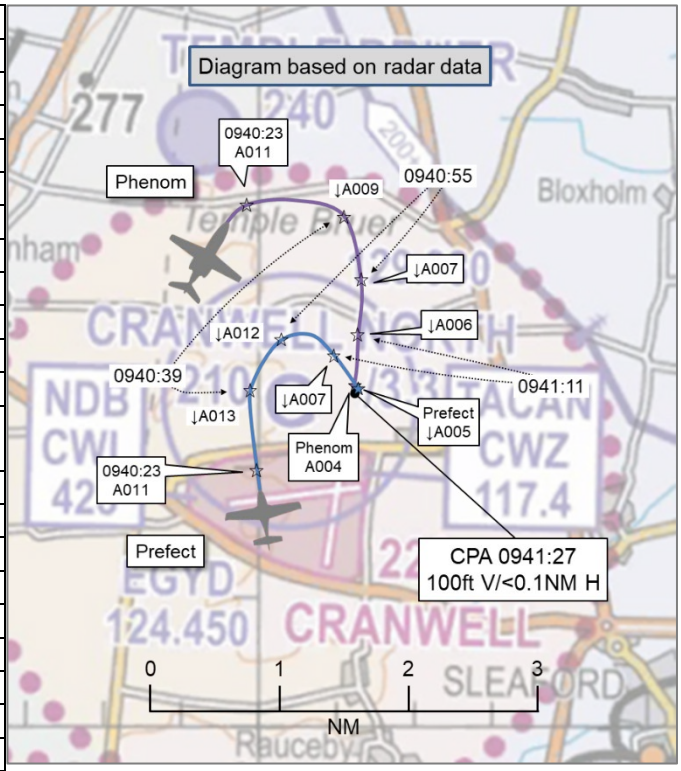
AIRPROX REPORT No 2022258

Date: 02 Nov 2022 Time: 0941Z Position: 5303N 00029W Location: RAF Cranwell

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Prefect	Phenom
Operator	HQ Air (Trg)	HQ Air (Trg)
Airspace	Cranwell CMATZ	Cranwell CMATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Cranwell Tower	Cranwell Tower
Altitude/FL	500ft	400ft
Transponder	A, C, S	A, C, S+
Reported		
Colours	White	Blue, White
Lighting	Nav, Strobes, Landing	NR
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	NR	400ft
Altimeter	NR	QFE (1006hPa)
Heading	360°	188°
Speed	NR	115kt
ACAS/TAS	TAS	TCAS I
Alert	Information	None
Separation at CPA		
Reported	150ft V/150ft H	100ft V/50m H
Recorded	100ft V/<0.1NM H	



THE PREFECT TRAINEE PILOT reports that, following a non-eventful Tower-to-Tower transit from Barkston Heath to Cranwell, the 30min dual element of this exercise was flown with only minor debrief points. Throughout this period, the circuit was relatively quiet with a single Phenom joining during the last circuit. After the engine-running crew change, the solo trainee launched into the circuit without incident. The circuit contained a second Phenom which had joined the circuit during this period. During the downwind leg, the pilot was not aware of the 'one ahead' call from ATC and, as such, turned final without identifying this traffic. With hindsight, greater diligence to this may have led to an early go-around decision that would have averted the incident.

During the final turn, the pilot heard the call from the Phenom pilot to ATC asking if they, the Prefect pilot, was visual, after ATC relayed that to the pilot, the pilot responded that they were not. The Phenom pilot was then directed to go around, and it was at this time that the Prefect pilot became visual with the Phenom traffic below and to the left of their current position. At no point did the pilot feel the need to take avoiding action. The Prefect was subsequently cleared to land and did so without any further incident.

This report is being submitted following discussions with the Phenom crew on landing to support the investigation of their filed Airprox.

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

THE PREFECT QFI reports that, whilst monitoring the circuit from the Tower, the circuit flown by the trainee looked accurate and all RT calls made in the correct places. After the "*Final, Gear down*" call was made, it was clear that the Phenom may impact the trainee's ability to land due to a lack of separation, but this separation appeared reasonable and safe (the Phenom pilot had called final some 30sec earlier). The expectation was that the trainee would go-around if required, and this was well

within their demonstrated capabilities. After it became clear that the Prefect pilot was not visual with the Phenom ahead, ATC made the sound decision to send the Phenom pilot around, as they were the more experienced crew, and to allow the solo trainee to land. At this point, the Phenom visually appeared to be ahead of the Prefect and the go-around appeared to be flown without issue. The Prefect completed a standard landing when cleared by ATC.

Of note, the trainee had successfully flown the 30min dual sortie with only minor debrief points and had made sound positioning decisions with regard to other traffic in a slightly quieter circuit. The solo circuit was flown with the addition of 2 Phenoms in the circuit which was the first opportunity that the trainee had had to operate with a variety aircraft types (previously had only shared a circuit with Prefects). This could well have contributed to them not seeing the Phenom as their eyes would not have been used to looking for traffic in the slightly different shaped pattern.

THE PHENOM PILOT reports that while conducting a visual circuit at RAF Cranwell to RW19RH, the Phenom crew experienced an Airprox with a Prefect. The Phenom was established on the final approach and wings level having been cleared to touch-and-go. At approximately 400ft, the left-hand seat QFI observed a Prefect, above in the 2 o'clock position, in a descending turn converging towards them. The Prefect was estimated to be half-way around the final turn, belly-up to the Phenom. Immediately the Phenom QFI asked Cranwell Tower if the Prefect pilot was visual with the Phenom. ATC relayed the question to the Prefect solo trainee pilot who responded "*traffic not in sight*". ATC then directed the Phenom pilot to go around. Due to the proximity and perceived Loss of Safe Separation between both aircraft, the Phenom crew elected to continue the approach initially to gain separation and then execute the go-around at 200ft. The go-around was uneventful with adequate separation maintained. The Phenom pilot elected to land from the next approach, but mainly owing to sortie duration.

The pilot assessed the risk of collision as ‘Medium’.

THE CRANWELL TOWER CONTROLLER reports that in the circuit there were 2 Phenoms and a Prefect, the pilot of which was on a first solo circuit [they recalled]. The relevant Phenom pilot called final, gear down and was given clearance to land. The Prefect pilot called downwind to land and was told "one ahead". When the Phenom was approximately 2NM final, the Prefect pilot called final, gear down and was told to continue approach. It was then that it became apparent that the Prefect pilot had started to turn in for final and would potentially intercept the position of the Phenom. The Phenom pilot transmitted the question, asking if the Prefect [pilot] was visual with them, which they [the controller] relayed to the Prefect pilot. The Prefect pilot’s response was negative. The Supervisor (who was present at the time to observe the first solo aircraft, as is SOP), gave the instruction to send the Phenom around and allow the Prefect to land. From the controller’s position, which has a direct view due to the RW19RH circuit going around the Tower with final on RW19 being the closest to ATC, it was perceived that if the Prefect pilot were to be instructed to ‘go around’ they could have turned left to break off dead-side and flown directly into the path of the Phenom, slightly on their left, with which they had already declared they were not visual. The Prefect then levelled out slightly behind, above and to the right of the Phenom, approximately 10ft vertical separation existed and lateral separation couldn’t be accurately determined, however, on the radar replay, the returns appear to merge. The Phenom continued to descend slightly and then broke off to dead-side. The Prefect pilot was then given clearance to land and landed. The Phenom landed from the next circuit.

The controller perceived the severity of the incident as ‘Low’.

THE CRANWELL SUPERVISOR reports they were positioned in the VCR to witness the first solo Prefects due to get airborne. The events happened as described by the ADC in this report. Their only observation is that, had they been the ADC, they would have sent the Phenom around as soon as it became apparent that the Prefect had turned inside the Phenom and became a potential collision hazard. However, as they gave the instruction to send the Phenom around, the ADC did not hear it because the Phenom pilot asked if the Prefect was visual with them, which the ADC relayed. The Supervisor then reiterated the instruction to send the Phenom around because it was quite clear to them that the Prefect pilot was not visual with the Phenom and that, due to their relative positions, the

safest way to ensure that more separation was achieved between the two aircraft was to break the Phenom off and for them to turn left onto dead-side. This also allowed the lesser experienced pilot to land from their first circuit rather than try to reintegrate into a circuit in which there were two Phenoms.

The Airprox was nothing to do with the caravan controller as the Phenom had been given clearance to touch-and-go before the Prefect turned inside on final. As there were first solos in the circuit, as the Supervisor, they were positioned in the VCR and witnessed the whole incident. They believe the TRC would not have had as good an angle as they were positioned on the 'wrong' side of the Airprox to see it. However, as the RW19RH circuit passes around the Tower, from there, there was a direct view.

Factual Background

The weather at RAF Cranwell was recorded as follows:

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METAR EGYD 020950Z 18013KT CAVOK 10/07 Q1012 NOSIG RMK BLU BLU
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Analysis and Investigation

Prefect and Phenom operating organisations

The Prefect and Phenom operating organisations completed a joint investigation into this event which has resulted in a number of findings and a recommendation. The output from the investigation is summarised below:

A Prefect and Phenom flew into confliction in the visual circuit whilst positioning for the final stages of approach to RW19RH at Cranwell. ATC personnel observations put the vertical separation at 10ft, however, they were unable to judge horizontal separation but the Phenom crew considered it to be around 50m horizontally and 100ft vertically. Radar traces show a convergence.

The Prefect pilot was unaware of the Phenom in the circuit and missed the 'one ahead' RT call due to verbalisation of internal checks, plus they did not assimilate the implication of the 'continue' instruction when they called final. Additionally, although the TAS sounded an alert, the trainee was unable to act on the information prior to the subsequent Phenom RT. Elementary Flight Training (EFT) refresher trainees are likely to be working hard in a busy circuit.

The Prefect pilot was unused to operating in a mixed circuit traffic environment. The Phenom has a slightly wider visual circuit pattern and therefore the Prefect pilot was not necessarily looking in the correct part of the sky during their normal visual scan of the surrounding airspace.

The ATCO (ADC) did not recognise the close proximity of the two aircraft and did not intervene prior to the Phenom crew querying the Prefect's position. Initial reactions from both the QFI in the Tower and the ADC were that there was a lower perception of the potential for LoSS from their viewpoint. The Supervisor was more aware but attempts to intervene were interrupted by the Phenom pilot's RT call.

The expectation of ATC was that the Phenom pilot was better placed to effect a go-around as the Prefect pilot was a solo trainee and had not sighted the Phenom. However, the Phenom crew felt they required to continue the descent to increase separation and overtake the Prefect, prior to safely manoeuvring to the dead-side. This took approximately 8sec to action including configuration of the aircraft (power setting and flaps).

ATC deemed it appropriate to prioritise the solo Prefect pilot as it was crewed by a relatively inexperienced trainee, and the relative positioning meant any action from the Prefect pilot would potentially have taken it more directly into the path of the Phenom, due to crossing to the dead-side.

The circuit contained two Phenom aircraft airborne and two solo trainee Prefect aircraft, completing a single circuit. Of note, the [Cranwell] FOB[1] does not mirror the Barkston Heath FOB, which specifies permitted circuit numbers, including solos, although this would have permitted this level of circuit occupancy (which is runway [in use] dependant).

A recommendation had been made and accepted that consideration be given to limiting the circuit traffic levels, including provision of a sterile circuit, for all EFT and refresher sorties.

The runway that was in use at Cranwell is shorter with a slightly tighter/faster right-hand circuit pattern [than the trainee had been used to]. Additionally, the trainee was more familiar with Barkston Heath and, as a result, it has been agreed to mandate that first solos are not exported from home base.

The trainee was on a refresher course prior to Prefect Multi-Engine lead-in training, and therefore had more hours on type than a typical solo trainee but had only one dual-to-solo EFT sortie on their previous syllabus.

The turn to final was flown, [by the Prefect pilot], tighter than previous circuits, affecting the trainee's ability to visually detect the Phenom due to the relative orientation and flightpath, however, it was noted that previous circuits with the QFI were flown to the appropriate standard by the trainee.

There is no requirement for the pilot to read-back an ATC notification RT call of "*one ahead*". Had this been a requirement, it would have highlighted to the ATCO and supervising QFI that the trainee had not assimilated the calls and hence had low Situational Awareness.

Cranwell ATSU Investigation Summary

The runway in use was RW19RH which has a much smaller visual circuit than either RW26 or RW08. The ADC was in control of Tower UHF Stud (#2) and Tower VHF (which saw no use in this incident). The ADC had a total of 4 aircraft pilots on frequency during the incident: a Phenom pilot established in the visual circuit on #2, another Phenom pilot who was joining the visual circuit via the initial point also on #2, a Prefect pilot who was number 1 at the RW19 hold, initially on GND VHF, and another Prefect pilot, who was number 2 at the RW19 hold behind the first also initially on GND VHF.

The Supervisor was present in the VCR and was plugged into a VCCS console to monitor a first solo, [the pilot of the Airprox Prefect] was a student on a refresher course and had flown solo before.

The incident began with [the Airprox Prefect pilot] switching from GND to TWR, closely followed by [the second Prefect pilot]. Between these transmissions, [the Airprox Phenom pilot] called initial and joined the visual circuit, [the second Phenom] was already in the circuit but not yet downwind. [The pilots of both Prefects] called ready for departure, [the non-Airprox Prefect pilot] was instructed to hold and [the Airprox Prefect] was given a clearance to take off. [The second Phenom pilot] (number 1 in the circuit) called downwind to touch-and-go, then final with gear down and was instructed to continue (due to [the Airprox Prefect] rolling to take-off) and, after 28sec, was given a clearance to touch-and-go, then shortly self-initiated a go-around. [The Airprox Phenom] (was number 2 in the circuit, now number 1) then called downwind to touch-and-go. As expected of a solo circuit sortie, [the Airprox Prefect pilot] called downwind to land, which the ADC acknowledged and informed the student that there was one ahead (not that it is non-standard to not do so, but the traffic ahead was not acknowledged by the student). 4sec later [the Airprox Phenom pilot] called final gear down and a clearance to touch-and-go was given by the ADC.

The Phenom pilot naturally flew an extended visual circuit when compared to the Prefect so, in the 30sec between receiving a positive clearance to touch-and-go and [the Airprox Prefect pilot] also calling final gear down, [the Airprox Phenom] was still approaching short final to touch-and-go. As expected, the ADC instructed [the Airprox Prefect pilot] to continue the approach as they were

[1] Flying Order Book.

unable to issue a [landing] clearance at that time. [The Airprox Prefect pilot] complied, however conducted the approach without being visual with [the Airprox Phenom] and, due to having a shorter circuit, began to cut across in front of the Phenom.

7sec after the 'continue approach' instruction was given, a callsign (assumed to be [the Airprox Phenom], though not stated on frequency) asked to confirm that the Prefect pilot was visual with the Phenom on final, which the ADC relayed to the solo student. After a pause of a few seconds [the Airprox Prefect pilot] declared "*not seen*". Under the Supervisor's instruction off comms, the ADC instructed [the Airprox Phenom pilot] to go around in order to deconflict. [The Airprox Phenom pilot's] response was "*standby*" in an uncharacteristically alarmed tone. 8sec later [the Airprox Phenom pilot] stated they were now going around and the ADC shifted their attention towards the (now ahead) solo student, to confirm their gear was down and issue a clearance to land.

Outcome

[The Prefect pilot] started to cut in front of [the Phenom] while on final, [the Phenom pilot] had already been cleared to use the runway. The solo [Prefect] student was unaware of, and not visual with, the Phenom that was ahead of them and cleared to use the runway.

Controllers have been briefed to maintain increased awareness when solo students are in the circuit.

RW19RH is reasonably uncommon in its usage. It gives the controller a higher workload and is a smaller circuit than RW26/08. The wind favoured RW19RH, and was incompatible with ops on RW26/08.

Military ATM

An Airprox occurred on 2 Nov 22 at approximately 0945 in the RAF Cranwell visual circuit, to RW19. The Prefect and Phenom pilots were in receipt of an Aerodrome Control Service from the Cranwell Aerodrome controller.

The Cranwell Aerodrome controller, operating RW19 right-hand circuits, had 2 Phenom aircraft and 1 Prefect aircraft in the visual circuit. The Airprox Phenom pilot called downwind to touch-and-go. The Prefect pilot called downwind to land and was informed of one ahead. The Phenom pilot called 'final, gear down', and was given a clearance to touch-and-go. With the Phenom on 2NM final, the Prefect pilot called 'final, gear down', with a 'continue' provided by the controller. The Phenom pilot queried if the Prefect pilot was visual with them, which they weren't. Following an instruction from the Cranwell Supervisor, the Phenom pilot was instructed to go-around, and the Prefect was seen to level-out slightly behind and above to the right of the Phenom.

The Cranwell Supervisor was positioned in the Visual Control Room as per Standard Operating Procedure for any first solo flight in the visual circuit. When it became apparent that the Prefect had turned inside the Phenom, the Cranwell Aerodrome controller was instructed to send the Phenom around, however, due to pilot transmissions, this was not heard by the controller, therefore the instruction was repeated. Due to the experience of the pilots, the Cranwell Supervisor deemed the safest option was to send the Phenom around and allow the Prefect to land.

Figures 1-6 show the positions of the Prefect and Phenom aircraft at relevant times during the Airprox. The screenshots were taken from a replay using the NATS radars which are not available to the Cranwell controller therefore may not be entirely representative of the picture available to them.

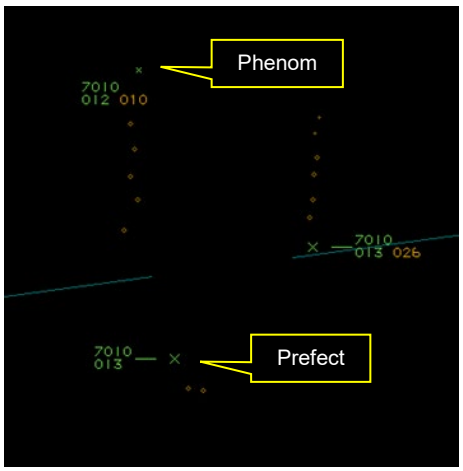


Figure 1 - Prefect pilot reported Downwind.

At 0940:03 the Prefect pilot reported turning downwind to land, Figure 1, and the Cranwell Aerodrome controller stated one ahead. 7sec later, the Phenom pilot reported 'final, gear down', having previously requested a touch-and-go at 0939:20. The touch-and-go was approved.

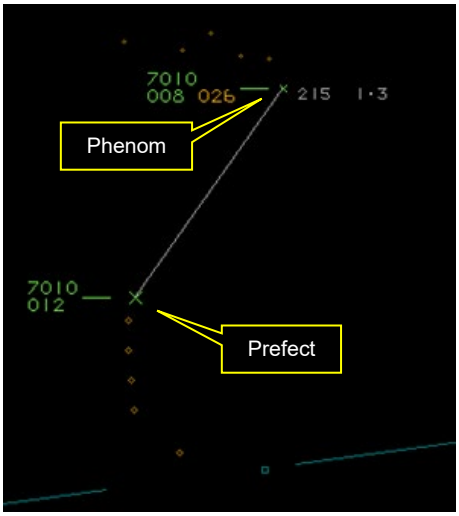


Figure 2 - Prefect pilot reported Final.

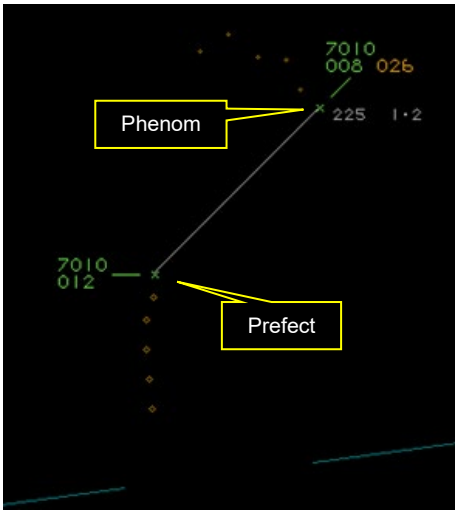


Figure 3 – Prefect pilot instructed to continue approach.

At 0940:44 the Prefect pilot reported 'final, gear down', with the Cranwell Aerodrome controller instructing the Prefect pilot to continue their approach. At Figure 3, the measured separation was 1.2NM and 400ft.

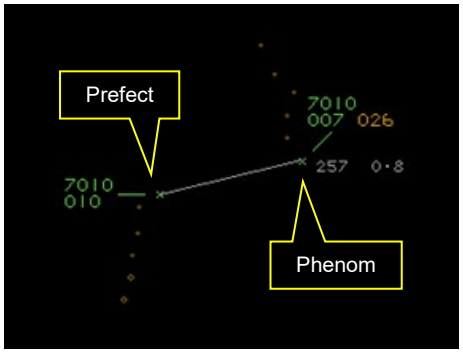


Figure 4 –
Prefect pilot not visual with the Phenom.

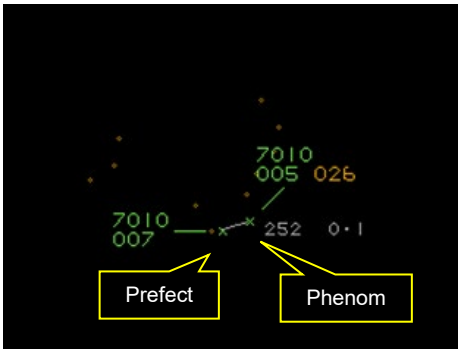


Figure 5 -
Phenom pilot instructed to go around.

At 0940:59, the Phenom pilot asked the Cranwell Aerodrome controller if the Prefect pilot was visual with the Phenom, to which the Prefect pilot reported "not seen". The measured separation had

reduced to 0.8NM and 300ft, Figure 4. Figure 5 illustrates the moment the Phenom pilot was instructed to go around, with separation reduced to 0.1NM and 200ft. Whilst the Phenom pilot was initiating the go-around, separation continued to reduce to a minimum of 0.0NM and 100ft at CPA, Figure 6.

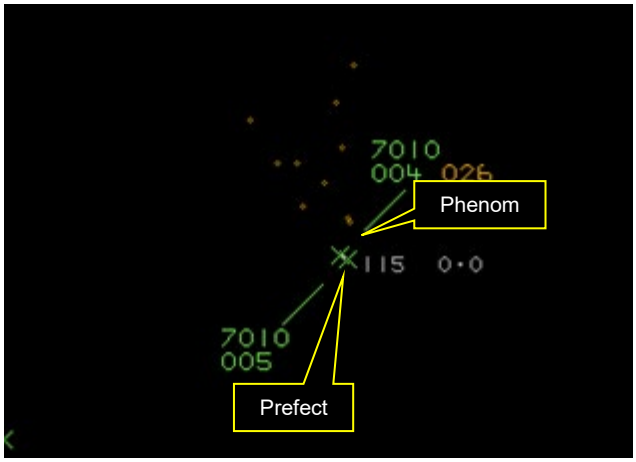


Figure 6 – CPA. 0941:27.

Analysis

With RW19 right-hand in use, the circuit direction is behind the tower and shorter in relation to other circuits flown at Cranwell. The Cranwell Supervisor was positioned next to the Aerodrome controller and had good Situational Awareness. Although intervention was applied, the Cranwell Aerodrome controller didn't hear the instruction due to transmissions on frequency. It is believed it was at this stage that the Phenom pilot became visual with the Prefect, which was slightly above them, belly-up in a right-hand turn. With the Cranwell Aerodrome controller instructing the Phenom pilot to go around, the Phenom pilot stated they elected to continue the approach initially to gain separation and then execute a go-around at 200ft.

There were several opportunities for the Prefect pilot to gain Situational Awareness of the circuit traffic and with the Phenom pilot having been cleared to touch-and-go, the Prefect pilot should have maintained a good lookout to establish the Phenom's location. Had the Cranwell Aerodrome controller also maintained a good lookout, then positive control should have been instigated at the time of the Prefect pilot calling final, either sequencing the Prefect behind the Phenom or sending the Prefect pilot round at circuit height.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and both aircraft were detected and identified using Mode S data. The radar replay showed the aircrafts' elevation as flight levels, however, as the pressure on the day was recorded as 1012hPa, the flight levels displayed equate closely to altitude.

At 0941:03, the Prefect was downwind right-hand for RW19 and the Phenom was passing abeam the Prefect on final for RW19. At this time the Prefect was 200ft above the Phenom at a range of 0.7NM, Figure 7.

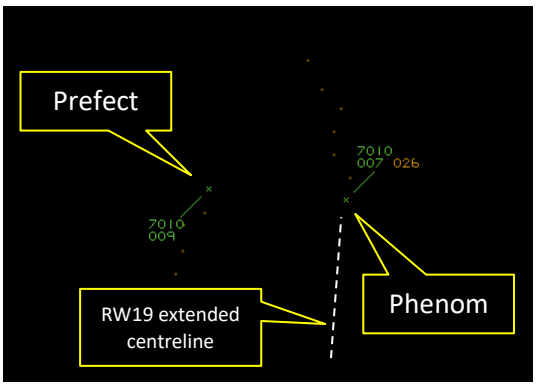


Figure 7 – 0941:03.

As the aircraft continued in the circuit, the radar return for the Prefect became subject to a small amount of radar jitter, until it once again stabilised with both aircraft on final. At 0941:23, the lateral separation between the aircraft had reduced to less than 0.1NM and the vertical separation was recorded as 200ft, Figure 8.

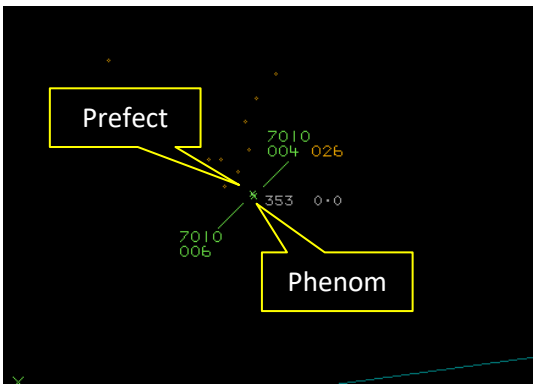


Figure 8 – 0941:23.

CPA occurred on the next radar sweep, at 0941:27 when, although the lateral separation between the aircraft remained at less than 0.1NM, the Prefect was recorded as having been ahead of the Phenom and the vertical separation had reduced to 100ft. This was as a result of the Phenom pilot remaining level whilst the Prefect had continued to descend, Figure 9.

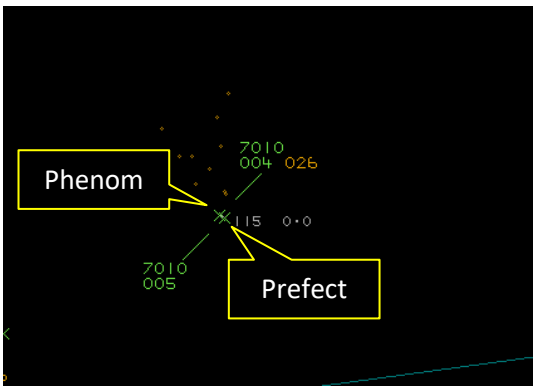


Figure 9 – 0941:27: CPA.

The Prefect and Phenom pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[2] 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.[3]

[2] MAA RA 2307 paragraphs 1 and 2.
[3] MAA RA 2307 paragraph 17.

Comments

Prefect DDH comment

This occurrence highlights the challenges of operating in a mixed circuit with inexperienced trainees, particularly when aircrew are unfamiliar with either the airfield or the other aircraft type(s). Accordingly, they welcome the review of activity levels within the circuit when solo trainees are airborne and agree that first solo sorties should not be exported from Homeplate. From the report statements, it appears possible that the CPA was not as close as originally perceived, but that a credible confliction occurred with the Phenom aircraft due to the Prefect aircraft executing an early turn onto final with reduced Situational Awareness on the aircraft ahead. Although the Phenom pilot was instructed to go around by ATC, the decision by the Phenom crew to continue the approach until safely separated from the Prefect before moving onto the dead-side showcased defensive flying and captaincy skills, especially when considering that the other aircraft was a solo trainee. Whilst this action resulted in a confliction on final, this appeared to be the safest and [most] controlled course of action noting the geometry of the two aircraft. As the DDH, their primary risk is LoSS within the circuit, and they note with interest that a Safety Assessment of Change was proposed to identify whether the mandatory readback of 'one ahead' would be beneficial as a risk reduction measure to prevent reoccurrence of such conflictions. Whilst the implementation of such a readback could possibly improve circuit pattern Situational Awareness, the panel tasked to investigate this measure identified that extra radio calls within a full circuit would likely introduce distraction to both aircrew and controller personnel. They agree with this assessment and believe that additional radio calls to acknowledge 'one ahead' would reduce capacity and Situational Awareness, and increase the likelihood of task saturation, rather than improve it, with the potential for a commensurate increase in RT loading. Separately, an Occurrence Safety Investigation into LoSS within the operating environment will shortly be completed, which they will review for identification of opportunities to improve safety within the circuit.

Cranwell ATSU Comment

Authorising Officer Closure Comments: This incident highlights the need for flexibility over rigid adherence to the FOB when a solo student is operating in the circuit. It also highlights the considerable value of the VCR Supervisor position to maintaining a safe operating environment at Cranwell. On this occasion, the Supervisor was able to provide direction and guidance to the ADC to ensure that the safest course of action was achieved, even if it was technically at variance with the priority rules as detailed in the FOB.

With regard to the actions of the aircrew, they have nothing to add to the conclusions of the [Prefect and Phenom operating organisations] investigation. They do, however, welcome the direction that first solo sorties should not be exported from Homeplate.

HQ Air Command

The Prefect pilot turned final in front of the Phenom without Situational Awareness. Intervention by ATC was robust in this case and the subsequent actions of the Phenom crew were sound. The review of RT procedures has concluded there is insufficient space to accommodate acknowledgement of traffic calls in a busy circuit. It is encouraging to see that procedures for solo students operating in the circuit have been reviewed by the local supervisory chain. Whilst restricting solo student flying to the Homeplate will affect flexibility, it is likely to improve air safety. The trainee pilot will be required to cope with mixed and busy circuits during their career, but it should be decided at a local level when and where this is appropriate. An inexperienced trainee will be working harder than an experienced pilot when the other traffic is flying a pattern less familiar to them, especially at a different airfield and runway. Exposure to mixed circuit situations should be in a controlled environment and would be more appropriate for prior dual sorties at this stage of flying training.

Summary

An Airprox was reported when a Prefect and a Phenom flew into proximity at RAF Cranwell at 0941Z on Wednesday 2nd November 2022. Both pilots were operating under VFR in VMC, both in receipt of an Aerodrome Control Service from the Cranwell Tower controller.

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.

The Board first considered the actions of the Prefect pilot and a military pilot member stated that the RW19RH circuit at Cranwell is noticeably different from that with which the Prefect pilot would have been familiar, including having a shorter downwind leg, compressing the time available to the pilot to complete their necessary checks. Members discussed that being able to integrate into a circuit which contains aircraft of varying performance and speed is an important skill for a pilot, however, the Board agreed that undertaking the early solo flights at their Homeplate is beneficial and agreed that the introduction of this procedure would be advantageous (**CF6**). Members agreed that the Prefect pilot's workload had been high during their downwind and base leg, and that this had contributed to them not assimilating the available information regarding the presence of the Phenom (**CF10**) from both the RT and their TAS (**CF11)**. Because the Prefect pilot had not assimilated the information regarding the Phenom, they had not had any awareness of its presence (**CF9**), nor had they become visual with it (**CF13**) and, by continuing in the circuit, the Prefect pilot had not conformed with the pattern of traffic which had been formed by the Phenom (**CF7, CF8**).

Next, members discussed the actions of the Phenom pilot, noting that although they had been equipped with TCAS, the system had not alerted (**CF12**). However, as the Airprox had happened in the visual circuit and the Phenom pilot had been fully aware of, and visual with, the Prefect, the Board agreed that this had not materially affected the outcome of the event, concluding that the Electronic Warning System Operation and Compliance barrier had not been used. The Board was encouraged that the Phenom pilot had alerted the controller that the Prefect had been converging with them and, although there was a brief discussion regarding whether the Phenom pilot could have done more at this time, members agreed that it had been appropriate for them to initially maintain their flightpath to avoid further loss of separation, and that this had also meant that they had remained 'predictable' to the controller. The Board then examined the Phenom pilot's reaction to the instruction from the Tower controller to go around, again agreeing that taking time to properly configure the aircraft and accelerate ahead of the Prefect had been an appropriate course of action.

The Board then examined the involvement of the ground elements, quickly agreeing the presence of a Supervisor in the Tower had been advantageous. A military ATCO member stated that RW19RH is not often utilised at Cranwell, and that sections of the circuit can be obscured from the controller's viewpoint. However, the addition of a Supervisor, who can more readily move around the Tower to overcome any obscuration, is of benefit. The Board agreed that it had been reasonable for the controller to have assumed that the Prefect pilot had been aware of the Phenom and would follow the established traffic pattern (**CF3**). Members noted that it had been the Supervisor who had first become aware of the potential conflict, however, they had been unable to quickly communicate it to the controller as they had been interrupted by the busy RT (**CF4**). The Board agreed that, as the Supervisor had been unable to immediately communicate the developing situation to the controller, the controller had developed their Situational Awareness (**CF5**), and detection of the conflict (**CF1**), at a later than optimum point which, although the controller had acted as quickly as they had been able to, resulted in the conflict resolution instructions being issued late (**CF2**).

Finally, in assessing the risk of collision, the Board agreed that the Prefect pilot had not had any awareness of the presence of the Phenom nor had they become visual with it at any point. Members commented that, due to external factors, the controller had developed their situational awareness late,

aided by the Supervisor, and that the Phenom pilot had carried out the controller's instructions in an effective manner. Members agreed that, although the actions of the Supervisor, controller and Phenom crew had reduced the risk of collision, it had not removed it entirely (**CF14**) and that in this case, safety had not been assured. Accordingly, the Board assigned a Risk Category B to this Airprox.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2022258			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Situational Awareness and Action			
1	Human Factors	• Conflict Detection - Detected Late	An event involving the late detection of a conflict between aircraft	
2	Human Factors	• Conflict Resolution - Provided Late	An event involving the late provision of conflict resolution	
3	Human Factors	• Expectation/Assumption	Events involving an individual or a crew/ team acting on the basis of expectation or assumptions of a situation that is different from the reality	
4	Contextual	• Frequency Congestion	An event involving frequency congestion that reduces the effectiveness of communications	
5	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness
	Flight Elements			
	• Regulations, Processes, Procedures and Compliance			
6	Organisational	• Flight Operations Documentation and Publications	Flight Operations Documentation and Publications	Inadequate regulations or procedures
7	Human Factors	• Use of policy/Procedures	Events involving the use of the relevant policy or procedures by flight crew	Regulations and/or procedures not complied with
	• Tactical Planning and Execution			
8	Human Factors	• Monitoring of Environment	Events involving flight crew not to appropriately monitoring the environment	Did not avoid/conform with the pattern of traffic already formed
	• Situational Awareness of the Conflicting Aircraft and Action			
9	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late, inaccurate or only generic, Situational Awareness
10	Human Factors	• Understanding/ Comprehension	Events involving flight crew that did not understand or comprehend a situation or instruction	Pilot did not assimilate conflict information
	• Electronic Warning System Operation and Compliance			
11	Contextual	• Other warning system operation	An event involving a genuine warning from an airborne system other than TCAS.	
12	Human Factors	• Response to Warning System	An event involving the incorrect response of flight crew following the operation of an aircraft warning system	CWS misinterpreted, not optimally actioned or CWS alert expected but none reported
	• See and Avoid			
13	Human Factors	• Monitoring of Other Aircraft	Events involving flight crew not fully monitoring another aircraft	Non-sighting or effectively a non-sighting by one or both pilots
	• Outcome Events			
14	Contextual	• Near Airborne Collision with Aircraft	An event involving a near collision by an aircraft with an aircraft, balloon, dirigible or other piloted air vehicles	

Degree of Risk: B

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:

Situational Awareness of the Confliction and Action were assessed as **partially effective** because the controller reasonably assumed that the Prefect pilot would have followed the Phenom onto final and both the controller and the Supervisor became aware that this had not happened at a later than optimum stage.

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the Prefect pilot did not conform with the pattern of traffic formed by the Phenom. Also, the process of exporting early solo sorties from Homeplate has been identified as sub-optimal.

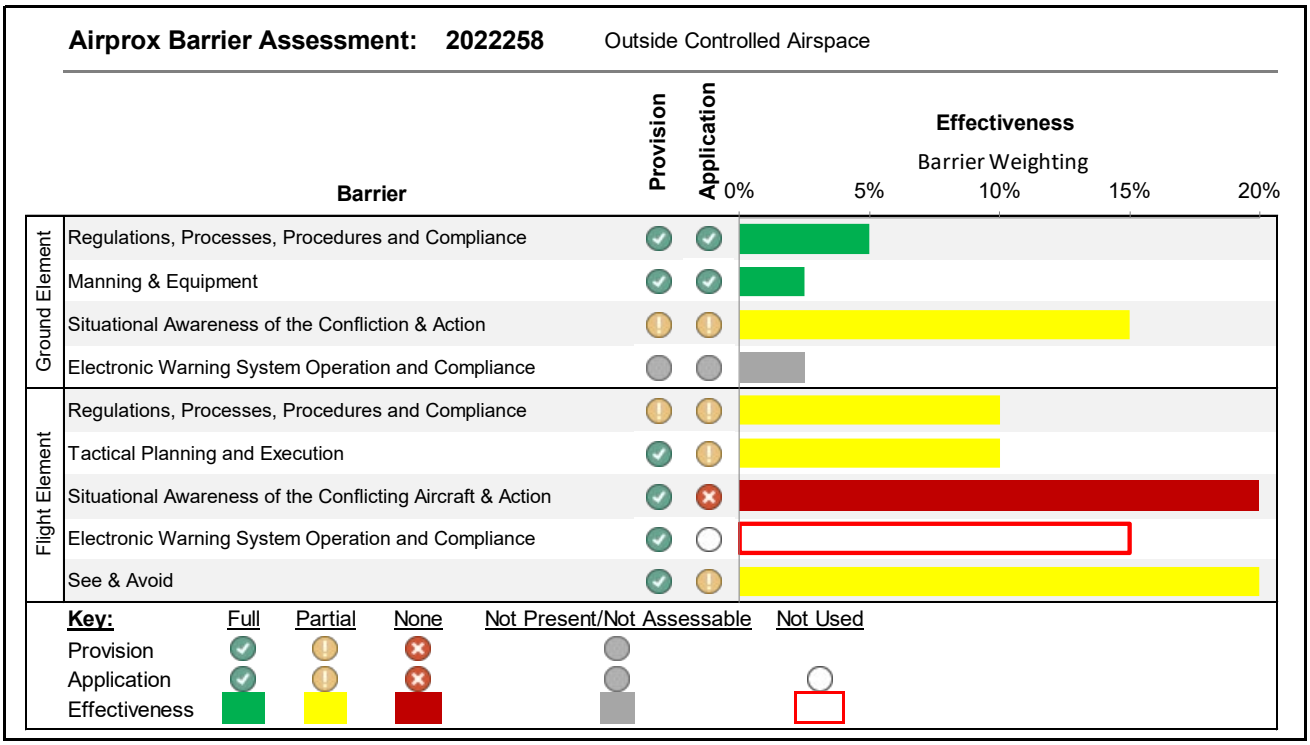
Tactical Planning and Execution was assessed as **partially effective** because, on noticing the approaching Prefect, the Phenom pilot's initial plan adaption had been to question whether the Prefect pilot had been visual with them rather than break the confliction.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because the Prefect pilot had not had any awareness of the presence of the Phenom, and the Phenom pilot had been unable to predict the Prefect pilot's flightpath.

Electronic Warning System Operation and Compliance were assessed as **not used** because, due to their proximity to the ground, the TCAS RA function on the Phenom had been inhibited and, although the Prefect's TAS had alerted, the pilot had been unable to assimilate this information.

See and Avoid were assessed as **partially effective** because, after visually acquiring the Prefect, the Phenom pilot had initially maintained the converging trajectory, whilst the Prefect pilot had not become visual with the Phenom at any point.

[4] 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: 2022258
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