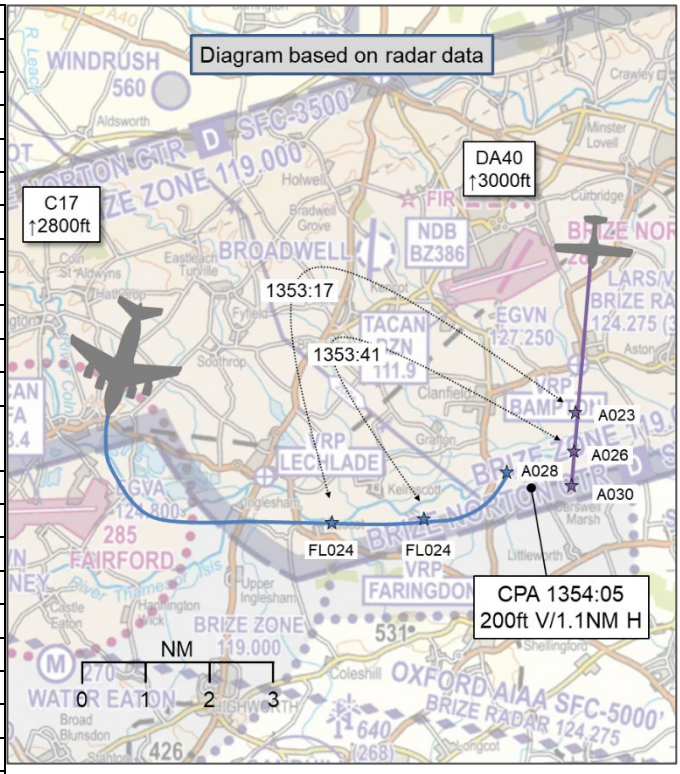
AIRPROX REPORT No 2021023

Date: 12 Apr 2021 Time: 1354Z Position: 5141N 00133W Location: 4NM S Witney

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	C17	DA40
Operator	HQ Air (Ops)	Civ FW
Airspace	Brize CTR	Brize CTR
Class	D	D
Rules	IFR	VFR
Service	Radar Control	Radar Control
Provider	Brize Director	Brize Radar
Altitude/FL	2800ft	3000ft
Transponder	A, C, S	A, C,S
Reported		
Colours	Standard C17	White
Lighting	Nav, Strobes, Landing	Nav, Strobes
Conditions	VMC	VMC
Visibility	NR	NR
Altitude/FL	2800ft	2400ft
Altimeter	QNH	QNH
Heading	080°	180°
Speed	NK	110kt
ACAS/TAS	TCAS II	Unknown
Alert	TA	Unknown
Separation		
Reported	0ft V/4000ft H	200ft V/0.5-1NM H
Recorded	200ft V/1.1NM H	



THE C17 PILOT reports that they were in the Brize instrument pattern, receiving radar vectors in the Brize Class D airspace. ATC advised of co-ordinated VFR traffic 500ft below routing north to south. They were not visual with the traffic but ATC's prompt directed their visual scan to the approximate area, however they could not yet see the traffic. The internal TCAS display showed the ATC called traffic as climbing, which was not the co-ordination they were expecting. At this point the TCAS gave a Traffic Advisory – none of the three pilots on the flight deck had a visual identification on the traffic. The traffic was indicating on TCAS as the same level and on entering the 4000ft lateral displacement (directly ahead) the pilot elected to break left to avoid the traffic, transmitting their actions on the radio to ATC as they did so (noting they were under a radar service). They thought that although the ATC co-ordination should have been suitable and sufficient, the other aircraft had not followed its clearance from ATC and posed a risk to their aircraft. After changing heading by approximately 30° they rolled wings level to try again to visually identify the aircraft, which they did and it was sufficiently close that they elected to break left again to ensure sufficient lateral displacement as the other aircraft was at the same height. The pilot noted that having had a TCAS RA in the visual circuit only 15min prior they suspected they may have been more twitchy than they would normally have been to other traffic. This may have aided or hindered in the situation.

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

THE DA40 PILOT reports they were on the second leg of a solo navigational flight. After arriving at Chipping Norton, the first turning point, they called Brize Radar to request a zone transit and Basic Service. One hold was made outside controlled airspace whilst waiting for the clearance to enter. Clearance was given shortly after entering the orbit to fly VFR direct track to Faringdon not below 2300ft VMC. Shortly after passing Brize Norton airfield, ATC informed them about traffic which had departed and was to remain in the circuit. The aircraft was a C17 which they saw visually. At this point they were

at 2400ft as cleared on track to Faringdon under a Radar Control Service. As they saw the aircraft on downwind, visually it seemed that the aircraft was at a similar altitude and that they were converging. This aircraft was at no point heard on the frequency. The pilot felt they had 4 options to avoid a collision 1. Turn left: they did not opt for this as it would not have solved the conflict since it was coming from the right hand side. 2. Turn right: The other traffic was to remain in the circuit, had they turned right for avoidance and it turned left to join base from downwind they would have ended up with the same problem, only for it to be on base leg this time. 3. Descend: Clearance was not below 2300ft, so not an option. 4. Climb: Apply best rate of climb to get away from the conflicting traffic. At the time, the best option seemed to be climb, so they applied full power and entered a best rate of climb. Once they entered the best rate of climb, it was clear that they would be rather close, however nothing else could be done from once they decided to enter the climb. The C17 pilot then sighted them and entered a left bank to resolve the conflict. After 1-2 minutes ATC called with a message stating that in "*Class D airspace you are meant to maintain own separation*". The controller continued to state that the C17 had to take avoiding action because otherwise they would have collided. The pilot acknowledged their valid point and apologised for the error and continued along their route.

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

THE BRIZE CONTROLLER reports that they were the Approach, Zone and Director controller. They were under training as an Approach controller. The DA40 pilot called on the Zone frequency requesting a zone transit routing from north of RAF Brize Norton through to Faringdon VFR. At this time there were two aircraft in the visual circuit, a PA28 (1300ft in the visual circuit) and a C17 (1800ft in the visual circuit). They were then notified by the ADC that the C17 had requested a radar vectored approach after their next circuit. With the visual circuit traffic in mind, the controller cleared [DA40 C/S] on a VFR transit routing direct Faringdon not below altitude 2300ft. They immediately warned the DA40 pilot about the C17 which was at this point 2NM to the east of Brize on approach. They informed [DA40 C/S] that the C17 would shortly be climbing out to altitude 2800ft and to report visual with the aircraft. [DA40 C/S] entered the control zone and reported visual with the C17. The C17 climbed out to altitude 2800ft and contacted them on the Director frequency 133.750. The C17 was turned to the South-East to position for an approach to RW25. As [DA40 C/S] passed through the BZN overhead the controller asked if they were still visual with the C17, they replied no. The controller called the location of the C17 again to [DA40 pilot] and they confirmed they were visual. They then informed the C17 pilot about [the DA40] and that they were visual. At this time [the DA40] was indicating 500ft below on Mode C. Having taken steps to ensure [DA40 C/S] had situational awareness of the C17, they believed the pilot would take visual separation as a VFR transit under Class D rules. Despite this, [DA40 C/S] climbed through the level of the C17, crossing ahead from north to south. The C17 reported [DA40 C/S] as being within close proximity and took an avoiding action turn to the north to ensure separation was maintained. [DA40 C/S] departed the zone to the south and the C17 was then vectored for a PAR approach for RW25.

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

THE BRIZE SUPERVISOR reports that the unit had been working at a medium to high level of traffic for the hour and a half prior to the incident; with Zone and Director both manned individually. Approach had bandboxed the frequencies with no departures or Director traffic and 2 in the visual circuit. The 'not below clearance' was given to separate from the visual circuit. The C17 then left the visual circuit for an instrument circuit. The C17 was called to the zone transit and the pilot called visual. At this point they turned their attention to a query from the Radar controller so did not witness the incident. They noted that having called visual with the C17 they could not explain why the pilot then decided to climb into confliction.

Factual Background

The weather at Brize Norton was recorded as follows:

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METAR EGVN 121350Z 03004KT 9999 SCT045 08/M03 Q1029 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

The C17 was being vectored in the Radar Training Circuit (RTC) for a PAR approach in receipt of a Radar Control Service, flying IFR. After a heading change to 075° while on the downwind leg, they were passed Traffic Information from the Brize Norton controller regarding the position of the DA40 stating it was *"left 11 o'clock 3 miles crossing left to right ahead, 400ft below DA40 visual with you".* The C17 pilot reported that they did not see the DA40 but their TCAS showed the DA40 was climbing which was unexpected. They then received a TCAS TA and, as none of the onboard crew were visual the DA40, opted to break left to ensure sufficient lateral separation, which was communicated to ATC.

The DA40 pilot had been cleared through the Brize Norton CTR not below 2300ft VMC under a Radar Control Service routing direct track to Farringdon. The pilot reported that they were informed of the C17 departing from Brize Norton to remain in the circuit which was acquired visually. They were asked by ATC if they were still visual with the C17 and were given further Traffic Information when they reported that they were not. The DA40 pilot reported that they then saw the C17 downwind and it appeared that they were at the same level converging. Due to the position of the C17 and the clearance restriction to operate not below 2300ft, the DA40 pilot opted to climb to avoid the C17.

The Brize Norton controller was under training and was bandboxing with Approach, Director and Zone taskings with no expected departures or director traffic. They were providing an ATS to the DA40, the C17 and another aircraft which only came onto frequency around one minute prior to CPA. The controller cleared the DA40 pilot to transit the CTR not below 2300ft as the visual circuit was active and provided Traffic Information on the position of the C17 along with their intentions to depart for the RTC and requested the DA40 pilot report visual which they confirmed. Once identified on climb-out the C17 pilot was instructed to turn towards the downwind leg when level at 2800ft. Once in the turn, the C17 was given a further heading change to 090° after which the controller confirmed whether the DA40 pilot was still visual with the C17, to which they then confirmed they weren't. Traffic Information was given to enable to the DA40 pilot to become visual again. The controller then took control of another aircraft although their interaction was limited due to their distance to the airfield. The C17 pilot was given another heading change and was passed Traffic Information on the DA40 advising them the DA40 pilot was visual with them.

Figures 1-6 show the positions of the C17 and the DA40 at relevant times during the Airprox. The screen shots are taken from a replay using the NATS Radars, which are not utilised by Brize Norton therefore, may not be entirely representative of the picture available to the Brize Norton Controller. Note that due to the relative positions of the two aircraft, the NATS radars display the height of the C17 as a flight level and the height of the DA40 as an altitude until Figure 6 when both aircraft are displayed with altitude. The QNH was 1029hPa, therefore 480ft can be added to the height displayed for the C17. The Brize controller would have had both aircraft displayed in altitude on their radar.

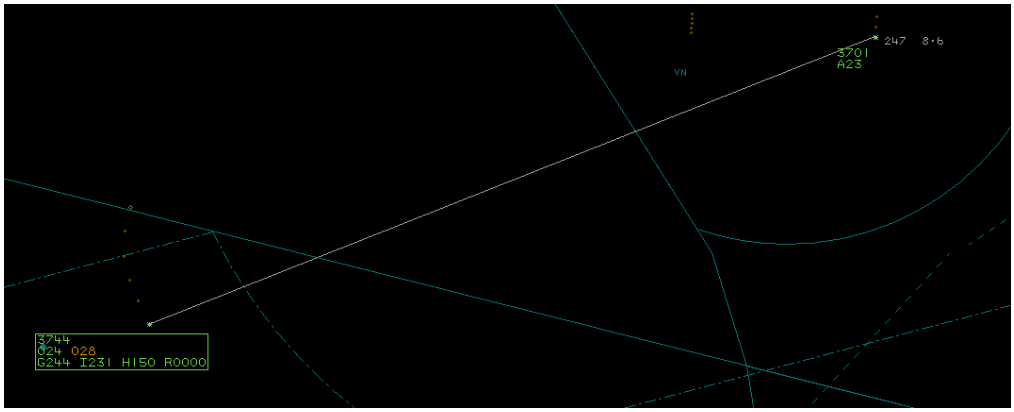

Figure 1: C17 is given a left turn onto 090°.

The C17 pilot was given a left turn to 090° in keeping with a standard turn in the Radar Training Circuit. The DA40 was routing on track to Faringdon and had previously reported visual with the C17. Separation was measured at 8.6NM (Figure 1).

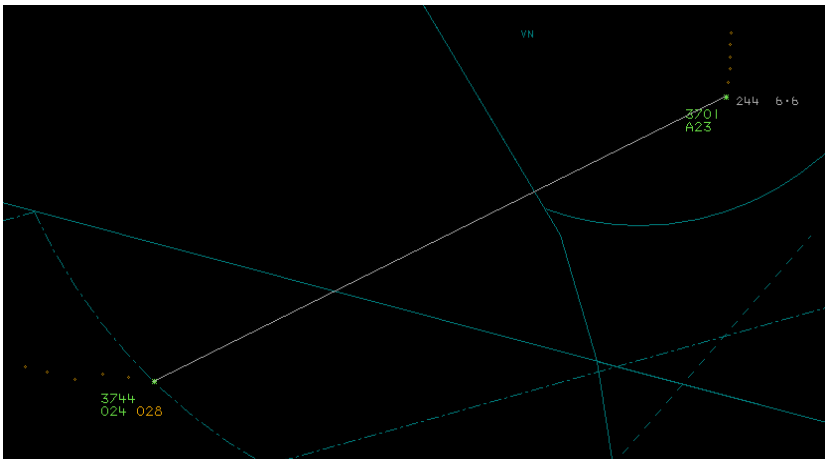

Figure 2: DA40 is provided with updated Traffic Information.

The Brize Norton controller queried whether the DA40 pilot was still visual with the C17 and, after it was confirmed they were not, provided updated Traffic Information "*west 4miles tracking east, 500ft above"*. Separation decreased to 6.6NM (Figure 2).

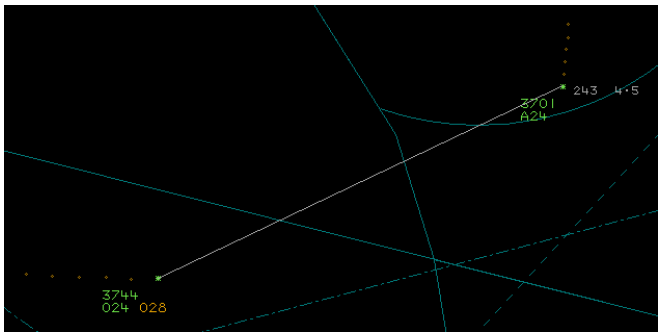

Figure 3:
C17 was given a heading change to 075° with Traffic Information on the DA40.

Three seconds after the DA40 pilot confirmed they were visual with the C17, another aircraft called the controller requesting a service. Once the exchange was complete the controller changed the C17 heading to 075° and provided Traffic Information on the DA40 stating they were "*left 11 o'clock, 3NMs crossing left to right, 400ft below"*. Separation decreased to 4.5NM (Figure 3).

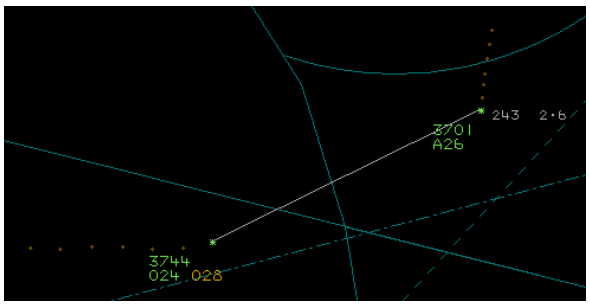

Figure 4:
C17 pilot reported they are intending to turn left.

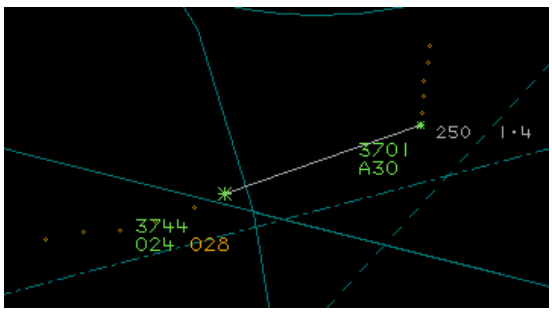

Figure 5:
C17 pilot reported breaking left.

Twenty-three seconds later the C17 pilot reported that they were going to turn left, the DA40 could be seen to be climbing. Separation decreased to 2.6NM (Figure 4). Nineteen seconds after their

initial report the C17 pilot reported breaking left with separation decreasing to 1.4NM. CPA was measured at 1.1NM and 200ft (Figure 6).

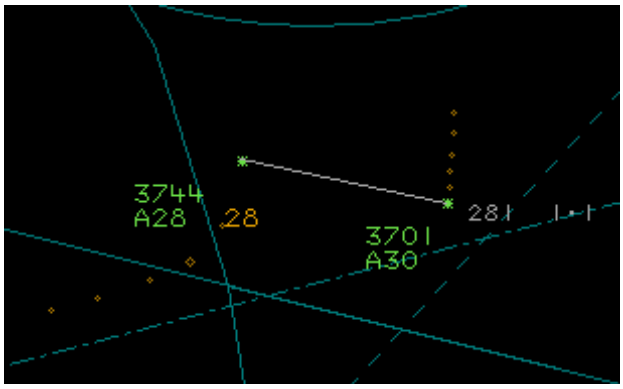

Figure 6: CPA.

Although the Brize Norton Approach controller was bandboxed with two other disciplines, Director and Zone, traffic levels were relatively low and appropriate for the bandboxing situation. While the controller provided Traffic Information to both the C17 and the DA40 pilots, it was at times inaccurate in reference to the range of the aircraft. Once Traffic Information was passed, the DA40 pilot became visual quickly on both occasions, however, the C17 pilot only became visual after they manoeuvred their aircraft away from the DA40. The DA40 pilot's clearance to transit the CTR, not below 2300ft, allowed them freedom to climb on their route. That said, they were instructed to maintain VMC and did have the responsibility to maintain separation from other aircraft.

UKAB Secretariat

Within Class D airspace:

> IFR and VFR flights are permitted and all flights are provided with air traffic control service. IFR flights are separated from other IFR flights, receive traffic information in respect of VFR flights and traffic avoidance advice on request. VFR flights receive traffic information in respect of all other flights and traffic avoidance advice on request[1]
>
> Separation standards are not prescribed for application by ATC between VFR flights or between VFR and IFR flights in Class D airspace. However, ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other[2]

The C17 and DA40 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[3] If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right.[4] 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.[5]

[1] (UK) SERA.6001 Classification of Airspace
[2] CAP 493 Manual of Air Traffic Services Integration of VFR Flights with IFR Traffic in Class D CTR/CTA/TMA. MAA RA3228 paragraph 4.
[3] (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.
[4] (UK) SERA.3210 Right-of-way (c)(1) Approaching head-on. MAA RA 2307 paragraph 13.
[5] (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome. MAA RA 2307 paragraph 17.

Comments

HQ Air Command

This Airprox was subject to a Local Investigation that came up with only 1 causal factor. It is heartening to see such an honest and detailed report from the pilot of the DA40, explaining their thought process and how the situation developed. Ultimately, the decision to climb was not the best course of action; however, the pilot felt that they were doing the right thing to avoid conflict, which proved to be incorrect and actually made the situation worse. It was due to the TCAS alert that the C17 crew elected to fly a hard manoeuvre to avoid any conflict and it was this action that stopped the distances from getting any closer.

A C17 is an extremely large aircraft, and with only 4-500ft separation between the 2 aircraft, could look a lot closer and potentially co-altitude to a pilot in a small aircraft who is not used to being in such close proximity. This may explain why the pilot of the DA40 thought they were doing the right thing by climbing, avoiding the aircraft that was perceived to be co-alt. However, the event highlights that if there is any doubt over a possible conflict to question ATC early if there is time, as there was with this incident.

ATC gave a not below altitude (due to the circuit being active), rather than a prescriptive altitude to fly at due to the C17 being above. With no option to descend, the option to climb seemed the logical choice at the time, as the DA40 effectively had freedom to manoeuvre above altitude 2300ft. Perhaps a hard height would have cleared up any ambiguity with the coordination. With controller training taking place and being distracted by a new aircraft on frequency, both the supervisor and the controller missed the climb by the DA40 into confliction. However, the important fact remains, the DA40 was VFR within Class D airspace and therefore responsible for maintaining separation.

Summary

An Airprox was reported when a C17 and a DA40 flew into proximity 4NM south of Witney at 1354Z on Monday 12th April 2021. The C17 pilot was operating under IFR in VMC, the DA40 pilot was VFR in VMC and both pilots were receipt of a Radar Control Service from Brize Approach.

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.

Due to the exceptional circumstances presented by the coronavirus pandemic, this incident was assessed as part of a 'virtual' UK Airprox Board meeting where members provided a combination of written contributions and dial-in/VTC comments.

The Board first looked at the actions of the controller. They had given the DA40 a clearance to cross CAS 'not below' 2300ft, and whilst members thought it likely that the controller intended for the DA40 pilot to remain at 2300ft, thus giving 500ft separation between the two aircraft, nevertheless, the 'not below' clearance gave the pilot the impression of some autonomy in their height. In the event the DA40 pilot, an inexperienced pilot, was uncertain of what to do and when they perceived that there was a conflict, believing that they had latitude in their height, began to climb. Members thought this could have been avoided with more defensive controlling, by giving an exact height for the DA40 to fly at and explicitly stating that it was for separation against the C17, rather than just relying on Traffic Information. Furthermore, they thought the Traffic Information to both pilots was inadequate, with inaccurate ranges and position information passed as cardinals to the C17 pilot (who was steady on heading) rather than using clock-code, which may have enabled the C17 pilot to see the DA40 earlier (**CF1**, **CF3**). Some civilian controlling members noted that they would have been uncomfortable allowing only 500ft separation between two aircraft with such a weight differential, with the potential for wake-turbulence

for the DA40. The clearance given was for the DA40 to cross to Farringdon, which would take it directly through the path of the C17, and the controller was expecting the DA40 pilot to remain clear of the C17, as per the rules for VFR crossing of Class D airspace. However, noting that the controller checked whether the pilot was visual with the C17 and updated Traffic Information to them, members wondered why the controller did not then notice that the DA40 pilot had begun to climb, because if they had spotted this, then they could have provided an earlier resolution (**CF4**, **CF5**). Members noted that the controller was under training and were told that the controller was validated in the Director position, but not in Approach. This led them to wonder whether the OJTI[6] was monitoring the trainee sufficiently, the trainee controller would be expected to be proficient in directing the C17 in the RTC and only require monitoring in the Approach task, but the OJTI also did not notice the climb of the DA40 (**CF2**).

Turning to the C17 pilot; they were climbing to 2800ft into the RTC and within CAS therefore in receipt of a Radar Control Service. Once steady on a downwind heading they could see the DA40 on their TCAS and although they received Traffic Information from the controller, felt uncomfortable as the two aircraft closed. Once they received a TCAS TA and were still not visual, the pilot decided to take action by turning (**CF8**). After completing the avoiding action turn the pilot became visual with the DA40 (**CF9**) and believed the proximity to be such that they needed to take further action to increase the separation. Although members understood why the pilot felt the need to take action unilaterally, they did wonder whether if the pilot had questioned the controller earlier about the traffic seen on their TCAS, the controller would have been prompted to check the intentions of the DA40 pilot.

For their part, the DA40 pilot had been given a clearance to cross Brize CAS not below 2300ft. The controller had given the pilot Traffic Information on the C17 and the pilot became visual. Members noted that the C17 was a very large aircraft and would have looked closer than it actually was particularly to someone who was unfamiliar with the size of the aircraft, and it was likely that, from a distance, the DA40 pilot perceived the two aircraft to be at the same level (**CF7**). In their report, the pilot describes how, believing that they needed to take action, they discounted a series of options that led them to make the decision to climb (**CF6**) and members commended the pilot for their honesty. However, members wondered why the pilot did not just ask ATC to clarify the height of the C17 and if necessary ask for help in deciding on a course of action, and they urged pilots not to be afraid to ask questions when unsure. Having started out below the C17, once the DA40 pilot had started to climb they were in the impossible position of not being able to outclimb the C17 and thus creating a worsening situation (**CF10**), but fortunately, the C17 pilot took action to remain clear.

Finally, the Board assessed the risk of the Airprox. They discussed the fact that the C17 was not a very manoeuvrable aircraft and that the pilot would not normally expect to need to take avoiding action when flying IFR in the RTC. They noted that the DA40 was being flown by an inexperienced pilot and thought that the controller could have provided more guidance to help alleviate the uncertainty, all of which described a situation where safety was degraded. Nevertheless, once the C17 pilot had taken the avoiding action, the radar separation was such that in the Board's opinion there had been no risk of collision. They therefore assigned Risk Category C.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021023			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Regulations, Processes, Procedures and Compliance			

[6] On the Job Training Instructor

1	Human Factors	• ATM Regulatory Deviation	An event involving a deviation from an Air Traffic Management Regulation.	Regulations and/or procedures not fully complied with
	• Manning and Equipment			
2	Human Factors	• Recurrent/OJT Instruction or Training	Events involving on the job training of individuals/ personnel	
	• Situational Awareness and Action			
3	Human Factors	• ANS Traffic Information Provision	Provision of ANS traffic information	TI not provided, inaccurate, inadequate, or late
4	Human Factors	• Conflict Detection - Not Detected	An event involving Air Navigation Services conflict not being detected.	
5	Human Factors	• Monitoring of Equipment/Instruments	Events involving an individual or a crew/ team not to appropriately monitoring equipment or instruments	Equipment misinterpreted
	Flight Elements			
	• Tactical Planning and Execution			
6	Human Factors	• Insufficient Decision/Plan	Events involving flight crew not making a sufficiently detailed decision or plan to meet the needs of the situation	Inadequate plan adaption
	• Situational Awareness of the Conflicting Aircraft and Action			
7	Human Factors	• Unnecessary Action	Events involving flight crew performing an action that was not required	Pilot was concerned by the proximity of the other aircraft
	• Electronic Warning System Operation and Compliance			
8	Contextual	• ACAS/TCAS TA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system traffic advisory warning triggered	
	• See and Avoid			
9	Human Factors	• Identification/Recognition	Events involving flight crew not fully identifying or recognising the reality of a situation	Late sighting by one or both pilots
10	Human Factors	• Perception of Visual Information	Events involving flight crew incorrectly perceiving a situation visually and then taking the wrong course of action or path of movement	Pilot was concerned by the proximity of the other aircraft

Degree of Risk: C.

Safety Barrier Assessment[7]

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

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

Ground Elements:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because the controller passed inaccurate Traffic Information to both pilots.

Manning and Equipment were assessed as **partially effective** because the OJTI did not interject to resolve the confliction.

Situational Awareness of the Confliction and Action were assessed as **ineffective** because the controller did not detect that the DA40 was climbing and would therefore be a conflict.

Flight Elements:

Tactical Planning and Execution was assessed as **partially effective** because the DA40 pilot elected to climb.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the inaccurate Traffic Information led to flawed SA for the DA40 pilot.