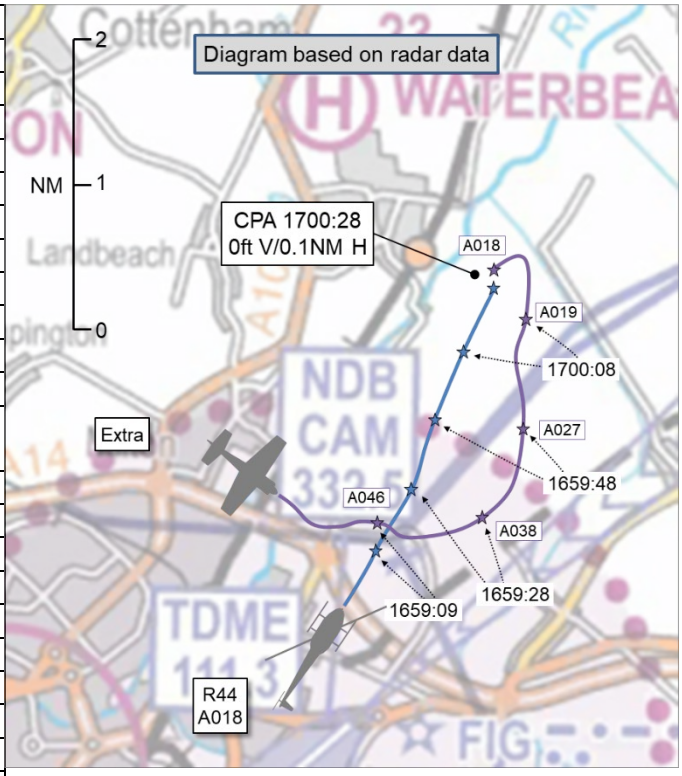
AIRPROX REPORT No 2022215

Date: 18 Sep 2022 Time: 1700Z Position: 5216N 00013E Location: 3.5NM NNE Cambridge

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	R44	Extra EA300
Operator	Civ Helo	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	Listening Out
Provider	Lakenheath Radar	Cambridge Traffic
Altitude/FL	1800ft	1800ft
Transponder	A, C, S	A, C, S
Reported		
Colours	Black, silver	Red, white, blue
Lighting	Nav, landing, night	Strobe, landing, nav
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1775ft	2500ft
Altimeter	QNH (1022hPa)	QNH (NK hPa)
Heading	060°	315°
Speed	93kt	150kt
ACAS/TAS	Not fitted	Not fitted
Separation at CPA		
Reported	0ft V/450ft H	500ft V/0.5NM H
Recorded	0ft V/0.1NM H	



THE R44 PILOT reports that whilst flying from [departure airfield] to a [destination site] in an R44, they encountered a dangerous situation with an aerobatics aircraft, possibly a blue Extra with smoke trailing facilities. [The R44 pilot] had been in contact with Mildenhall Zone [they recall] on 128.900MHz for a MATZ penetration of the easterly stub, flying at 1700ft, and had been given a squawk of 0430 [they recall]. Mildenhall gave clearance to transit at said altitude. At that point, they noticed the aerobatics aircraft descending to the same altitude to the east of them approximately half a mile away. The aircraft then proceeded to overtake, still approximately half a mile away, but then turned directly towards them in a spiralling twist. At the last minute, [the Extra pilot] set a smoke trail and veered sharply to the left of them. [After CPA], the [Extra pilot] banked hard right, still with a smoke trail. Being a seasoned pilot, [the R44 pilot] maintained heading, but [as avoiding action] started to descend as [it can be hard] to know what an aerobatics pilot might do next (thinking that they had flown through a routine) but they knew they don't go too low. [The R44 pilot] flew through the smoke and turbulence within approximately 5-6sec at 100kt. The aerobatics aircraft then continued to loop off to the left at approximately half a mile away at which point [the R44 pilot] spoke with Mildenhall to see if they were in contact with the [aerobatics] aircraft. [The Mildenhall controller] said they only had 'contact' which they assumed was 'squawk contact' and not 'ATC'. At this point the [R44 pilot] entered the MATZ stub at 1200ft and lost sight of the aerobatics aircraft. [Subsequently], they have been in contact with Mildenhall to report the occurrence.

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

THE EXTRA PILOT reports that in the early evening of the 18th of September, they were flying in the vicinity of Cambridge airfield. When flying from west-to-east, their position was overhead the southern end of the village of Milton (north Cambridge) at approximately 4000ft (outside what would be the ATZ if active). Their intention had been to position from west-to-east while descending to circuit height (1000ft AGL) to join the circuit downwind to land on RW05 at Cambridge. In this location, prior to

returning to the airfield, and at approximately 1658, they identified a helicopter to their right directly overhead the airfield on a northerly track between 1000-1500ft. Because of the height and location of the helicopter overhead the airfield, they were concerned that the aircraft could be joining or remaining in the visual circuit at the airfield. They manoeuvred to maintain visual contact and attempted to communicate with this aircraft on the radio (using Cambridge frequencies 125.905MHz and 120.965MHz [Tower and Approach respectively]) to see if it was possible to establish their intentions. Their radio call (which received no response) was: "*Cambridge Traffic* [Extra callsign]*, Extra 300, overhead Milton at 4000ft descending, positioning to join downwind for runway 05, visual with the helicopter departing the airfield to the north. Say your intentions*". At this time the helicopter was within the nominal bounds of what would be the ATZ if active.

Whilst they were aware that the ATZ is technically non-existent when no air traffic control is present (such as at weekends), they were surprised by the position and altitude of the aircraft. They had not heard any other aircraft on frequency and had attempted to communicate via the radio. In their experience, it is very unusual for an aircraft not using Cambridge airfield to be in this position as it is known to be (and is) a busy training airfield. Aircraft tend to either avoid the nominal bounds of the ATZ (if not arriving or departing from the airfield) or will transmit blind calls on the radio to announce their position and intended route if they are transiting. As such, they did not want to lose visual contact with what they could now see was a Robinson R44 until certain of their intentions. This would ensure there would not be any conflict with the [Extra pilot's intention to] join to the circuit at Cambridge. They opted to remain visual with the [R44] while it routed northwards.

In addition to always being visual with the [R44], and thus able to maintain safe separation, the [Extra pilot] also used the smoke system fitted to [the Extra] to ensure that it was as visible as possible to the other aircraft. They positioned themselves to the right of the R44 (which, as being a helicopter pilot too, they knew to be the location where they would stand a better chance of being seen). Due to their relative position throughout, and the fact that they had a trail of white smoke from their aircraft, they were confident that they had been seen at a safe distance by the [R44 pilot]. After approximately 1min of maintaining visual contact at a safe distance from the [R44], [and after CPA], they were then east-abeam the southern end of Waterbeach. At this stage, it became apparent that the R44 was continuing to track northwards at an altitude of 1500ft and thus would not be a conflict with their join. To avoid any additional conflict prior to returning to the airfield they climbed to a higher altitude and began to turn back toward Cambridge airfield before descending and joining downwind to land on RW05 a couple of minutes after. They were always visual with the [R44] in perfect VMC and had maintained a safe distance. They do appreciate that, in hindsight, seeing another aircraft in the sky on a relative track with a smoke system on may have surprised the other pilot, hence the reason for their submission of the Airprox.

The pilot assessed the risk of collision as 'None'.

THE LAKENHEATH CONTROLLER reports that [the R44 pilot] called Lakenheath Approach requesting a Basic Service and MATZ penetration routing towards RAF Marham. Within a couple of minutes of talking to [the R44 pilot], a collision alarm went off with another aircraft. That aircraft was rapidly descending out of FL85, however levelled off at FL45 and did not appear to be a factor with [the R44]. Shortly afterwards, the aircraft again did a rapid descent and Traffic [Information] was issued [to the R44 pilot]. [The R44 pilot] did enquire if [the Lakenheath controller] had been talking to that aircraft and they were informed they had not. [The R44 pilot] did mention on frequency that the aircraft appeared to be doing aerobatic manoeuvres and went right in front of them.

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

THE CAMBRIDGE CONTROLLER reports that this occurrence took place on a weekend when Cambridge ATC was not manned. Flying does take place out of hours, and at weekends, under an Out of Hours Indemnity Scheme, however, there is no ATC service provided. There are no RT or surveillance recordings available.

Factual Background

The weather at Mildenhall was recorded as follows:

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METAR EGUN 181655Z 01010KT 9999 FEW040 BKN120 15/08 A3011 RMK AO2A SLP200 T01520077 $
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The entry for Cambridge in the AIP provides the following information:

EGSC AD 2.3 Operational Hours
1 AD Administration
Mon, Wed 0800-1800 (0700-1700); Tue, Thu 0900-1700 (0800-1600); Fri 0800-1700 (0700-1600).

EGSC AD 2.18 Air Traffic Services communication facilities
Cambridge Approach
ATZ hours coincident with AD hours as detailed at EGSC AD 2.3.

EGSC AD 2.20 Local Aerodrome Regulations
4 Warnings
a. Caution - Aerial activity takes place outside of aerodrome published hours.

Analysis and Investigation

Lakenheath RAPCON Front Office

The RAPCON Chief Controller and Assistant Chief Controller reviewed the events that had occurred on 18th August from 1657 to 1707. A tape transcript had been provided offering exact details of the Airprox to better understand how the situation developed and if it could have been prevented.

[The transcript was provided to the UKAB Secretariat].

At the time of the incident, the radar control room was staffed with one Supervisor and one controller. This was appropriate for the traffic levels.

At 1657:22, the RAPCON controller established contact with [the pilot of the R44] 13NM southwest of LKH. The pilot requested a Basic Service and MATZ penetration with routing to [destination site]. The controller agreed to the pilot's request, radar identifying them and affording them a Basic Service and MATZ penetration. At initial contact, [the pilot of the R44] was at an altitude of 1800ft. At the exact same time of contact with [the pilot of the R44], another unverified radar contact showing the callsign of [the Extra] was manoeuvring within 2NM of [the R44] at an altitude of 8500ft. [The pilot of the Extra] was not in contact with the LKH controller and was not a factor. At 1658:20, [the pilot of the Extra] descended rapidly to 4600ft and a collision alert went off. The LKH controller did not issue traffic as the altitudes between the two aircraft provided ample separation and the aircraft appeared to level off. It is our assessment that the STCA system had detected the rapid descent and calculated that if it continued a conflict may have occurred.

At 1659:44, [the pilot of the Extra] descended to 2100ft, resulting in 300ft of vertical separation between that pilot and [the R44]. A second collision alert went off and the LKH controller did not issue traffic. At 1700:14, [the pilot of the Extra] descended further, resulting in less than 100ft vertical and 1NM of horizontal separation between that pilot and [the R44], and a third collision alert went off. The LKH controller issued traffic and [the pilot of the R44] reported visual with the traffic. At 1700:38, [the pilot of the R44] asked if the LKH controller was in contact with the other aircraft as it was doing aerobatics. The LKH controller confirmed that they were not in contact with the other aircraft and elaborated on the traffic call that [the pilot of the Extra] appeared to be rapidly manoeuvring and dropping from FL50 to co-altitude. The LKH controller provided up-to date and accurate traffic calls from 1701:14 until 1702:14. [The pilot of the R44] was obviously frustrated with the situation but did not specifically report an Airprox on frequency.

Lakenheath Radar was made aware of the incident on the 19th September by the pilot of [the R44] who telephoned to discuss the situation. This enabled an effective review and swift corrective action.

As the facility managers, it is our stance that the controller had enough information and capacity and should have zoned-in on the potential development of a situation based on the proximity of [the R44] and [the Extra]. A Basic Service was provided properly through the first audible collision alert (based on the altitude separation between [the R44] and [the Extra]), but duty-of-care was neglected as soon as the second collision alert went off and the two aircraft were in conflict with each other. The controller provided excellent service following the third collision alert.

UKAB Secretariat

An analysis of the NATS radar replay was undertaken and both aircraft could be identified from Mode S data. The diagram was constructed and the CPA determined from the radar data. The aircraft were observed on radar to be at Flight Levels. The QNH passed to the R44 pilot was 1019hPa.

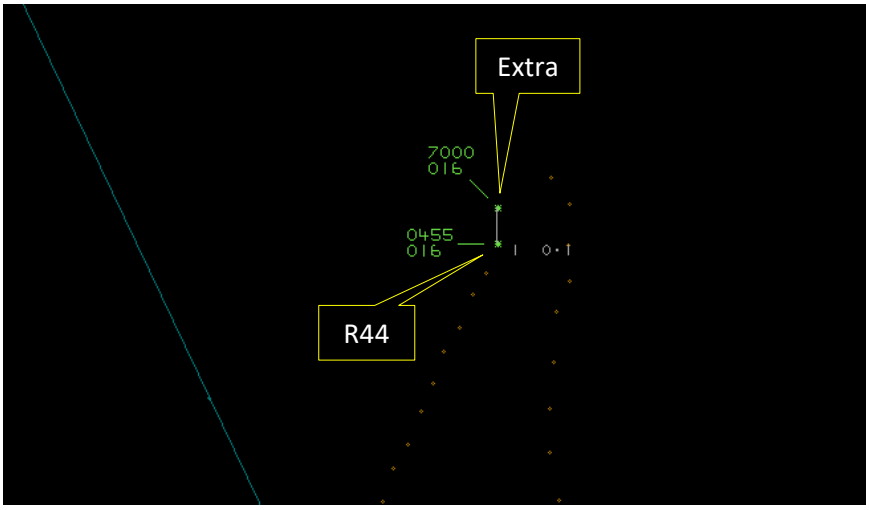


Figure 1 – CPA at 1700:28

The R44 and Extra pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[1] If the incident geometry is considered as overtaking then the R44 pilot had right of way and the Extra pilot was required to keep out of the way of the other aircraft by altering course to the right.[2]

Summary

An Airprox was reported when an R44 and an Extra flew into proximity 3.5NM north-northeast of Cambridge at 1700Z on Sunday 18th September 2022. Both pilots were operating under VFR in VMC, the R44 pilot in receipt of a Basic Service from Lakenheath Radar and the Extra pilot listening-out on Cambridge Tower and Approach frequencies.

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 pilot of the R44. Members noted the entry in the AIP for Cambridge which provides a caution that aerial activity takes place outside the aerodrome published

[1] (UK) SERA.3205 Proximity.
[2] (UK) SERA.3210 Right-of-way (c)(3) Overtaking.

hours. Members wondered why the pilot of the R44 had chosen to transit through the Cambridge overhead at 1800ft and had not made a call on the Cambridge frequency for the benefit of any pilots in the area. Whilst considering the radio contact made by the pilot of the R44, the guidance provided in CAP413 in the section regarding Military Aerodrome Traffic Zones and Penetration Services was recalled:

> *10.73 Pilots requiring a MATZ, and where appropriate, ATZ penetration service must establish two way RTF communication on the appropriate frequency with the aerodrome controlling the zone when 15NM or 5min flying time from the boundary whichever is the sooner, and request approval to penetrate the MATZ, and if appropriate ATZ.*

It was noted that the pilot of the R44 had first contacted the Lakenheath controller at 1657:22 when they had been 1NM southwest of the Cambridge overhead and approximately 8NM from the MATZ boundary. Members suggested that it would have been prudent for the pilot of the R44 to have made a call on the Cambridge frequency to advise of their intentions (**CF6**) and perhaps altered their track slightly to have allowed time to have contacted the Lakenheath controller for a MATZ penetration. That the pilot of the R44 had essentially maintained course and altitude throughout the encounter with the Extra was considered a reasonable response to limit the dynamic situation developing unexpectedly. Nevertheless, members agreed that the pilot of the R44 had been concerned by the proximity of the Extra (**CF10**).

Turning their attention to the actions of the pilot of the Extra, members noted that the pilot had reported that their intention had been to descend to circuit height and join for RW05. It was acknowledged that they had attempted to elicit the intentions of the R44 pilot by calling on the Cambridge frequency but to no avail. Members noted that the pilot of the Extra had been aware that the R44 had been 'departing to the north' and so members were puzzled as to why the pilot of the Extra had decided to descend rapidly and fly parallel to the R44 for several miles. This, members concluded, demonstrated that the plan for landing at Cambridge, howsoever disrupted by the transit of the R44, had not been adapted adequately to meet the needs of the situation (**CF8**). It would have been far more prudent, indeed, to have positioned the Extra away from conflict with the R44 and joined the circuit to land as intended.

The Extra pilot had positioned their aircraft to the right of the R44 and members agreed that that had essentially constituted an overtaking manoeuvre. In terms of enhancing conspicuity, members understood that the laying of a smoke trail would have aided the pilot of the R44 in visually acquiring the Extra. It was suggested that the R44 had already passed well beyond where it would be reasonably expected that a visual circuit would have formed for RW05, and that if the pilot of the Extra had maintained their intention to land at Cambridge then it would not have been necessary to emit smoke for conspicuity.

The moment of CPA occurred as the pilot of the Extra had flown across the track of the R44 whilst still trailing smoke. Members noted that the pilot of the Extra reported that they had maintained visual contact with the R44 throughout the encounter and were in agreement that, as such, the overtaking manoeuvre had not been conducted adequately to 'keep out of the way of the aircraft being overtaken' (**CF7**). It was further agreed that the pilot of the Extra had flown close enough to the R44 to have caused its pilot concern (**CF9**)

The Board next considered the actions of the Lakenheath controller. Member's attention was drawn to the three STCA's that had triggered (**CF5**). Notwithstanding the findings of the investigation by the Lakenheath RAPCON Front Office, members pondered the timings of the alerts and the separation of the aircraft. It was agreed that at the moment of the first alert, the aircraft had been separated by a considerable vertical extent and that there had been no risk of collision. There was extensive discussion by members regarding the second triggering of the alert. Some members noted that the separation of the aircraft had been in excess of 1000ft vertically and that it had not been necessary to have passed Traffic Information (TI) on the Extra to the pilot of the R44. The separation at the second STCA noted by members had been different from that quoted by the RAPCON Front Office perhaps due to Mode C errors and a different smoothing algorithm in use on the NATS radar replay. Other members noted that the Extra had descended so rapidly that, whilst acknowledging that the pilot of the R44 had been under a Basic Service, it would have been prudent to have passed TI. Another opinion was proffered that,

given there had been only 30 seconds between the second and third alert, and that TI was given at exactly the moment the third alert had triggered, it could be surmised that TI had been passed upon the second alert after a 30 second thinking-time delay. In conclusion of that part of the discussions, members agreed that the Lakenheath controller had complied with their regulations, albeit having detected the conflict late (**CF2**) and having acted on the STCA late (**CF4**).

Members were also in agreement that, given that the pilot of the Extra had been manoeuvring rapidly and had not tuned-in to the Lakenheath frequency, that all situational awareness of the Extra that the Lakenheath controller may have gathered would have been late and somewhat generic (**CF3**). Consequently, the TI that the Lakenheath controller had passed to the pilot of the R44 had been late (**CF1**).

When determining the risk, the Board considered that both pilots had visually acquired the other and, whilst the separation between the aircraft had been significantly reduced and normal safety standards had been eroded, there had not been a risk of collision. As such, the Board assigned a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2022215			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Situational Awareness and Action			
1	Human Factors	• ANS Traffic Information Provision	Provision of ANS traffic information	TI not provided, inaccurate, inadequate, or late
2	Human Factors	• Conflict Detection - Detected Late	An event involving the late detection of a conflict between aircraft	
3	Contextual	• Traffic Management Information Action	An event involving traffic management information actions	The ground element had only generic, late, no or inaccurate Situational Awareness
	• Electronic Warning System Operation and Compliance			
4	Human Factors	• ATM personnel operation/interpretation of equipment	An event involving the operation or interpretation of ATM equipment by ATM personnel	Controller did not adequately act on the EWS indications
5	Technical	• STCA Warning	An event involving the triggering of a Short Term Conflict Alert (STCA) Warning	
	Flight Elements			
	• Tactical Planning and Execution			
6	Human Factors	• Accuracy of Communication	Events involving flight crew using inaccurate communication - wrong or incomplete information provided	Ineffective communication of intentions
7	Human Factors	• Action Performed Incorrectly	Events involving flight crew performing the selected action incorrectly	Incorrect or ineffective execution
8	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
	• See and Avoid			
9	Human Factors	• Incorrect Action Selection	Events involving flight crew performing or choosing the wrong course of action	Pilot flew close enough to cause concern
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[3]

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

Ground Elements:

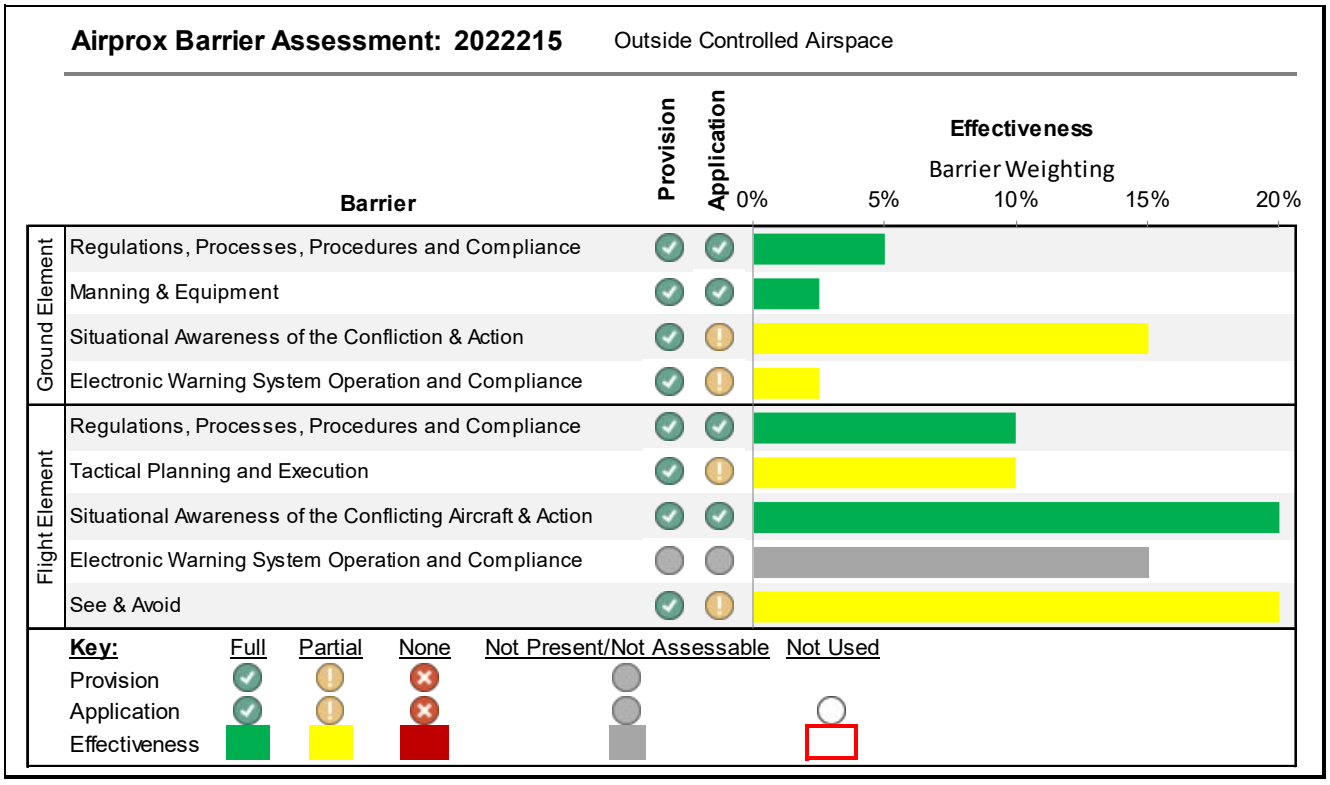
Situational Awareness of the Confliction and Action were assessed as **partially effective** because Traffic Information had been passed late to the pilot of the R44.

Electronic Warning System Operation and Compliance were assessed as **partially effective** because the Lakenheath controller had not acted upon the second activation of the STCA in a timely manner.

Flight Elements:

Tactical Planning and Execution was assessed as **partially effective** because the Extra pilot had conducted an overtaking manoeuvre but had not sufficiently kept out of the way of the R44 pilot.

See and Avoid were assessed as **partially effective** because the pilot of the Extra had flown close enough to the R44 to have caused its pilot concern.



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