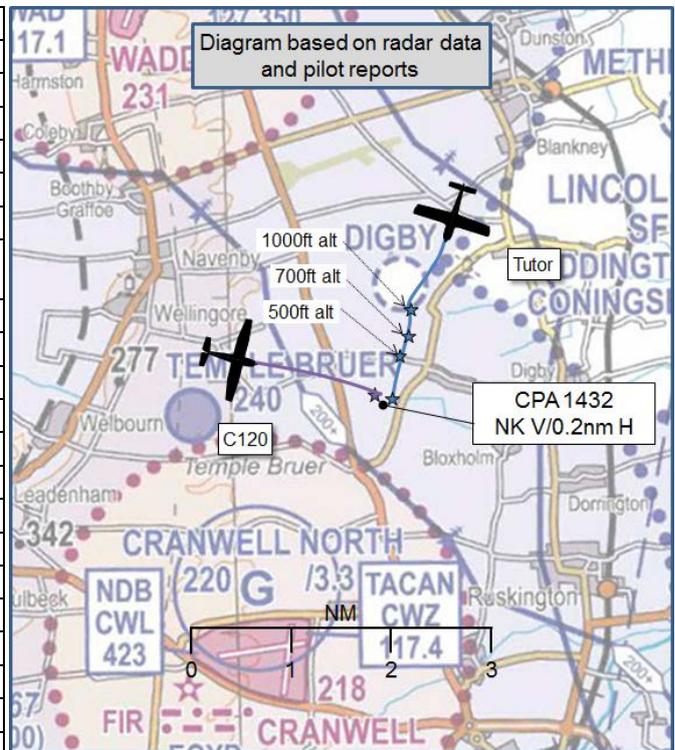


AIRPROX REPORT No 2016121

Date: 18 Jun 2016 Time: 1430Z Position: 5305N 00027W Location: Cranwell MATZ

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Tutor	C120
Operator	HQ Air (Trg)	Civ Pte
Airspace	Cranwell MATZ	Cranwell MATZ
Class	G	G
Rules	VFR	VFR
Service	Aerodrome	Basic
Provider	Cranwell Tower	Waddington LARS
Altitude/FL	500ft	NK
Transponder	C	A
Reported		
Colours	White	Cream, Red
Lighting	Nav, Strobe	NK
Conditions	VMC	VMC
Visibility	>10km	10km
Altitude/FL	1000ft	1100ft
Altimeter	QFE	NK
Heading	200°	120°
Speed	120kt	90kt
ACAS/TAS	TAS	Not fitted
Alert	TA	N/A
Separation		
Reported	1000ft V/500ft H	500ft V/0.5nm H
Recorded	NK V/<0.2nm H	



THE TUTOR PILOT reports that he was on recovery to Cranwell from the NE and switched from a Traffic Service with Waddington ATC to Cranwell Tower in the vicinity of Digby. As he completed his initial call to Cranwell Tower he noticed a TAS contact in his right 2 o'clock at 3-4 miles without any height information. Approximately 10-20 seconds later Cranwell ATC reported the contact at 3 miles, unknown height. He elected to increase his rate of descent to clear the most likely GA altitudes and achieve his final join height, and tailored his lookout accordingly. As he passed approximately 1000ft QFE, he finally achieved a tally as the aircraft became silhouetted above the horizon. He assessed that they were on a collision course and accelerated his descent to 500ft. He passed 500ft below, and approximately 500-1000ft ahead of the aircraft, which he identified as a C172 [actually a C120] that was flying at approx 1000ft QFE. The 'C172' did not react to his presence. He assessed that had he not increased his initial rate of descent, the separation distance would have been very small due to a likely later tally. The TAS and a warning from the Cranwell controller certainly reduced the risk of a more serious incident. He commended the Cranwell controller because her traffic information was sourced from only the radar repeater and, because the occurrence happened outside the 2.5nm ATZ, could be considered to be outside her immediate responsibility as a visual controller. He was later informed that the 'C172' was transponding with a Waddington IFF code set.

He assessed the risk of collision as 'Low'.

THE C120 PILOT reports that he was routing from Grove Farm to Fenland. His route of flight avoided Waddington ATZ and took him close to his operating base, which he remained slightly north of to ensure clearance from Cranwell North gliding site and also well clear of Cranwell ATZ. The Tutor was sighted in his left 10 o'clock, well below, and passing left to right before notification from Waddington of the traffic. In his opinion there was no Airprox.

He assessed the risk of collision as 'None'.

THE CRANWELL CONTROLLER reports that the Tutor was recovering from the NE for a downwind join for RW 01RH from approximately 3000ft QFE; previously the Tutor was with Waddington under a Traffic Service. The North airfield was active with Cranwell gliders and numerous 7000 squawks and non-squawking contacts in the general area. She noticed on the Air Traffic Monitor that there was a Waddington squawk (3602) tracking W to E inside the Cranwell MATZ (to the NE of CWL by approximately 3.5 to 4 nm) with no Mode C, which looked like it might conflict with traffic that she believed to be the Tutor on recovery. With no height information on the 3602 Squawk and no Traffic Information from Waddington, she called Traffic Information on the 3602 Squawk for the benefit of the Tutor. Looking out of the VCR, she could see neither of the aircraft. The pilot acknowledged the traffic and said he had a TAS contact with no height information but wasn't visual with the aircsystem at that point. He then sighted the traffic and descended to ~500ft QFE to avoid because they were at a similar altitude. A descent to 500ft would be the norm for a downwind join. The Tutor reported a C172 approximately 1000ft QFE. The pilot informed her that he didn't believe the aircraft to have responded to his manoeuvre (also acknowledging the C172 had right of way). The pilot of the Tutor also reported to her afterwards that Waddington LARS had been busy and he had not had the traffic called to him before he switched to Cranwell Tower. Having spoken to the ATCO i/c at Waddington, her understanding was they were busy, and by the time they were able to correlate the track of the C172 and its intentions, the pilot of the Tutor had already changed frequency to Cranwell Tower. Her concerns are that: flight safety could have been compromised had she been busy and didn't have the capacity to view the ATM; the Tutor pilot may have called visual with one of the Cranwell gliders instead of the Waddington 3602 traffic; she could have assumed the traffic in the MATZ was a glider if the 3602 squawk had not shown on the ATM; had the conflicting traffic not had a transponder fitted it would not show up on TAS; the workload of the ATCO IC at Waddington prevented them from being able to assimilate the information regarding the C172 and pass TI to Cranwell; recovery procedures from Waddington and the lack of a TS once traffic has left the Waddington frequency; a potential reliance upon TAS by pilots in spite of numerous non-squawking contacts at the weekend was a potential factor; and other airspace users airmanship and potential unpredictability versus the poor visibility [in her opinion] of the Tutor.

She perceived the severity of the incident as 'Medium'.

THE WADDINGTON CONTROLLER reports that she was the LARS controller at the time of the incident. The Tutor was one of several aircraft on her frequency in the lead-up to the incident; however, she does not remember how many other aircraft she was working at the time. It was a reasonably busy day on LARS and she was working 7-8 aircraft on several occasions. Waddington provides a Traffic Service to Cranwell Tutors at the weekend, up to a maximum of four at a time in addition to a maximum of 4 Basic Service tracks. There are 2 controllers rostered for weekend shifts with one LARS console open. Under normal circumstances, the Tutors report their sortie as complete and declare visual with Cranwell aerodrome; at this point, they are instructed to freecall Cranwell Tower. This differs to procedures during the week where Tutors would speak to a Cranwell radar controller first. The Tutor was conducting General Handling northeast of Cranwell in the vicinity of Bardney. He called complete and visual with Cranwell approximately 10nm away from Cranwell. In accordance with weekend procedures she instructed the pilot to freecall Cranwell tower. She is confident that she would have called any traffic that posed a factor at the time. The Cessna was operating under a Basic Service on a transit sortie. Her workload at the time was sufficient for her to overlook a call to Cranwell Tower to request a MATZ crossing for the Cessna before he entered the MATZ. At the point that it became apparent that the Tutor and Cessna were on converging headings, the Tutor had been off her frequency for approximately 5 track miles. She did attempt to raise the Tutor on her frequency but she believes he was already speaking to Cranwell Tower. Around the time she noticed the confliction, Cranwell Tower called on the landline to request traffic information on the Cessna. Due to the distraction of the landline, this resulted in a late call to the Cessna to alert him of the Tutor's presence. She remembers that the Cessna pilot did declare that he was visual with the Tutor.

She perceived the severity of the incident as 'Medium'.

Factual Background

The weather at Cranwell was recorded as follows:

SPECI EGYD 181316Z 35009KT 9999 BKN030 14/07 Q1021 BLU NOSIG

Analysis and Investigation

Military ATM

Portions of the tape transcripts between Cranwell Tower and the Tutor are below:

From	To	Speech Transcription	Time
Tutor	Cranwell Tower	Cranwell Tower [Tutor C/S] with Hotel request downwind join	14:30:20
Cranwell Tower	Tutor	[Tutor C/S] Cranwell Tower join downwind Hotel correct circuit clear	14:30:30
Tutor	Cranwell Tower	[Tutor C/S]	14:30:35
Cranwell Tower	Tutor	[Tutor C/S] traffic believed to be you has traffic right one o'clock two miles crossing right left ahead no height information	14:31:00
Tutor	Cranwell Tower	[Tutor C/S] er TAS contact we're overhead Digby at this time	14:31:11
Cranwell Tower	Tutor	[Tutor C/S] just to give you an update on that traffic it is now in your right one o'clock one and a half miles crossing right left ahead no height information believed to be speaking to Waddington	14:31:33
Tutor	Cranwell Tower	[Tutor C/S] visual	14:31:45
Tutor	Cranwell Tower	[Tutor C/S] is now clear of that traffic	14:32:16
Cranwell Tower	Tutor	[Tutor C/S] do you know what is was?	14:32:22
Tutor	Cranwell Tower	Er it looked like a Cessna 152	14:32:25
Cranwell Tower	Tutor	Thank you	14:32:25
Tutor	Cranwell Towerand he was co-altitude	14:32:30
Tutor	Cranwell Tower	and [Tutor C/S] he didn't appear to react to my manoeuvre to go below him	14:32:40
Cranwell Tower	Tutor	Roger ... are you declaring anything	14:32:45
Tutor	Cranwell Tower	Negative, I'll consider it once I finish flying for the day	14:32:50

Portions of the tape transcripts between Waddington Zone, the Tutor and the C120 are below:

From	To	Speech Transcription	Time
C120	Waddington Zone	Waddington [C120 C/S], Waddington [C120 C/S] good afternoon again.	14:18:35
Waddington Zone	C120	[C120 C/S] Waddington Zone squawk three-six-zero-two.	14:18:42
C120	Waddington Zone	Three-six-zero-two [C120 C/S] Cessna one-two-zero just airborne from Grove Farm routing to Fenland one thousand feet on one-zero-one-five request a Basic service and zone transit.	14:18:48
Waddington Zone	C120	[C120 C/S] Basic service Barnsley one-zero-one-seven.	14:19:15
C120	Waddington Zone	Basic service one-zero-one-seven [C120 C/S].	14:19:20
Waddington Zone	C120	[C120 C/S] traffic northeast of you half a mile tracking west indicating three hundred feet below.	14:19:24
C120	Waddington Zone	[C120 C/S] looking nothing seen.	14:19:30
Waddington Zone	C120	[C120 C/S] Darlton gliding site active up to two thousand feet.	14:19:33
C120	Waddington Zone	[C120 C/S] copied thanks.	14:19:37

From	To	Speech Transcription	Time
Waddington Zone	C120	[C120 C/S] request your present altitude?	14:19:46
C120	Waddington Zone	[C120 C/S] one thousand one hundred feet on one-zero-one-seven.	14:19:47
Tutor	Waddington Zone	Waddington [Tutor C/S] is er complete we are airfield insight with Cranwell for visual recovery happy to go on route.	14:29:32
Waddington Zone	Tutor	[Tutor C/S] free call Cranwell tower.	14:29:39
Tutor	Waddington Zone	[Tutor C/S].	14:29:41
Waddington Zone	Tutor	[Tutor C/S] are you still on this?	14:31:50
Waddington Zone	C120	[C120 C/S] er,	14:31:58
C120	Waddington Zone	[C120 C/S] I've got traffic just left right below there was no confliction.	14:32:02
Waddington Zone	C120	[C120 C/S] roger I hadn't arranged a Cranwell crossing for you.	14:32:07
C120	Waddington Zone	Roger we are keeping well clear of the A-T-Z.	14:32:13
Waddington Zone	C120	[C120 C/S].	14:32:15

At 1429:39 (Figure 1), the Tutor is well to the north of Cranwell and the C120 is to the North West. The controller free calls the aircraft to Cranwell tower, as per procedures, at this time there is 6.9nm lateral separation between the Tutor and C120. The C120 pilot reported maintaining 1000ft, which would indicate that approximately 1800ft separation existed at this time. The tape transcript indicates no traffic information was passed by the Waddington controller to the Tutor about the C120 before leaving the frequency. Given the distance between the two aircraft and their relative speeds, traffic information may have provided situational awareness but visual acquisition would have been difficult.

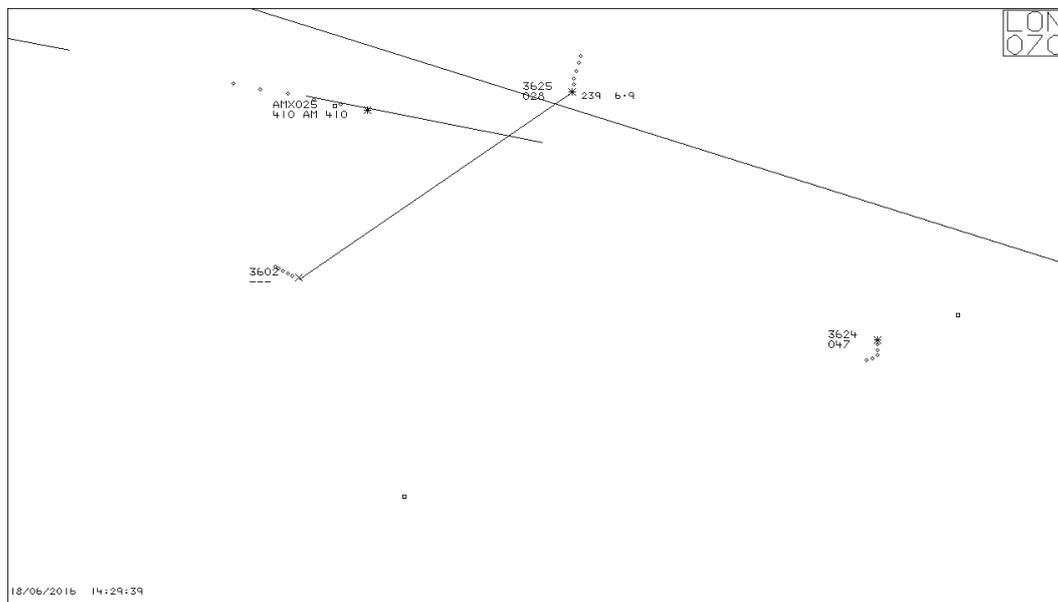


Figure 1: Geometry at 1429:39 (Tutor squawking 3625; C120 squawking 3602).

At 1431:00 (Figure 2), the Cranwell tower controller, using information from the ATM monitor, passed traffic information to the Tutor on the C120. The Tutor pilot responded by indicating they had also registered the contact on TAS.

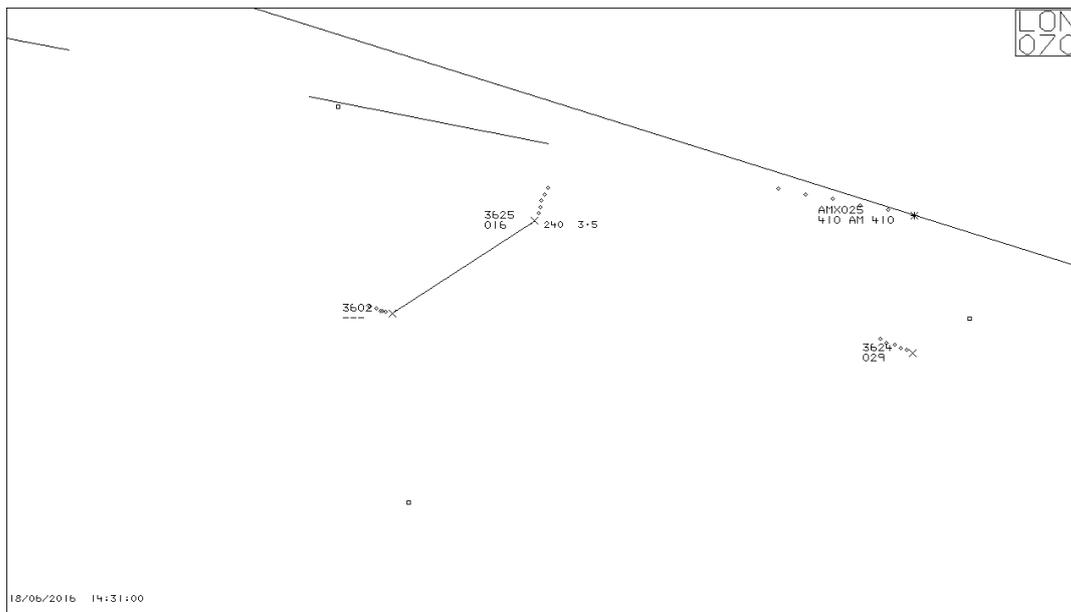


Figure 2: Geometry at 1431:00 (Tutor squawking 3625; C120 squawking 3602).

At 1431:33 (Figure 3), the Cranwell tower controller passes an update to the Tutor pilot on the C120.

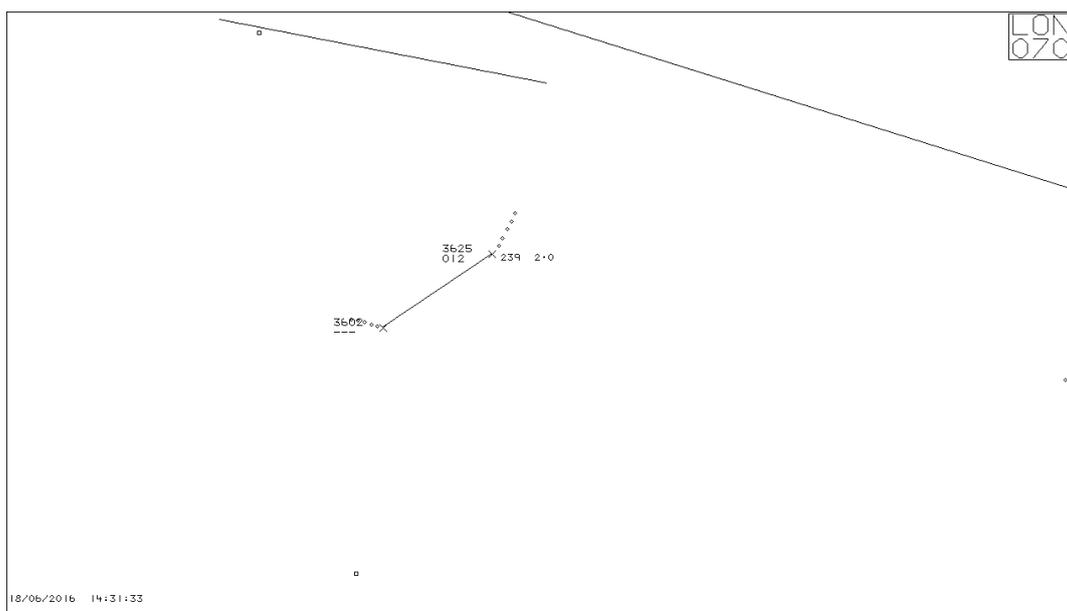


Figure 3: Geometry at 1431:33 (Tutor squawking 3625; C120 squawking 3602).

At 1431:45 (Figure 4), the Tutor pilot calls visual with the C120. The radar replay shows 1.4nm separation exists between the aircraft. If the C120 maintained the same height throughout this would indicate the aircraft are at a similar height at this point; this would correlate with the Tutor pilots report.

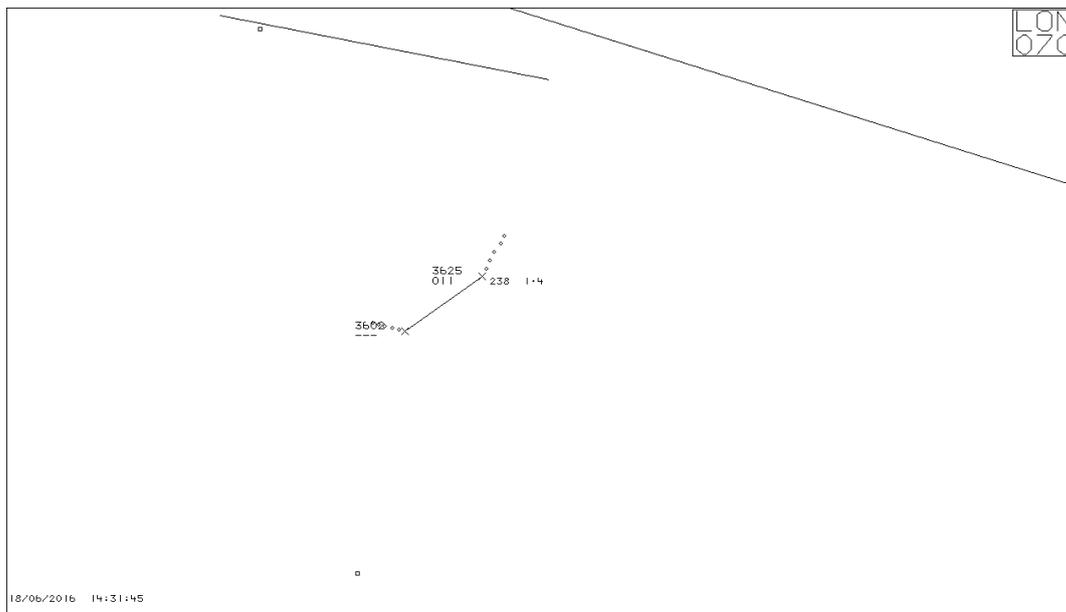


Figure 4: Geometry at 1431:45 (Tutor squawking 3625; C120 squawking 3602).

The Tutor pilot reports recovering from the NE switching from a Traffic Service with Waddington to Cranwell tower in the vicinity of Digby. On completion of the initial call the pilot noticed a TAS contact in their 2 o'clock at 3-4 miles without height information. Approximately 10-20 seconds later the Cranwell tower controller passed traffic information on the contact at 3 miles, unknown height. The pilot elected to increase their rate of descent to achieve their final join height and on passing 1000ft QFE became visual with the C120. The pilot reported descending to 500ft to avoid collision, passing 500ft below and approximately 500-1000ft ahead. The pilot commended the controller on the passing of traffic information. The pilot perceived the severity as low.

The Waddington Zone controller reported a busy day on LARS, working 7-8 aircraft on several occasions. The Tutor called general handling complete and visual with Cranwell; as per weekend procedures the controller freecalled the aircraft to Cranwell tower. The controller reported being confident that they called any traffic that posed a factor at that time. The C120 was under a Basic Service, and the controller reported workload at the time was such that they were unable to request a Cranwell MATZ crossing. At the point the controller recognised the converging headings of the C120 and the Tutor; the Tutor had been off frequency for approximately 5 track miles. The controller reported that at the point of noticing the conflict Cranwell tower called on the landline requesting traffic information on the C120. The controller reported a late call to the C120 on the Tutor and recalls the C120 declaring visual. The controller perceived the severity of the incident as medium.

The Cranwell Tower controller reported the Tutor recovering from the NE for a downwind join having been working with Waddington under a Traffic Service. The controller noticed a Waddington squawk tracking west to east inside the Cranwell MATZ on the ATM monitor, with no mode C. The controller registered a conflict with the recovering Tutor and therefore called the traffic. The controller was unable to see either aircraft looking out of the visual control room.

Waddington provides a Traffic Service to 6FTS Tutors (from RAF Cranwell) on weekends, with a maximum of four aircraft on frequency at any one time, in addition to four Basic Service aircraft. Weekend procedures for 6FTS Tutors are that upon completion with their sortie (under a Traffic Service with Waddington) they free call Cranwell Tower; this is due to the reduced establishment of radar controllers at Cranwell on weekends. The Tutor called visual with the airfield over 10nm away from Cranwell and at the point it was free called to Cranwell tower the C120 was separated significantly; it is likely the controller had not registered a conflict at this point. The Waddington controller reported a busy day, the tape transcript shows almost constant transmissions over the period, this would indicate a high workload. The C120 was under a Basic Service and the

controller may not have formally identified or have been tracking the aircraft's routing; under a Basic Service there is no requirement for the controller to pass traffic information or radar monitor the aircraft. Coupled with a high workload, it is likely that these factors precluded the controller informing Cranwell tower of the transit close to the Cranwell ATZ.

Weekend procedures leave potential for a gap in radar service; in the period after the Tutor left the Waddington controller's frequency, the aircraft was not receiving a Traffic Service or the associated Traffic Information the pilot may have received during weekday operations from Cranwell radar. The understanding of this limitation when recovering VFR to Cranwell at weekends is a key element because manning within Cranwell ATC is such that establishment of a radar controller is not possible. The Cranwell tower controller was proactive and, due to low VCR workload, recognised the confliction using information from the ATM monitor. They passed accurate traffic information on two occasions to the Tutor pilot allowing them to correlate the information with TAS. Together these proved effective barriers allowing the pilot to acquire the C120 visually and avoid.

UKAB Secretariat

The Tutor and C120 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard¹. If the incident geometry is considered as converging then the Tutor pilot was required to give way to the C120².

Comments

HQ Air Command

The barriers to MAC available in this incident were CWS, ATS and lookout, all of which played a part in reducing the severity of the encounter. The Waddington LARS controller was very busy, resulting in the need to prioritise workload; because the C120 was under a Basic Service then it is unsurprising that its pilot did not receive Traffic Information on the Tutor until quite late. However, a combination of proactive controlling by the Cranwell Tower controller, TAS contact, manoeuvre and pilot lookout all assisted the Tutor pilot in gaining visual with the C120, albeit at a much reduced range. The size of the aircraft and low visual conspicuity of the Tutor likely also contributed to difficulties in the pilots of both aircraft visually acquiring the other, as would the lack of height information from the C120 (IFF Mode 3/A only).

Summary

An Airprox was reported when a Tutor and a C120 flew into proximity at 1430 on Saturday 18th June 2016. Both pilots were operating under VFR in VMC, the Tutor pilot in receipt of an Aerodrome Service from Cranwell and the C120 pilot in receipt of a Basic Service from Waddington.

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 began by discussing the weekend manning at Cranwell and the provision of radar services from Waddington. One Board member questioned if there had been an adequate provision of service, but the Military Board members pointed out that this was normal for weekend operations, and further highlighted that a risk assessment had been carried out and formed part of the risk register for the Tutor operation at Cranwell. Members acknowledged that the Airprox had occurred on a particularly busy day, and that the Waddington controller had been working hard to provide a Traffic

¹ SERA.3205 Proximity.

² SERA.3210 Right-of-way (c)(2) Converging.

Service to several aircraft at once. The Board heard that under normal circumstances aircraft that require a crossing of the Cranwell MATZ are requested to contact Cranwell during weekdays and Waddington at weekends. Such aircraft will be notified to the Cranwell Tower Controller, and both controllers will agree the level and route to ensure aircraft within, joining or leaving the visual circuit are given relevant information on the MATZ crosser. Unfortunately, on this occasion, this information had not been passed to the Cranwell Tower Controller by the Waddington controller, which resulted in a lack of timely flow of information to the joining Tutor pilot. Notwithstanding, the Cranwell Tower Controller had independently detected the likely conflict by monitoring the ATM Monitor, and the Board commended her for her diligence.

The Board then turned to the actions of the pilots. Members highlighted that the C120 pilot was in contact with Waddington LARS, had requested a zone [MATZ] crossing, and there was no reason for him to assume that this was not approved. In this respect, the Board were mindful that although military pilots must obtain permission before entering a MATZ, civilian pilots do not given that a MATZ offers no legal recognised status and no prior permission is required to enter. Notwithstanding, civilian pilots are strongly advised to obtain two-way communications with the controlling ATS prior to transiting the MATZ, and the Board agreed that the C120 pilot had done all that was required of him by communicating with Waddington to request a crossing. Turning to the Tutor pilot, members noted that, in accordance with the SERA Rules of the Air, he was required to give way to the C120, which he did (albeit descending to avoid the C120 by flying underneath and ahead of it was arguably not strictly in accordance with Rules of the Air given that SERA 3210(c) requires that: "An aircraft that is obliged by the following rules to keep out of the way of another shall avoid passing over, under or in front of the other, unless it passes well clear..."). Notwithstanding, the Board recognised that the Tutor pilot's actions hinged on the time that was available to him to take avoiding action, and that he had ultimately safely avoided the C120 whilst also attempting to achieve recovery to Cranwell in accordance with normal operations.

The Board then looked at the assessment for this Airprox, they felt that the following barriers were contributory factors to this Airprox:

- **ATS Operational Threat Awareness and Management** was considered to have been only **partially effective** because the Waddington radar controller did not coordinate a MATZ crossing for the C120 with the Cranwell Tower Controller, and so the required information was not available to the Cranwell Tower Controller in a timely fashion to transmit to aircraft on her frequency.

Members then considered the cause and risk of the Airprox. Noting the separation that had been achieved, and the fact that the Tutor and C120 pilots had both been in visual contact with each other well before CPA (aided in the Tutor's case by Cranwell ATC and his TAS), the Board agreed that there was no risk of collision and that normal safety standards had been achieved. Some members felt that the lack of information from the Waddington controller to the Cranwell controller regarding the C120 MATZ crossing was a factor in that normal procedures had not been applied; however, the consensus view was that the actions of the Cranwell controller had mitigated this breakdown. Overall, the Board decided that the Tutor pilot had simply been concerned by the proximity of the C120, and that, after analysis, the achieved separation meant that this was a non-proximate incident that fell within the definition of a Category E risk.

PART C: ASSESSMENT OF CAUSE AND RISK

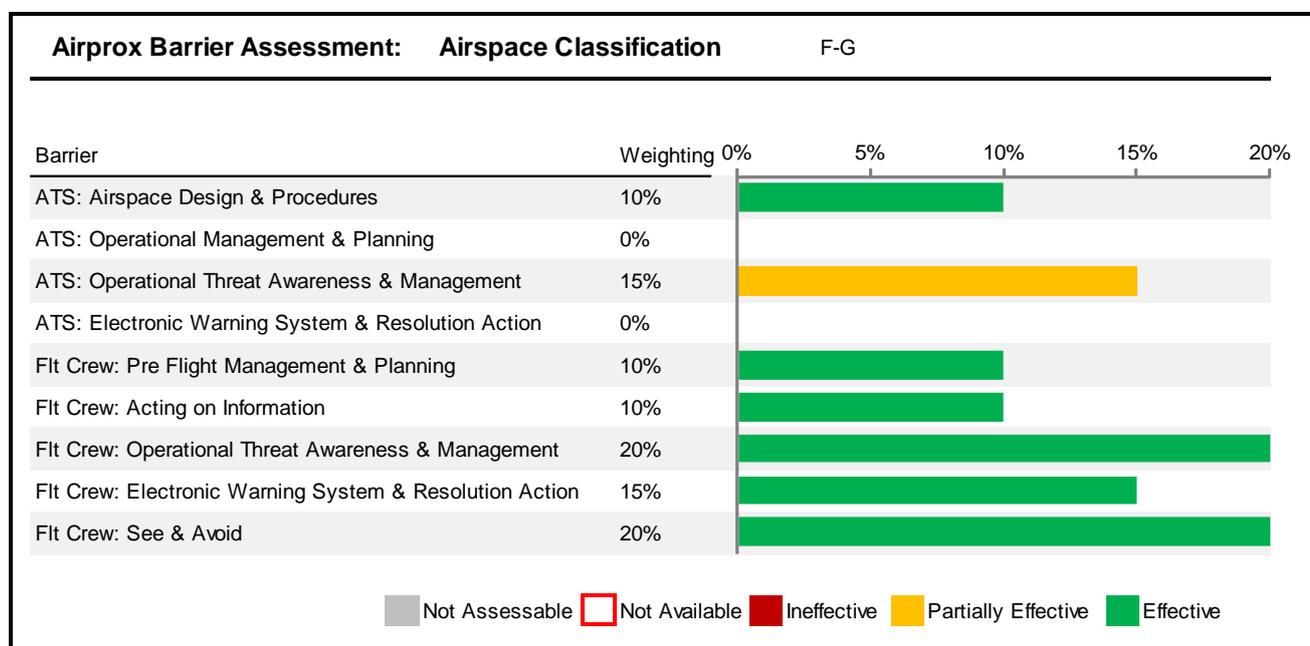
Cause: The Tutor pilot was concerned by the proximity of the C120.

Degree of Risk: E.

Barrier Assessment:

Modern safety management processes employ the concept of safety barriers that prevent contributory factors or human errors from developing into accidents. Based on work by EASA, CAA,

MAA and UKAB, the following table depicts the barriers associated with preventing mid-air-collisions. The length of each bar represents the barrier's weighting or importance (out of a total of 100%) for the type of airspace in which the Airprox occurred (i.e. Controlled Airspace or Uncontrolled Airspace).³ The colour of each bar represents the Board's assessment of the effectiveness of the associated barrier in this incident (either Fully Effective, Partially Effective, Ineffective, Not Available, or Not Assessable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident.



³ Barrier weighting is subjective and is based on the judgement of a subject matter expert panel of aviators and air traffic controllers who conducted a workshop for the UKAB and CAA on barrier weighting in each designation of airspace.