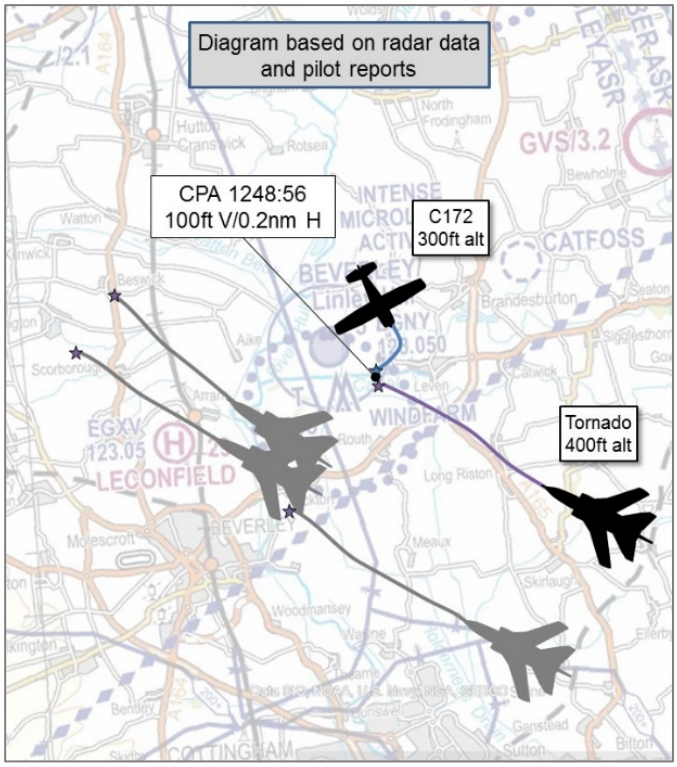
AIRPROX REPORT No 2018319

Date: 17 Dec 2018 Time: 1249Z Position: 5353N 00021W Location: Beverley Airfield

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	C172	Tornado
Operator	Civ FW	HQ Air (Ops)
Airspace	Beverley Airfield	Beverley Airfield
Class	G	G
Rules	VFR	VFR
Service	AGCS	Listening Out
Provider	Beverley	Low Flying Freq
Altitude/FL	450ft	550ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White, Orange	Grey
Lighting	Anti Col	Not reported
Conditions	VMC	VMC
Visibility	10nm	>10km
Altitude/FL	400ft	500ft
Altimeter	QFE (1014hPa)	NK
Heading	300°	310°
Speed	80kt	420kt
ACAS/TAS	Not fitted	TCAS II
Alert	N/A	TA
Separation		
Reported	200ft V/200m H	500ft V/0.5nm H
Recorded	100ft V/0.2nm H	



THE C172 PILOT reports that he was on a routine instrument training exercise with a qualified pilot. At the time of the incident he had returned from OTR VOR at 2000ft whilst working Humberside ATC. He was aware of prevailing NOTAM'd exercises but noted they were above his level and over the sea [UKAB note: the NOTAM was for Danger Area activity not germane to this Airprox]. He received no report from Humberside of nearby military traffic and had changed to Beverley Radio. After descending deadside for RW30RH he entered the circuit pattern and turned final at ~500ft to commence the approach. He heard the engine noise of the military aircraft to the left and witnessed the Tornado pass directly in front and slightly above before it banked to the left and assumed a track of about 300° directly above the runway that he was approaching. Whilst the military aircraft clearly took avoiding action, the C172 pilot maintained his approach as he was already behind and below the other aircraft and so in a position of increasing separation without further action. He landed without further incident although the pilot under training found the experience disconcerting.

He assessed the risk of collision as 'Medium'.

THE TORNADO PILOT reports that he was part of a low-level formation of 4 Tornados. The believed Airprox was at about 1249 on the 17 Dec 18 in the vicinity of Beverley/Linley airfield (Minor Airfield Training) with a C172. He was the back-right aircraft of a card formation that had just entered low-level on a heading of 310° with a planned route line that ran perpendicular (2.3nm) SW of Beverley/Linley airfield. He was offset to the right of the planned track-line to constitute the formation correctly. From the aircraft HUD[1] tape and RAIDS[2] the aircraft tracked very close to Beverley/Linley airfield with the following timeline:

[1] HUD – Head-up Display.
[2] RAIDS – a podded data-link system used to record aircraft parameters for training purposes.

- 1248:32, 490ft Rad Alt, level flight, 369KIAS: the aircrew were presented with a TCAS TA alert (3nm ahead). Position of the ac was 3.5nm SW [actually SE] of Beverley/Linley airfield.

- 1248:45, 565ft Rad Alt, level flight, 426KIAS: the pilot became visual with a C172, below and right of the nose and a gentle climbing turn to maximise separation was actioned. The Tornado passed down the left-hand side of the C172 on the same heading at 1050ft Rad Alt. It was assessed by the Tornado crew that the C172 was at ~300' on the same heading and there was significant separation between aircraft throughout with no crossing flight paths.

The Tornado pilot additionally observed that, in his opinion, Beverley/Linley airfield was a minor aerodrome where 'see-and-avoid applies'. He went on to note that it had a designation as 'Training Airfield' but, due to a windfarm positioned within the aerodrome blue circle shown on the LFC[3], the 'T' has been moved out from centre. Furthermore, he noted that the LFHB[4] suggests this 'Light Aircraft Landing Site' has a significant amount of movements, greater than 10k per year, but remains a minor aerodrome.

He assessed the risk of collision as 'Low'.

Factual Background

The weather at Linton-on-Ouse was recorded as follows:

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METAR EGXU 171250Z 18006KT 9999 FEW013 SCT250 07/05 Q1014 BLU NOSIG
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Analysis and Investigation

UKAB Secretariat

The C172 and Tornado pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[5]. 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[6].

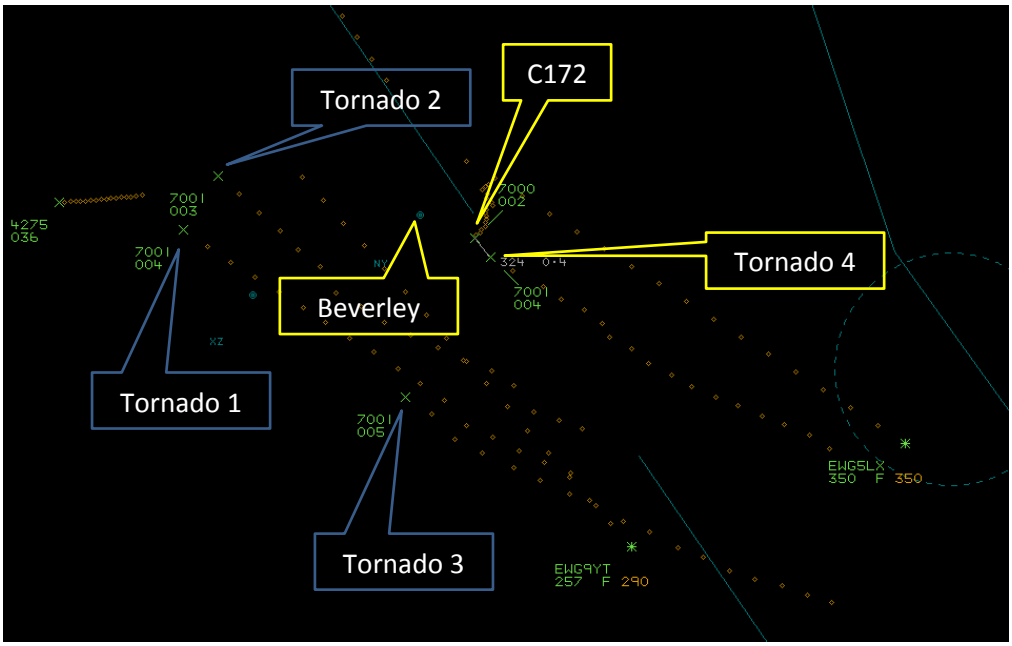


Figure 1: 1248:51 Prior to CPA

[3] LFC – Military Low-Flying Chart.
[4] LFHB – Military Low-Flying Handbook detailing regulations, avoidances, warnings and information for military low-flying.
[5] MAA RA 2307 paragraphs 1 and 2.
[6] MAA RA 2307 paragraph 15.

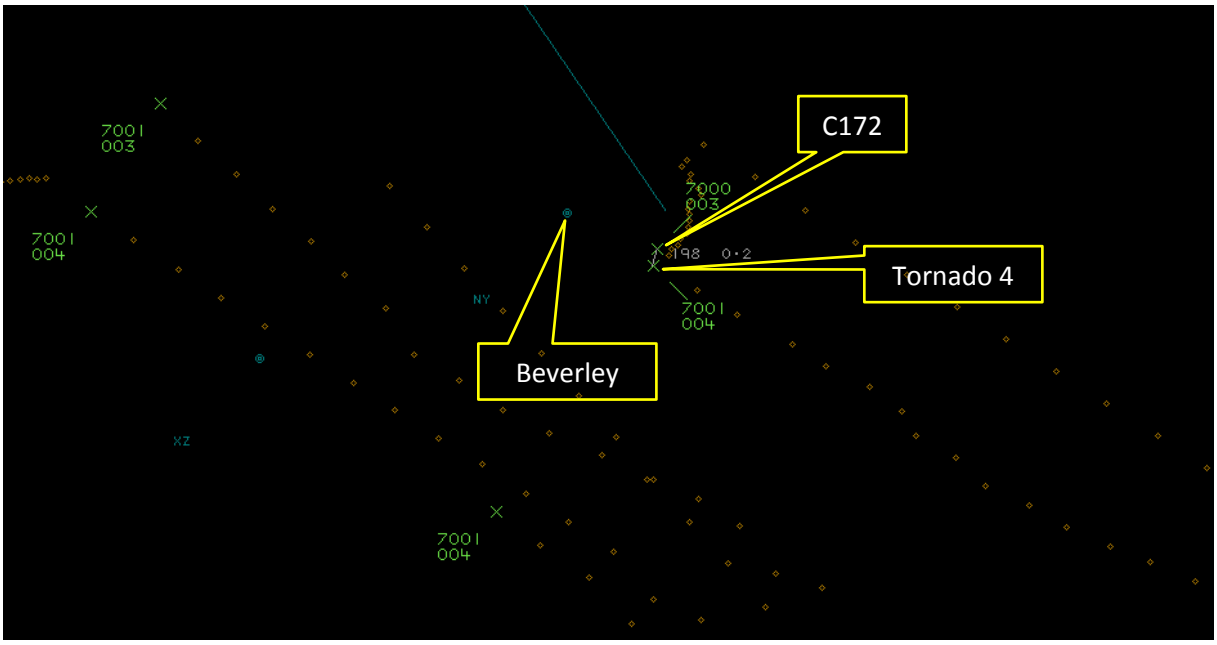


Figure 2: 1248:56 At CPA

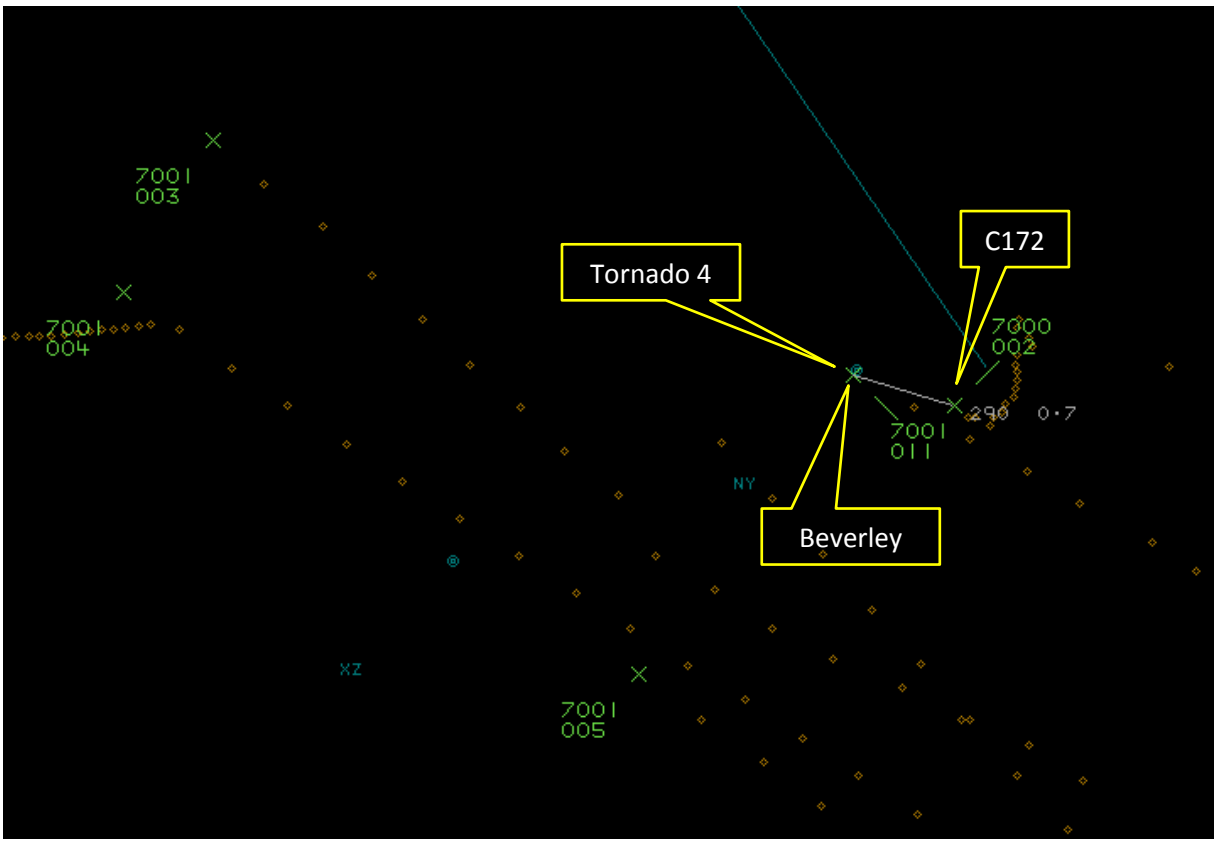


Figure 3: 1249:03 After CPA – Radar Displays Tornado Climbing

C172 Operating Authority Comment

This incident is one of a growing trend of infringements of the standard operating circuit at Beverley Airfield. They are routinely subject to intrusions by Typhoons, Tornados, Tucanos (especially) and most recently Grob training aircraft.

Reporting to the Low Flying Complaints Unit is found empirically to be a waste of time as one receives unhelpful platitudes with scant, if any, recognition of the hazards created by these behaviours. On occasion they can contact the flight crew involved and that is helpful.

They routinely have contact with the Coastguard, Police and Medical helicopters who always call before passing near the circuit area. If tasked, they are always given priority and regular circuit traffic managed accordingly. Very occasionally military traffic will call but they cannot instil this discipline generally despite many, many attempts so to do.

Previously RAF Linton voluntarily introduced an exclusion zone equivalent to an ATZ in response to two Airprox reports; that proved very effective and Tucano intrusions fell to zero. Currently RAF Linton have stated that they are not minded to reinstate that; Beverley have recorded their concern and disappointment at that position.

Beverley Airfield is very busy with about 11,000 movements per year, with a movement defined as a departure from or arrival to the airfield, thus take-offs and landings exceed this figure. Most of this activity takes place at weekends when the military are generally inactive. They are however busy in the week also, notably with regular student activity including solo circuit work. The only 'solution' put forward by the military is for Beverley to re-licence and thus reinstate the previous ATZ. It is presumed that will increase their conspicuity as far as military traffic is concerned.

The re-introduction of an ATZ by re-licencing the airfield is something they have only done on a temporary basis for special events. For them to take this step permanently is both costly and administratively onerous. It is their considered view that responsibility for the incident detailed in this report and many others of a less hazardous nature lies with the RAF and not with Hull Aero Club Ltd.

This Airprox is raised as they consider the incident serious enough to warrant the attention of the UKAB. They place on record however their general concern that a much more serious incident will eventually occur if everyone cannot agree a better way of working.

Comments

HQ Air Command

Beverley airfield is designated in the UK AIP and the UK Military Low Flying Handbook (UKMLFHB) as a ‘minor aerodrome’ that conducts training. This is shown on CAA and military VFR charts as a small circle with a ‘T’ in or near the circle depicting the airfield. The Tornado pilot had planned to avoid the airfield by approximately 2.5nm, which would normally be expected to be sufficient margin. However, the transit formation that the Tornados were flying required the subordinate elements (numbers 2 and 4) to offset either to the right or left of the leader’s track line. There was no option to offset to the left due to the built-up areas (Hull) so both aircraft were on the right. Whilst the crew was aware of the presence of Beverley airfield, they were not aware of whether or not there was any activity there until the issuance of the TA. This then cued their lookout in the direction of the Beverley circuit, whereupon they became visual with the Cessna and judged that a gentle climbing turn would be sufficient to increase separation as there was no risk of collision.

The plan-to-avoid barrier was weakened by the planning a single-track line for a card formation – this is normal practice and the lead aircraft would expect the subordinate element to take account of any airspace restrictions or similar that affect its anticipated track progression. Here, the absence of an ATZ or similar led the formation to believe that this minor aerodrome is much like many of the others – the ‘T’ designation was not easy to see on the cockpit map display and so did not alert the crew to the likely presence of circuit traffic.

The surveillance-based ATS barrier was not employed by the Tornado crews as it is impractical for aircraft flying at low-level. It is not stated which type of service the Cessna pilot had agreed with Humberside just prior to the Airprox, but there is no guarantee that the Tornado traffic would have been called to the Cessna pilot as there would have been quite some distance between the Cessna and the Tornados when the Cessna pilot changed frequency to Beverley.

The electronic conspicuity (EC) barrier was partially effective as the Tornado crews received a TA generated by the Cessna, demonstrating once again that interoperable EC systems are a useful addition to the multiple barriers employed in the avoidance of MAC. This cued the Tornado crew's lookout and they gained visual with the Cessna in the circuit, judging that there was no risk of collision but nevertheless choosing to increase the separation.

It is noted that, in the past, a restriction had been voluntarily introduced by the local unit operating Tucano, but this is no longer the case and would not have prevented this Airprox as it only applied to Tucano operators. It is unfortunate that all minor aerodromes in the UK are depicted on military low flying charts by a small circle and that the only clue that training activity is conducted is the addition of a small 'T' either within or next to the circle, as these are understandably quite easy to miss. SERA 3225 and RA 2307 should act as a degree of 'protection' for aerodrome traffic patterns (in Beverley's case, upwards of 11,000 movements per year), but these are not infallible. Exploration of other barriers (such as possible provision of full ATC services or the establishment of a zone around the airfield to make it more visible to all users of Class G airspace and VFR charts) should be encouraged as sound safety management practice. Finally, this incident occurred prior to the publication of the Air Safety Matters leaflet, issued by the RAF Safety Centre in early Feb 2019, containing advice on the rules surrounding flight in the vicinity of minor aerodromes; it is hoped that this leaflet will increase awareness and understanding for all crews.

Summary

An Airprox was reported when a C172 and a Tornado flew into proximity in the Beverley visual circuit at 1249hrs on Monday 17th December 2018. Both pilots were operating under VFR in VMC, the C172 pilot in receipt of an AGCS from Beverley and the Tornado pilot listening out on the low-level frequency.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, radar photographs/video recordings and reports from the operating authorities.

The Board began by discussing the actions of the Tornado crew. The military Board member began by explaining that the Tornado formation's planned track took them between Leconfield and Beverley, and that the subordinate elements of each pair of aircraft would be expected to adjust their track to account for airspace or populated areas. He commented that the radar replay shows that the No2 Tornado (in the lead element) had adjusted away from Beverley but the No4 Tornado (in the rear element) had not. Ultimately, it was not known to him why the No4 crew had not adjusted their track other than to say that as a busy subordinate of a low-level fast-jet formation also tasked with maintaining contact with their own element's leader (No3 Tornado), they may have become task focused to the extent that they may not have seen Beverley airfield in the general clutter on their map as they routed towards its location (see figure 4). He opined that, without the benefit of distinctive annotation (such as an ATZ), it can be difficult to identify Beverley on the Tornado in-cockpit moving map. Notwithstanding, he agreed that the Tornado crew should have avoided the pattern of traffic at Beverley and, although the crew reported that they climbed gently to avoid the C172, he noted that, subject to lag in the tracks and heights indicated on the radar display, the radar replay appeared to show that the Tornado crew climbed at or just after CPA.

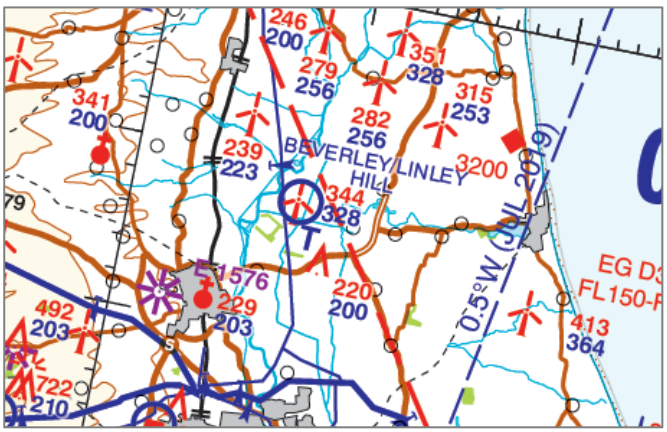


Figure 4: Mil LFC showing Beverley/Linley Hill

Some members noted that the Tornado crew had received a TCAS TA indication some 3nm before the flew over Beverley and they wondered why the Tornado crew had not reacted at that point (about 30secs prior to CPA) rather than simply focus their lookout ahead. Although it was known that TCAS TAs could not be relied on for lateral separation due to potential angle-of-arrival errors within the antenna systems, the crew could still have climbed at that point to ensure that they passed over Beverley well above the pattern of traffic. In this respect, other members were concerned by the Tornado pilot's comment that Beverley was a minor airfield were 'see-and-avoid applies'. Although this recognises that see-and-avoid applies in all circumstances in Class G airspace, the requirements of MAA RA 2307 Paragraph 15a in relation to flight in the vicinity of an aerodrome were clear in that '*…while flying in the vicinity of what the Aircraft Commander knows, or ought reasonably to know, to be an Aerodrome…*' military pilots should '*Conform to the pattern of traffic formed by other Air Systems intending to land at that Aerodrome, or keep clear of the airspace in which the pattern is formed.'* In essence, although it was recognised by the Board that not all airfield strips or landing sites could be avoided at all times if pilots did not know of their presence, they should avoid those that they could reasonably know were there (i.e. displayed on their map) on the assumption that there may be traffic either airborne or about to get airborne at that location. In this respect, the Board noted that the incident had occurred before the publication of the RAF Safety Centre 'Air Safety Matters' briefing note Issue 41 regarding the avoidance of minor aerodromes, but commended all those who operate at low-level to review its content and especially to note its description of minor airfields as 'see-and-remain-clear' with associated advice about having a robust plan to stay clear of them if traffic is spotted in the vicinity.

The Board then turned its attention to the actions of the C172 pilot. Having turned final, they noted that he was only aware of and saw the Tornado as it passed in front of his aircraft, slightly above, before it banked to the left. Members concluded that he had therefore only seen the Tornado at CPA, or just after, and although a timely reminder to maintain a robust lookout in all directions at all times, even in the circuit pattern, they agreed that there was little else he could have done in the circumstances and time available.

Turning to the comments from the C172 operating authority (Hull Aero Club Ltd), the military Board member noted that RAF Linton-on-Ouse/RAF Leeming organise a bi-annual Regional Airspace Users Working Group (RAUWG) as a forum for all users to discuss good practice, forge relationships and highlight areas of concern to create a safer and more cooperative use of the local airspace. The Board agreed that this was an excellent initiative and wondered if Hull Aero Club Ltd were aware of and invited to these meetings, and whether they had attended as a way of addressing their concerns. The military member was unable to confirm their attendance, but resolved to ensure that the associated RAUWG organisers included them in the next invitation to attend.[7] The debate then turned towards the practicalities of establishing ATZs and licencing requirements, during which members noted that Hull Aero Club Ltd had commented that they had more than 11,000 aircraft movements per year. Given the number of movements stated, it seemed that some method of mitigating the associated risks from unintended overflight was sensible. Ultimately, that was the purpose of ATZs, to provide a protected volume of airspace for busy airfields. This prompted a discussion on the merits of an ATZ balanced against the associated administrative burden, regulatory requirements and attendant costs. Although members agreed that it would be prudent to have an ATZ, they were not necessarily that easy to establish, and sometimes minor aerodrome owners are discouraged by the associated costs and the amount of work involved to satisfy the regulatory processes.[8] Some members opined that the requirement for an ATZ for training airfields should not depend on the weight of an aircraft (>5700kg), but on a minimum number of movements at an aerodrome. In concluding their discussions, the Board agreed that there appeared to be disincentives to setting up ATZs for minor aerodromes which were at risk of having a deleterious safety impact. What was required was a simple and affordable way of providing protection to busy training airfields from all other airspace users (not just military) and so the Board resolved to make a recommendation that the CAA investigate options for the cost-effective and straightforward establishment of airspace to afford additional protection for busy minor aerodromes.

[7] It was understood that the next RAUWG meeting would be at RAF Leeming on 26 July 2019, and that the Project Officer could be contacted on 01677 457062.
[8] http://publicapps.caa.co.uk/docs/33/20190201PolicyStatementEstablishmentAndDimensionsOfATZs.pdf

Turning to the cause of the incident, the Board quickly agreed that the Tornado crew should have known about Beverley's location from their pre-flight planning and in-flight moving map which, although somewhat cluttered, indicated that Beverley was an active minor aerodrome with training movements. Furthermore, they had received a TCAS TA warning them of the presence of the C172 about 30secs prior to CPA but had decided only to lookout rather than conduct an early avoiding manoeuvre. The Board therefore agreed that the cause of the Airprox was that the Tornado crew had flown into conflict with the C172 in the Beverley visual circuit, with a contributory factor that the Tornado crew did not avoid the pattern of traffic at Beverley. Turning to the risk, there was a prolonged discussion about when the Tornado pilot actually climbed to avoid the C172. The radar recordings and C172 pilot's report indicated that the Tornado pilot had not climbed until at or just after CPA. In contrast, the Tornado pilot's report indicated that he had seen the C172 below and right of the nose in sufficient time that in his opinion only a gentle climbing turn was required to maximise separation. Irrespective of the precise choreography, the Board were unanimous in agreeing that, at the very least, the closure speed and the fact that the C172 pilot did not see the Tornado until after CPA meant that safety had been much reduced below the norm to the extent that there had been a risk of collision. Accordingly, the risk was assessed as Category B.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tornado crew flew into conflict with the C172 in the Beverley visual circuit.

Contributory Factor(s): The Tornado crew did not avoid the pattern of traffic at Beverley.

Degree of Risk: B.

Recommendation(s): The CAA investigate options for the cost-effective and straightforward means to afford additional protection of traffic operating in the immediate vicinity of busy minor aerodromes.

Safety Barrier Assessment[9]

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

Flight Crew:

Regulations, Processes, Procedures, Instructions and Compliance were assessed as **ineffective** because the Tornado pilot did not avoid the pattern of traffic at Beverley airfield.

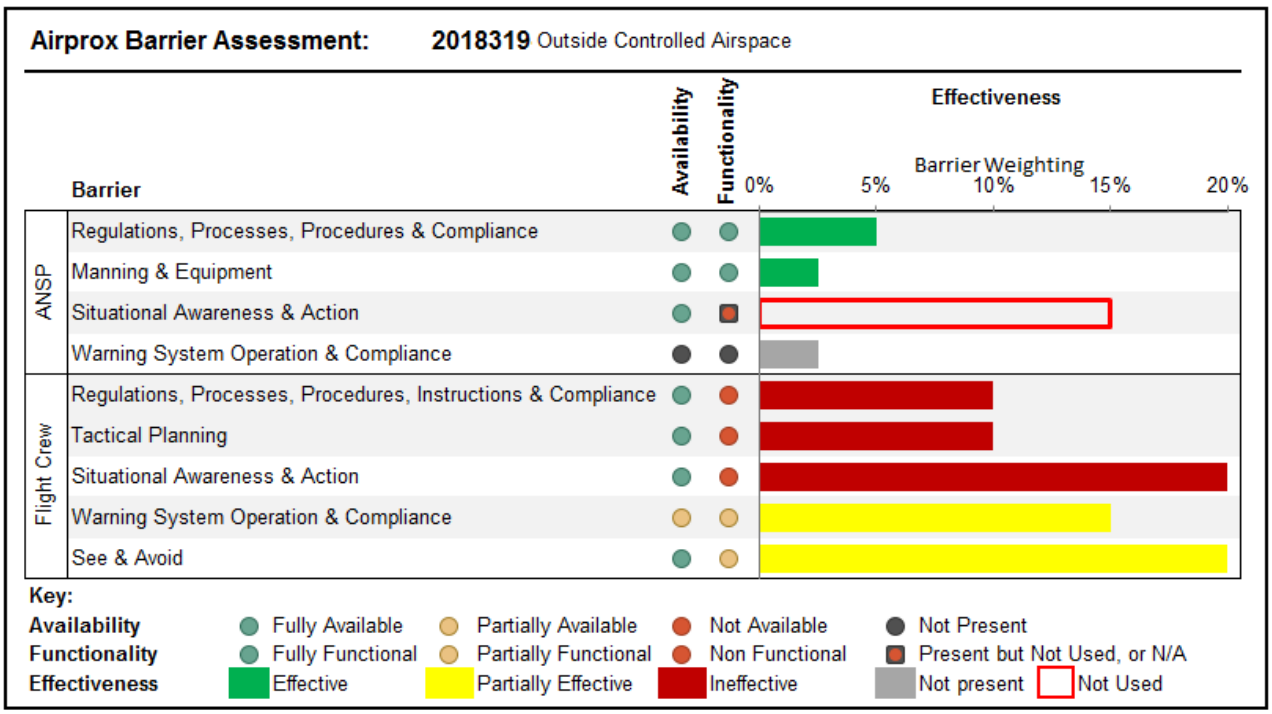
Tactical Planning was assessed as **ineffective** because the Tornado crew did not avoid Beverley airfield, which was marked on their maps.

Situational Awareness and Action were assessed as **ineffective** because the Tornado pilot had SA on the C172 through a TCAS TA at 3nm (which correlated to Beverley Airfield) but did not act until just before CPA.

Warning System Operation and Compliance were assessed as **partially effective** because although the TCAS TA focused the Tornado pilot's attention ahead, he did not positively act when he received the TA (by immediately climbing for example).

See and Avoid were assessed as **partially effective** because the Tornado pilot only became visual with the other aircraft just before CPA, and the C172 pilot did not see the Tornado until after CPA.

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


Airprox Barrier Assessment: 2018319 Outside Controlled Airspace
Barrier
Availability
Functionality
Effectiveness
Barrier Weighting
0%
5%
10%
15%
20%
ANSP
Regulations, Processes, Procedures & Compliance
Manning & Equipment
Situational Awareness & Action
Warning System Operation & Compliance
Flight Crew
Regulations, Processes, Procedures, Instructions & Compliance
Tactical Planning
Situational Awareness & Action
Warning System Operation & Compliance
See & Avoid
Key:
Availability
Fully Available
Partially Available
Not Available
Not Present
Functionality
Fully Functional
Partially Functional
Non Functional
Present but Not Used, or N/A
Effectiveness
Effective
Partially Effective
Ineffective
Not present
Not Used