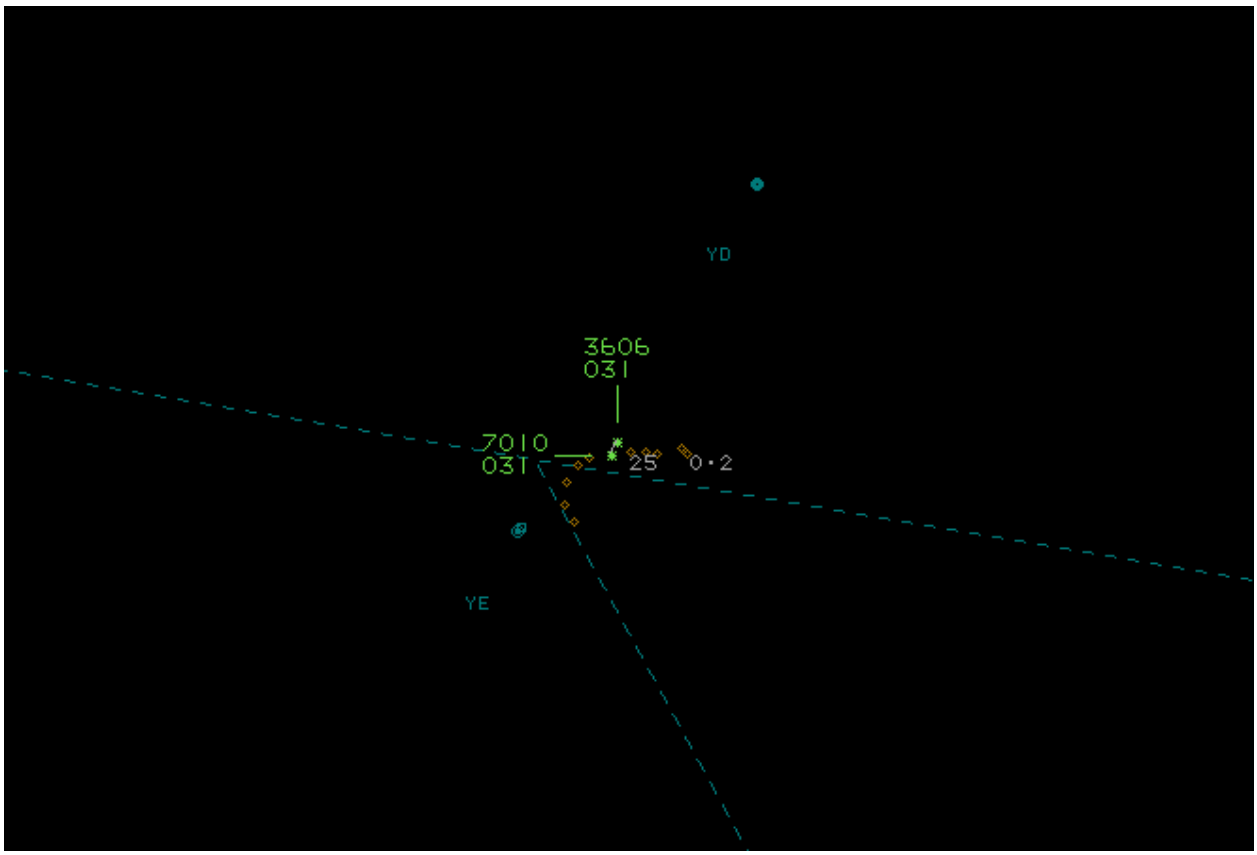

Figure 3 – CPA

The investigation into this incident noted that the order book available to the Cranwell Approach Controller did not reference the fact that PFLs could be conducted from above 2500ft and this was reinforced by the fact that High Key at Cranwell is 2500ft. It was subsequently identified that the aircrew manuals indicated that PFLs could be conducted from 3000ft. With this preconception it is unsurprising that the Cranwell Approach Controller was content that there would be sufficient separation between the aircraft but, having warned Waddington about the situation it would have been prudent to also have informed Barkston Tower.

For their part, the Waddington Zone Controller was aware that a PFL was taking place and was operating under the belief that High Key at Barkston was the same as that at Waddington (2500ft) and passed this information to the PA28 pilot. Once it became apparent to the Waddington Zone Controller that the aircraft were closer than anticipated, formal Traffic Information was passed to the PA28 pilot, albeit only 16secs prior to CPA. That said, the PA28 pilot was in receipt of a Basic Service, had already been passed Traffic Information on the Prefect and had reported visual with it and therefore the Waddington Controller discharged their duties under CAP774 appropriately.

UKAB Secretariat

The Prefect 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 hazard[1]. If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right[2]. If the incident geometry is considered as converging then the Prefect pilot was required to give way to the PA28[3].

[1] SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.
[2] SERA.3210 Right-of-way (c)(1) Approaching head-on. MAA RA 2307 paragraph 13.
[3] SERA.3210 Right-of-way (c)(2) Converging. MAA RA 2307 paragraph 12.

Comments

HQ Air Command

This Airprox was subject to an in-depth local investigation which identified a number of causal factors and provided a number of recommendations to reduce the likelihood of a similar occurrence in the future.

Based on knowledge of PFL procedures at their own airfields, the Cranwell and Waddington controllers had assumed that the Prefect at Barkston Heath would only be climbing to 2500ft QFE for their PFL even though airspace up to 3000ft QFE had been requested. The PA28 pilot was subsequently informed that the Prefect would climb to 2500ft. This gave them all the impression that a greater degree of vertical separation would be achieved than actually resulted.

The Waddington controller told the Cranwell controller that the PA28 was '[at] about three and a half thousand, 1021'. The pressure setting couldn't be recalled by the Cranwell controller during subsequent transmissions, illustrating that more doubt existed over the degree of separation than would actually be achieved. Nevertheless, the Waddington controller did well to keep the PA28 pilot updated with Traffic Information on the Prefect, even though only a Basic Service was being provided. Cranwell and Waddington ATC have since been provided with a guide to visual PFL heights for Elementary Flying Training Aircraft. Cranwell ATC have reported that they've addressed the issues relating to non-standard phraseology and liaison with adjacent units. This work has also been shared with Waddington ATC.

Although Traffic Information on the Prefect was successfully passed to the PA28 pilot, Traffic Information on the PA28 was not passed to the Barkston Heath controller by the Cranwell controller and therefore this was not passed on to the Prefect pilot. The Barkston Heath controller was without an Air Traffic Monitor (ATM) and reliant on information from Cranwell to build their situational awareness of aircraft operating overhead their MATZ. So, the Prefect pilot was not aware of the presence of the PA28 until their TCAS alerted them. It is fortunate that the PA28 pilot was, by now, visual with the Prefect and able to make an avoiding manoeuvre to increase separation. The lack of provision of ATM at Barkston Heath is due to be rectified under project Marshall (expected to be installed by Summer 2020). As a result of this Airprox, an increase in liaison between Cranwell and Barkston Heath controllers has taken place in order to improve communication.

Summary

An Airprox was reported when a Prefect and a PA28 flew into proximity overhead Barkston Heath at 1602hrs on Tuesday 2nd July 2019. The Prefect pilot was operating under VFR in VMC and the PA28 pilot was operating under VFR in VMC, the Prefect pilot in receipt of an Aerodrome Control service from Barkston Heath and the PA28 pilot in receipt of a Basic Service from Waddington.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board began by looking at the actions of the Prefect pilot. He had requested a Practice Forced Landing (PFL), and this required the Barkston Heath controller to contact Cranwell and request a height block up to 3000ft for the Prefect pilot to operate in, which was approved. The Prefect pilot determined that he would need to climb to 3000ft to commence the PFL in accordance with their local operating instructions, which resulted in him being at the topmost level of the block. Whilst at 3000ft, but prior to reaching the high-key position, he received a TCAS TA **(CF8)** and then saw the PA28, whose pilot had already commenced a turn away from the Prefect to increase the separation **(CF9)**. At no stage did he receive any Traffic Information regarding the PA28 **(CF7)**.

For his part, the PA28 pilot was receiving a Basic Service from Waddington and had requested a transit over the CMATZ, which had been approved. He received Traffic Information on the Prefect, but this included the controller stating that the maximum height would be 2500ft, which was erroneous. Regardless, he saw the Prefect and, whilst he momentarily lost sight of it, was subsequently able to make a right turn to ensure the aircraft were sufficiently separated.

Turning to the actions of the controllers, the Board noted that the ATC orders regarding aircraft climbing for a PFL did not correlate with the Prefect Flying Orders **(CF1 & 6)**, this resulted in an incorrect assumption by all the controllers involved that the Prefect pilot would climb to a height of 2500ft rather than 3000ft **(CF4)**. This incorrect mental model resulted in the Waddington controller passing Traffic Information to the PA28 pilot that contained an incorrect maximum height for the Prefect **(CF4)**. Some members opined that the height block of 3000ft may originally have been designed to provide a 500ft buffer between aircraft carrying out a PFL and overflights of the CMATZ before the Prefect had been introduced into service. It transpired that the recently introduced Prefects required a higher high-key altitude to previous aircraft types but this had not been communicated adequately to ATC when the they started operating from the airfield. This highlighted the importance of ensuring that all operational aspects should be reviewed prior to a new aircraft type operating at a unit in order to ensure that operational documents and procedures were harmonised **(CF1 & 6)**.

The Board noted that the Waddington controller had retained control of the PA28, rather than transferring it to the Cranwell controller, but had passed relevant information to Cranwell regarding the aircraft and the routing. Although as part of this he had passed the PA28 pilot's pressure setting, this had seemingly not been assimilated by the Cranwell Supervisor. Members noted that the Waddington controller had also passed Traffic Information to the PA28 pilot, even though the pilot was receiving a Basic Service and the controller was not required to monitor the flight **(CF2)**.

The Cranwell controller was aware of the PA28 transit as a result of the Traffic Information he had received from Waddington, and he knew that the Prefect was climbing for a PFL as communicated by the Barkston Heath controller. However, he did not pass Traffic Information to the Barkston Heath controller about the PA28 transit **(CF4 & 5)** because the Cranwell controller had incorrectly presumed the Prefect would only climb to 2500ft. Controller members commented that, even so, they would have expected the Cranwell controller to have passed on the information about the PA28's transit to the Barkston Heath controller, even if he had thought there was ample height separation, just for the Barkston Heath controller's situational awareness **(CF5)**. Not doing so had resulted in the Prefect pilot not receiving Traffic Information from the Barkston Heath controller on the PA28 **(CF7)**, and the Cranwell controller not assimilating that the aircraft would be at a similar level **CF3)**.

Turning to the risk, members agreed that the PA28 pilot had been visual with the Prefect at sufficient range to allow him to turn to increase the separation in a sufficiently timely and effective manner despite having banked hard to do so (separation at CPA was 0.2nm, which indicated that the PA28 pilot had probably manoeuvred at 0.3-0.4nm at least, although the lack of radar recording could not confirm this). Whilst this had ensured there was no risk of collision, the Board agreed that the absence of Traffic Information to the Barkston Heath controller, and the disparity in the local orders regarding the height that the Prefect would climb to, meant that safety had been degraded. Accordingly, they assessed the risk as Category C.

The Board were heartened that the units involved had taken the lessons learnt from this incident to put in place procedures to improve the respective ATC and operating orders with respect to Prefect PFLs, and to enhance communication between the units when PFLs were being conducted.

PART C: ASSESSMENT OF CONTRIBUTORY FACTOR(S) AND RISK

Contributory Factor(s):

	2019170		
CF	**Factor**	**Description**	**Amplification**
	Ground Elements		
	• Regulations, Processes, Procedures and Compliance		
1	Organisational	• Organisational Documentation and Publications	Inadequate regulations or procedures
	• Situational Awareness and Action		
2	Contextual	• Situational Awareness and Sensory Events	Not required to monitor the aircraft under the agreed service
3	Human Factors	• Conflict Detection - Detected Late	
4	Human Factors	• Traffic Management Information Provision	Not provided, inaccurate, inadequate, or late
5	Human Factors	• ATM Coordination	Inadequate or ineffective
	Flight Elements		
	• Regulations, Processes, Procedures and Compliance		
6	Organisational	• Flight Operations Documentation and Publications	Inadequate regulations or procedures
	• Situational Awareness of the Conflicting Aircraft and Action		
7	Contextual	• Situational Awareness and Sensory Events	Generic, late, no or incorrect Situational Awareness
	• Electronic Warning System Operation and Compliance		
8	Contextual	• ACAS/TCAS TA	TCAS TA / CWS indication
	• See and Avoid		
9	Human Factors	• Monitoring of Other Aircraft	Non-sighting or effectively a non-sighting by one or both pilots

Degree of Risk: C.

Safety Barrier Assessment[4]

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

Ground Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the height to which a Prefect climbs to High-Key at Barkston Heath was not harmonised across all documentation.

Situational Awareness of the Confliction and Action were assessed as **ineffective** because the Barkston Heath controller was not informed about the PA28 crossing the airspace.

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Prefect Flying Orders for a PFL did not fully correlate with ATC orders.

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

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the PA28 pilot was misinformed of the height that the Prefect was climbing to for the PFL, and the Prefect pilot was not informed about the PA28 crossing the CMATZ.