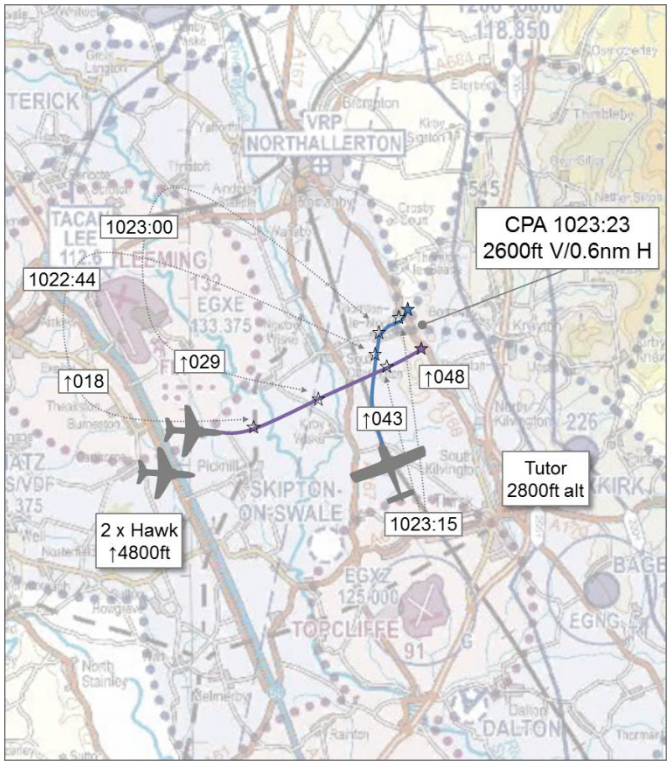
AIRPROX REPORT No 2017252

Date: 20 Oct 2017 Time: 1023Z Position: 5417N 00122W Location: Topcliffe

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Tutor	Hawk
Operator	HQ Air (Trg)	HQ Air (Ops)
Airspace	Topcliffe MATZ	Topcliffe MATZ
Class	G	G
Rules	IFR	IFR
Service	Deconfliction	Deconfliction
Provider	Topcliffe App	Leeming
Altitude/FL	2900ft	5500
Transponder	A, C, S	A, C, S
Reported		
Colours	White, Blue	Black
Lighting	Strobes, Nav	Strobes, Nav, Landing
Conditions	IMC	IMC
Visibility	0km	0km
Altitude/FL	2500ft	2500ft
Altimeter	QFE (997hPa)	QFE (995hPa)
Heading	070°	090°
Speed	100kt	300kt
ACAS/TAS	TAS	Not fitted
Alert	Information	N/A
Separation		
Reported	0ft V/1nm H	NK
Recorded	0ft V/1.6nm H / 1900ft V/0.6nm H	



THE TUTOR PILOT reports that he was conducting a Practice Diversion to Topcliffe for a PAR and was in receipt of a Deconfliction Service. He was approx. 5nm north of the airfield at 2500ft and IMC, when the TAS indicated a contact 3nm and 1200ft below, climbing. At the same time Topcliffe App gave avoiding action, which was swiftly reacted to. The contact was seen on TAS to climb through his level at approx. 1nm separation. Once clear of the traffic, he was given a heading to resume track and continue the sortie. An Airprox was reported to the controller.

He assessed the risk of collision as 'Medium'.

THE HAWK PILOT reports that he was the lead pilot in a formation of 2 Hawks, tasked in support of a training sortie in the D323/5 complex. The formation was warned-out to depart on a heading of 100°, climbing to FL190 with a handover to Blackdog, who were the controlling authority for the training task. On the taxi-out to RW16 he was issued with a release clearance of 'left turn 070 climb FL190, Squawk 6420, contact LEE App' followed by a tactical squawk and frequency for Blackdog and notification that the Topcliffe MATZ was active. After take-off, he switched to Leeming App frequency and initially requested a Traffic Service, commencing a climbing turn onto 070 at 500ft to avoid the Topcliffe MATZ. During the turn, App gave Traffic information on traffic 4nm NE, which he was not visual with. Shortly afterwards, when approaching 1500ft, he was about to enter cloud and so requested a Deconfliction Service. This was acknowledged with a restricted Deconfliction Service and avoiding action to turn right onto 090° due to the traffic 11 o'clock, 1nm, 2500ft. The avoiding action was taken immediately, and was followed by an instruction to expedite climb through FL50. Although he increased the rate of climb, he couldn't fully expedite because it would have risked losing his wingman in cloud, exacerbating the confliction issue. He informed App on passing FL50, and this was commensurate with achieving VMC and downgrading to a Traffic Service. During the post-flight in-brief he was informed that Airprox action had been initiated by the Tutor pilot.

He assessed the risk of collision as 'Medium'.

THE LINTON-BASED TOPCLIFFE APP CONTROLLER reports he was under training with an OJTI seated behind him. Shortly before this Airprox the Tutor departed from Linton on Ouse and had been handed over to them for an IFR approach, in the climb to 3500ft and on a heading of 330°. Whilst it was still taxying, Leeming were contacted to ask for control of the Topcliffe MATZ, which, until that point, had been with Leeming.[1] Once the Tutor was airborne, a squawk was applied and, when the pilot called, a reduced Deconfliction Service was agreed. They prenoted Topcliffe with basic inbound details and then called Leeming again to request a MATZ crossing. This was agreed with the Leeming Zone controller and the Tutor was descended to 2500ft. As the Tutor entered the MATZ a 0412 squawk was seen to depart from Leeming RW16, heading towards the Tutor, and so they requested Traffic Information from Leeming App. The Leeming App controller stated that it was in the radar training circuit at 2500ft QFE. He tried to co-ordinate the Tutor but Leeming seemed busy. The OJTI instructed him to give avoiding action, and the Tutor was turned onto a heading of 070°. The other aircraft was seen to continue to 2nm west of Topcliffe before turning away. He believed that no loss of separation occurred because of the effective avoiding action. The Tutor continued towards Topcliffe and, shortly afterwards, he noticed a 6042 squawk departing RW16 at Leeming and climbing straight ahead. At this point it wasn't a confliction so he didn't call it to the Tutor pilot, and because the MATZ crossing had been agreed with Leeming he thought the Leeming track would remain clear. However, it turned left towards the Tutor so he issued avoiding action to the Tutor pilot onto a heading of 090° and the traffic was called as left 8 o'clock tracking north-east with height information passed (although he couldn't subsequently remember what that height was). The other traffic then appeared to be heading east, slightly behind the Tutor, so he gave further avoiding action back onto 360° with further Traffic Information. The traffic passed 1/2nm behind the Tutor and climbed through the Tutor's level.

He perceived the severity of the incident as 'High'.

THE LINTON SUPERVISOR reports that he did not witness the event because he was undertaking other Supervisory duties in the ACR, but he was briefed about the incident by the OJTI immediately afterwards. He briefly spoke to the Leeming Supervisor who was aware of the first incident [the 0412 squawk], but not the second [the Airprox Hawk formation 6042 squawk] and then set about impounding the frequency and landline recordings.

THE LEEMING APP CONTROLLER reports that he was controlling a Tutor general handling to the west of Leeming and took a pre-note on a 3-ship of Hawks inbound. He took a phone call from Topcliffe App requesting a MATZ crosser at 2500ft, which was approved. He spilt the 3-ship as requested and gathered inbound recovery details before handing them over to Director. The Supervisor then passed a strip with climb-out details for a pair of Hawks and, at the same time, he took a handover on a single Hawk inbound. The Sup advised that 'call for release' was on [for the pair of Hawks] and shortly afterwards ADC requested release. He approved release, the Hawks climbed out, and he gave them a Traffic Service. He called the Topcliffe track to them, and, shortly afterwards, re-called it and asked whether they were visual. The pilot replied that he wasn't, and asked for Deconfliction Service. He gave a Deconfliction Service and told them to expedite through FL50.

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

THE LEEMING SUPERVISOR reports that he was supervising during a particularly busy recovery period, with a series of departures planned. There was a MATZ crosser routing south to north 3nm to the SE at 2500ft (the Linton Tutor in the Topcliffe radar training circuit (RTC)), and, because the App controller was on another landline, he took the climb-out details for a pair of Hawks departing on heading 100°, climbing to FL190. He issued a heading of 070° with the climb (to get above the Topcliffe MATZ) and put on a 'call for release'. He then handed the departure details to the App

[1] Control of the Topcliffe MATZ is shared between Linton and Leeming ATC depending on traffic requirements.

controller. The Director had 3 in the RTC and, because he didn't want to overload them, he took a handover on a Hawk inbound and asked it to call on the Leeming App frequency, rather than the Director frequency. During the time immediately before the Hawks got airborne, he left the Sup console to find another Director controller to relieve the current one because they had just had a particularly hard session. Consequently, he did not hear the call for release, or whether the App controller had changed the climb-out instructions. However, on climb-out he did hear the controller call the Tutor at 4nm, again at 1nm, and ask whether the Hawk pilot was visual; he then heard the avoiding action being given.

Factual Background

The weather at Leeming was recorded as follows:

METAR EGXE 200950Z 18004KT 9999 4500NE BR FEW003 SCT017 BKN030 12/12 Q0999 GRN BECMG 9999 NSW FEW017 SCT030 BLU=

SPECI EGXE 201013Z 16002KT 9999 6000NE BR FEW003 BKN020 13/12 Q1000 WHT BECMG 9999 NSW SCT025 BLU=

Analysis and Investigation

Military ATM

Figures 1-6 show the positions of the Hawk formation and Tutor at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using a NATS radar, which is not used by Leeming or Linton-on-Ouse ATC and therefore is not representative of the picture available to any of the controllers involved. Figure 1 is the first instance the Hawk formation showed on radar replay, though it was visible to the Leeming Approach Controller on climb out.

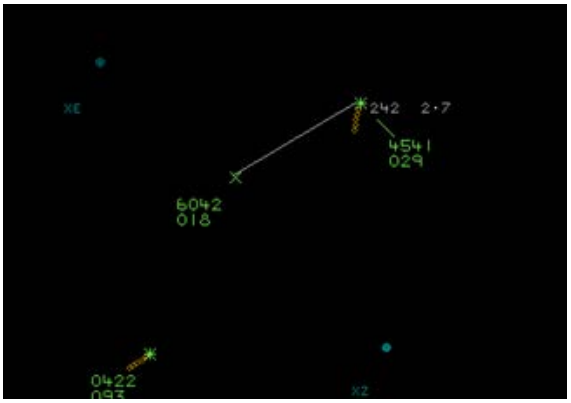


Figure 1: Geometry at 10:22:46

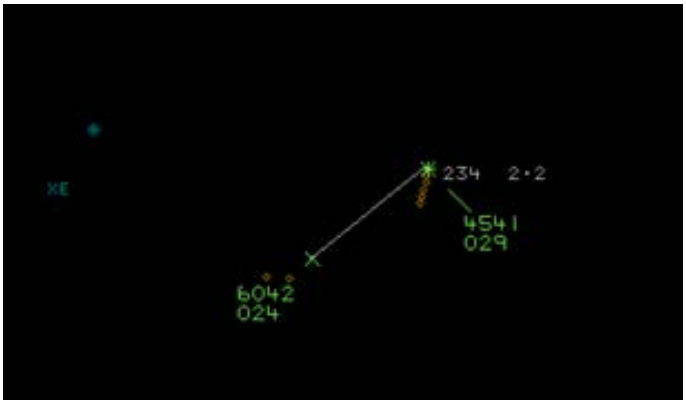


Figure 2: Geometry at 10:22:52

(Hawk squawking 6042, Tutor squawking 4541)

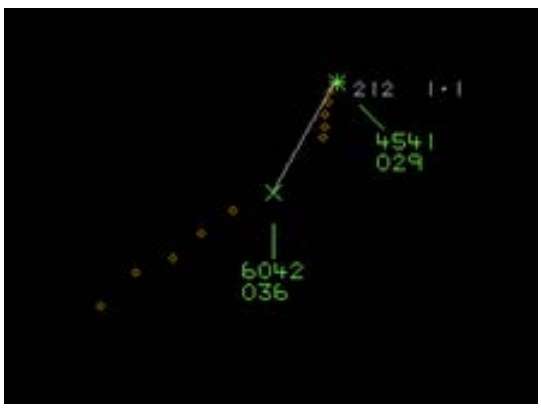


Figure 3: Geometry at 10:23:04

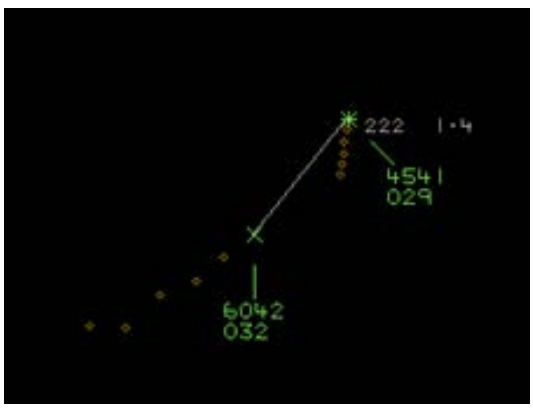


Figure 4: Geometry at 10:23:08

Figure 5: Geometry at 10:23:12

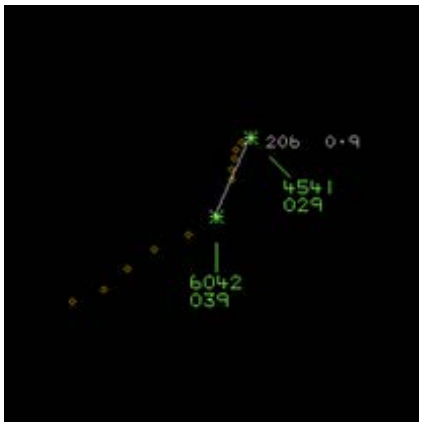


Figure 6: Geometry at 10:23:18

Figure 7: Geometry at 10:23:20

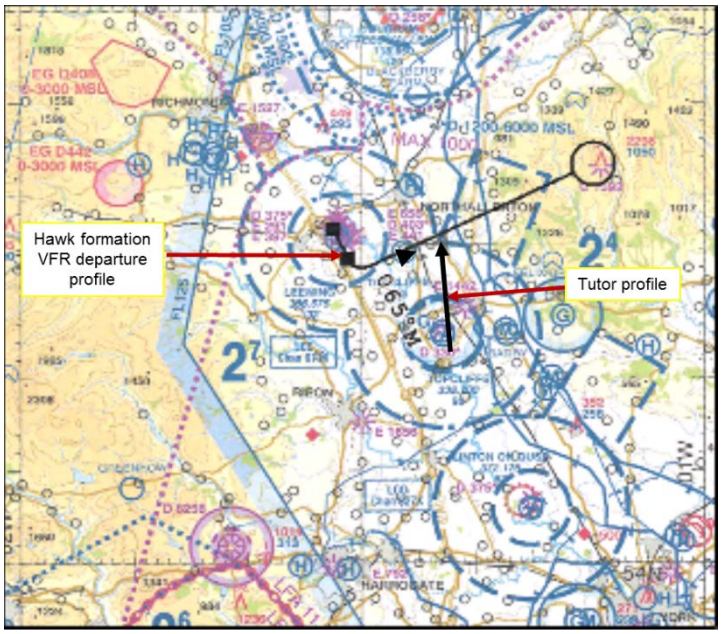


Figure 8: Hawk and Tutor profiles depicted on map (as determined in the OSI)

The Hawk formation planned to conduct a VFR departure from RW16 at Leeming, with requested heading 070° and FL190, prior to handover to their next controlling agency. At the time of the occurrence, the reported cloud was few at 300ft and broken at 2000ft, an improvement on earlier in the day. The Hawk pilots believed that they would be able to complete the departure while remaining VMC and therefore requested a Traffic Service on climb out.

The Leeming Supervisor was attempting to manage the anticipated high task-load of an inexperienced Director by asking the App Controller to take the initial handovers on inbound

aircraft requesting radar recoveries, which had the knock-on effect of increasing the App Controller's task load. When the Supervisor took the prenote on the Hawk formation, he imposed a call for release, having noted that there was a Tutor crossing the intended departure profile. Although the call for release was communicated to the App Controller, the Supervisor assumed that it would be obvious to the App Controller which conflicting aircraft it related to and therefore did not specifically point out the Tutor that had prompted it. Subsequently, there was an incident on Director that drew the Supervisor's attention away from the rest of the Control Room.

The Leeming Approach Controller, when passed the Hawk formation's departure details and the call for release instruction, believed that the call for release was due to another inbound Hawk. This mental model was formed despite having approved a Leeming MATZ crossing for the Tutor. The increased work associated with assisting the Director, coupled with reduced Supervision, meant that this mental model was not broken when the Leeming ADC called for release on the Hawk formation. It is not clear whether his scan noted the Tutor, or if the relevance was just not assimilated; however, the Hawk formation's departure was approved while the Tutor still posed a confliction. The App Controller agreed a Traffic Service with the Hawk formation and immediately passed Traffic Information (TI) on the Tutor. The TI was acknowledged by the lead pilot, who was not visual with the traffic. Approximately 15 seconds later, when the TI was updated (now north east, 1nm, indicating 300ft above), the App Controller also asked the pilot if he was visual with the traffic. The pilot responded that he was not and requested a Deconfliction Service. The App Controller agreed a Deconfliction Service and immediately issued avoiding action to the Hawk formation to climb through FL50, though by this time the avoiding action was unlikely to have had a material effect on separation achieved. Had the pilot requested a Deconfliction Service sooner, the App Controller may have been able to issue more effective avoiding action.

The Topcliffe App Controller, operating from Linton-On-Ouse ATC, was vectoring the Tutor for a PAR to RW20RH at RAF Topcliffe. He had requested a Leeming MATZ crossing (no closer than 3nm to the south east, not above 2500ft QFE) from the Leeming App Controller and was therefore surprised when the Hawk formation appeared on radar heading towards his Deconfliction Service Tutor. Avoiding action was issued to the Tutor pilot at the earliest opportunity, then updated twice, but the speed difference between the Tutor and Hawk formation meant that deconfliction minima could not be achieved. Separation was reduced to 1.6nm when the aircraft were at the same height.

A comprehensive Occurrence Safety Investigation (OSI) took place with collaboration between RAF Leeming and RAF Linton-on-Ouse. Recommendations were made, including the introduction of mandatory call for release in Leeming ATC when the Topcliffe MATZ is active, publicising the benefits of traffic-specific call for release, and a review of the local airspace management procedures between Leeming and Linton ATC.

UKAB Secretariat

The Tutor and Hawk 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]. If the incident geometry is considered as converging then the Hawk pilot was required to give way to the Tutor[3].

Comments

HQ Air Command

A thorough safety investigation into this incident was undertaken and involved both ATC units and the pilots of the aircraft involved. The investigation found a number of causal factors, some of which do not directly relate to the loss of separation but do provide some context to the Airprox.

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

The Hawk T1 aircraft is not currently fitted with a CWS; the Tutor aircraft is fitted with a TAS. Thus, this barrier is not as effective as it could have been because additional SA on other relevant (and transponding) traffic is only available to the pilot of the Tutor. As it was, the TAS alert in the Tutor was generated at approximately the same time as the controller of the Tutor issued avoiding action to the pilot. Lookout was an ineffective barrier in this case as the Tutor was IMC throughout the encounter.

Both aircraft were in receipt of a surveillance-based ATS (the Hawk under a Traffic Service initially and the Tutor under a Deconfliction Service (DS)). The Leeming Approach controller passed TI on the Tutor to the Hawk pilot as part of the initial radio call but, with the Tutor in cloud, the Hawk pilot was unable to gain visual. As the TI was updated and the contact was within one mile the Hawk pilot requested a DS, which naturally resulted in avoiding action being issued. This avoiding action was coincident with avoiding action being issued to the pilot of the Tutor by the Topcliffe controller.

A number of recommendations resulted from the investigation which should help to reduce the likelihood of recurrence, including a mandatory 'call for release' when the Topcliffe MATZ is activated and a review of how the Leeming/Topcliffe airspace is administered. However, there are also lessons here for all aircrew: consider upgrading to a DS as early as possible to give the controllers a better chance of achieving the required separation. Additionally, if the weather appears marginal for the intended departure profile – in this case a VFR departure through a BROKEN cloudbase – then it may be more prudent to switch to an IFR departure sooner rather than later such that all parties have time to develop a plan to maintain separation between aircraft.

Summary

An Airprox was reported when a Tutor and a Hawk flew into proximity in the Leeming/Topcliffe MATZ at 1023hrs on Friday 20th October 2017. Both pilots were operating under IFR in IMC, the Tutor pilot in receipt of a Deconfliction Service from Topcliffe App and the Hawk pilot in receipt of a Deconfliction Service from Leeming App.

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 first looked at the actions of the Tutor pilot. He was in the radar training circuit, in cloud, and receiving a Deconfliction Service with Topcliffe App (situated at RAF Linton on Ouse). He saw the Hawk approaching on his TAS and, at the same time, Topcliffe App issued avoiding action, which he took. The Board agreed that there was little he could have done to prevent the Airprox.

For their part, the departing Hawks had been issued with an amended departure clearance to avoid the Topcliffe MATZ, which they were told was active. Although they had reported that they had taken account of the forecast weather and thought that they would be able to achieve a VFR departure, some members wondered whether the Hawk pilots should have changed to an IFR departure before they got airborne given that they could probably see that they would have to climb through the cloud and that they knew that the Topcliffe MATZ was active. If it wasn't clear on the ground that they would encounter cloud, members thought that the Hawk lead would have been better placed in requesting a Deconfliction Service after the first call of traffic at 4nm, which he couldn't see. In leaving this decision until he was just about to enter cloud at 1nm separation from the Tutor, the Hawk lead left the controller few options to achieve effective separation. Some members wondered whether the Hawk pilot had fully assimilated the first Traffic Information when it was passed at 4nm; although it was recognised that the cockpit workload would have been high at that point, they commented that, under only a Traffic Service, it was for the Hawk pilot to ensure his separation from the other traffic rather than continue to track towards it.

The Board then looked at the actions of the controllers involved. The Topcliffe App controller had done all he could to inform Leeming about the presence of the Tutor, notifying the MATZ as active and giving Traffic Information to Leeming when requesting the MATZ-crosser. Knowing their own aircraft was under a Deconfliction Service, they called asking for Traffic Information on another Hawk in the Leeming circuit, which should have cued Leeming App into seeing the Tutor as a factor for his departing traffic. Unfortunately, the fast-moving Hawk approaching the slow Tutor meant that, despite their best efforts, deconfliction minima was not achieved.

Turning to the Leeming ACR, members noted that it was extremely busy and that the Supervisor was monitoring another controller who was experiencing difficulties. In an effort to relieve the pressure on that controller, the Supervisor was also using the App controller to position inbound traffic, in addition to them conducting their usual App tasks. Recognising that the Supervisor was attempting to assist the App controller by putting the call-for-release restriction on the taxying Hawks, it was unfortunate that he did not fully articulate the reasons behind the decision, and nor did the App controller ask rather than assuming it was for another aircraft. The App controller then issued a release for the departing Hawks under an incorrect mental model that the traffic for which the release call had been put in place had now cleared the departure lane. With regard to the Tutor that was displayed in the vicinity before he gave the release to the Hawks, members thought that it was likely that the App controller's high workload meant that he was probably mentally dealing with other traffic and had simply not assimilated that the Tutor would be a factor for the Hawks until it was too late. All of which being a timely warning to supervisors about the risks of they themselves taking on tasks and giving extra loading to one controller whilst trying to compensate for another.

Finally, the Board discussed the cause and risk of the Airprox. It was quickly apparent that there were a number of factors, all of which lined up in the classic 'Swiss Cheese' safety model. After much debate, it was decided that the underlying cause had been that Leeming ATC had released the Hawks into confliction with the Tutor. Notwithstanding, it was recognised that important contributory factors were that the App controller's workload was such that he had not assimilated that the Tutor was in the vicinity of the Hawks' departure track; that the reason for the Hawk release restriction had not been adequately communicated between the Supervisor and the App controller; and that the Hawk pilot had not acted upon the Traffic Information on the Tutor. In looking at the risk, and recognising that the encounter looked close from an ATC perspective, the Board noted that, in fact, the two aircraft were separated by 1.6nm as they passed through the same level. Some members thought that the fact that they were in cloud at the time warranted the risk assessment being that safety had been much reduced (Category B); however, the majority view was that although safety had been degraded, the risk of collision had been averted to a sufficient extent that this should be assessed as a Category C incident.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Leeming ATC released the Hawk formation into conflict with the Tutor.

Contributory Factors:

1. The Approach controller's workload was such that he did not assimilate that the Tutor was in the vicinity of the Hawks' departure track.

2. The call for release was not adequately communicated between the Supervisor and the Approach controller.

3. The Hawk pilot did not act on Traffic Information, passed under a Traffic Service.

Degree of Risk: C.

Safety Barrier Assessment[4]

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

ANSP:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because ATC released the Hawk into conflict.

Manning and Equipment were assessed as **partially effective** because the Approach controller was overtasked by the Supervisor, who was trying to protect the Director.

Situational Awareness and Action were assessed as **partially effective** because the Approach controller did not realise that the 'call for release' restriction was put in place against the Tutor.

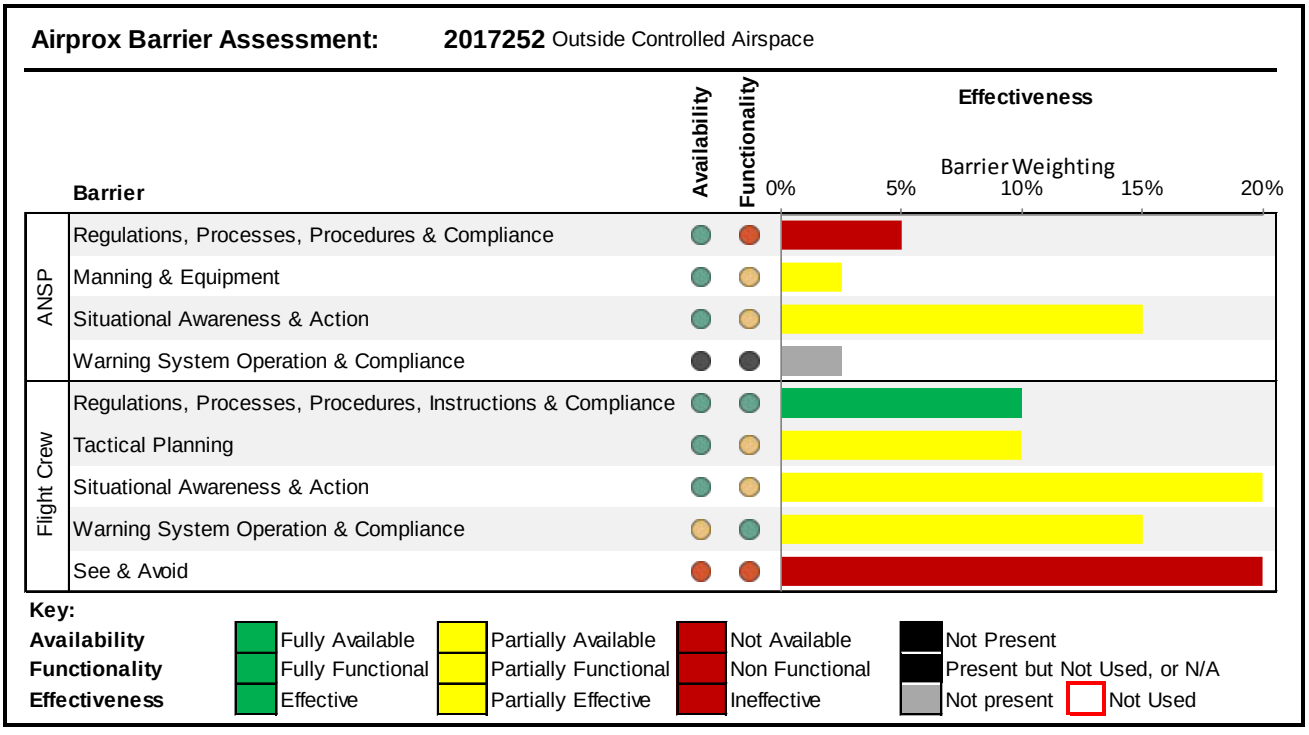
Flight Crew:

Tactical Planning was assessed as **partially effective** because the Hawk pilot had planned for a VFR departure, but couldn't maintain VMC.

Situational Awareness and Action were assessed as **partially effective** because the Hawk pilot was given Traffic Information on the Tutor at 4nm but continued towards it.

Warning System Operation and Compliance were assessed as **partially effective**; only the Tutor was fitted with TAS, the Hawk did not have any CWS.

See and Avoid were assessed as **ineffective**, both pilots were in cloud and neither saw the other aircraft.



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