

## AIRPROX REPORT No 2012010

Date/Time: 1 Feb 2012 1628Z

Position: 5417N 00128W (2.5nm ESE  
Leeming - elev 132ft)

Airspace: Vale of York AIAA (Class: G)

Reporting Ac      Reported Ac

Type: Hawk T Mk1      BE200

Operator: HQ Air (Ops)      Civ Comm

Alt/FL: 3500ft      4000ft↓  
QFE (1034hPa)      QNH (1038hPa)

Weather: VMC CLBC      VMC CLBC

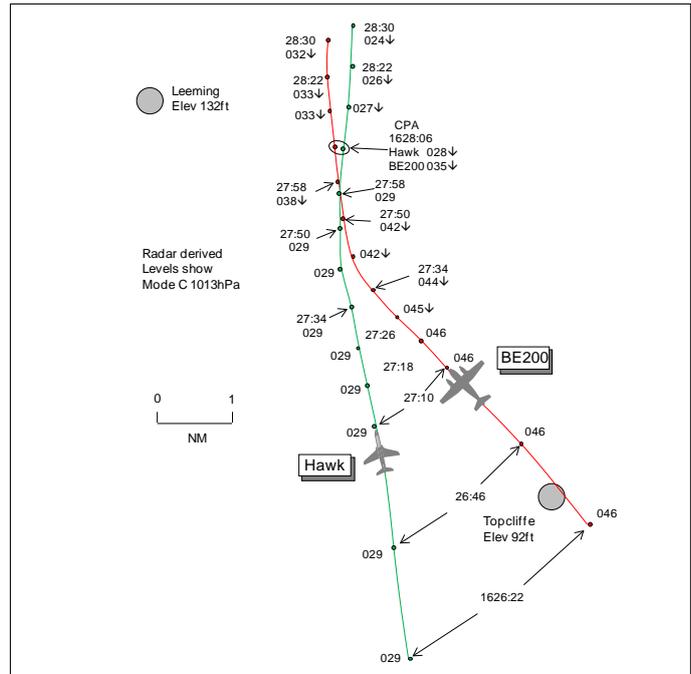
Visibility: 40km      8km

Reported Separation:

200ft V      Not seen

Recorded Separation:

700ft V/0.1nm H



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE HAWK T MK1 PILOT** reports inbound to Leeming and in receipt of a TS from Leeming DIR on 231.45MHz squawking an assigned code with Modes S and C. The visibility was 40km flying 500ft below cloud in VMC and the ac was coloured black with HISLs switched on. On recovery for a radar to ILS approach they were cleared for descent to 3500ft QFE 1034hPa heading 010°. On levelling-off about 10nm W of Linton-on-Ouse at 230kt they were given TI on a calibrator ac 1600ft above descending in their 2 o'clock range 4nm. A thin solid cloud layer with base 4000ft prevented them visually acquiring the other ac. Passing Topcliffe they were given a traffic update and on this occasion a gap in the cloud allowed them to obtain a 'tally' on traffic, a low-wing twin-engine type, in their 2 o'clock about 2nm tracking N about 1000ft above and only slightly slower than themselves. It became visually apparent that the ac was descending and their converging tracks would take their ac underneath the Calibrator by a few hundred feet. Just as they passed directly beneath the Calibrator at about 200ft MSD (visually assessed) the Calibrator turned R onto 010° and continued descent on top of them. He immediately turned NE and pushed down (bunted) to 3200ft, below their cleared level but with the ground in sight, to avoid the other ac's descent. Further descent clearance was then given to 1600ft and the ILS was flown without further incident whilst maintaining 'tally' on the Calibrator as it turned NW and descended to about 2000ft to transit to the N of Leeming. He assessed the risk as medium.

**THE BE200 PILOT** reports inbound to Durham Tees Valley VFR and in receipt of a TS from Leeming Zone, he thought [actually during transfer from Linton-on-Ouse to Leeming], on VHF, squawking 0024 with Modes S and C; TCAS 1 was fitted. The visibility was 8km flying clear below cloud in VMC and the ac was coloured blue/white with nav, strobe and anti-collision lights all switched on. They were performing a calibration task for Topcliffe and were routeing into the Topcliffe O/H at around 4000ft when the radar assessors informed them that they were 'task complete' and cleared to RTB. The FO informed Zone that the task was complete and they would RTB, and they took up a direct track to DTV. At this point he initiated a descent at 200kt as they were fairly close to DTV and needed to lose height. They were also approaching a thin layer of cloud which they wanted to descend below to remain in sight of the surface to facilitate a visual recovery into DTV. About this time Zone passed TI on a Hawk ac inbound to Leeming but this traffic was not sighted at any time by them, he thought. As they had not been handed-over to DTV he initiated a L turn onto approximately 330° to remain clear of the DTV CTR and, owing to the traffic call from Zone, he levelled-off at

around 3000ft to remain clear. They were handed to DTV and completed a visual approach to land. He was not aware of any Airprox occurring and there was no warning of traffic on the TCAS system.

**THE LEEMING DIRECTOR** reports operating as the LEO conducting an examination of DIR. A Leeming Hawk was handed over from ACC approximately 25nm S of Leeming for an ILS to RW16 under a TS. The Hawk was given descent initially to 3500ft QFE and TI was passed to Linton-on-Ouse (LOO). During the descent TI was passed to the Hawk pilot on an ac wearing a Calibrator squawk (indicating below) and the Hawk subsequently levelled-off at a height below the Calibrator ac and at this stage the 2 ac were still laterally separated. The Hawk pilot requested to amend his approach to a PSPC and was subsequently turned from his initial NW'ly heading onto a more N'ly track for a LH pattern (terrain and avoidance areas to the W of Leeming prevent an effective PSPC from being conducted RH). TI on the Calibrator ac, now on a slowly converging heading, was provided on several occasions. Whilst the Calibrator was indicating level with vertical separation of 1600ft based on Mode C, the Hawk pilot eventually gained visual contact. At a position 4nm SE of Leeming the Hawk pilot reported the Calibrator ac descending from a position directly above. The Hawk flight was then given descent to 1600ft (pattern height) and the pilot reported the Calibrator was now separated by 200ft vertically, then 100ft. At the time that the Hawk was given descent to 1600ft, Mode C indicated no less than 500ft vertical separation. The Calibrator flight was shortly thereafter in receipt of a service from Topcliffe Approach (collocated in the Leeming ACR) allowing separation to be maintained for the remainder of the Hawk's approach.

**THE LEEMING ZONE CONTROLLER** reports covering the Topcliffe Approach position, a standard operating practice during periods of low intensity. At 1628 DTV passed a pre-note on transit traffic routing S from DTV and during the landline conversation a Calibrator flight free-called on the Topcliffe Approach frequency requesting a TS en-route to DTV and reporting in the descent to 3000ft on 1038hPa (believed to be the DTV QNH). The Calibrator pilot gave no position information during his initial call and the ac was believed to be E abeam Leeming. The Calibrator flight was instructed to squawk ident and, after a short delay, was placed under a TS as requested. The Calibrator was subsequently pre-noted to DTV during the continuing and, at times, convoluted ongoing landline conversation. Leeming Supervisor requested the level that the Calibrator was descending to and its pilot, when asked, reported that he was now descending to 2000ft on 1038hPa. By now the Calibrator was 4nm NE Leeming and in proximity to an ac working Leeming DIR, squawking 0411. The Calibrator pilot was given TI on the Hawk which was conducting a PSPC to Leeming and currently maintaining 1600ft on 1034hPa (Leeming QFE). Additional TI was given on the Hawk which was now 2nm SW tracking W and indicating 700ft below. Shortly after this the Calibrator pilot reported visual contact with the Hawk. The Calibrator pilot was then instructed to maintain his current heading in order to remain clear of the Leeming radar pattern and to continue with DTV.

**BM SAFETY MANAGEMENT** reports that this Airprox occurred between a Hawk operating IFR in receipt of a TS from Leeming (LEE) DIR being vectoring for an ILS approach and a BE200 operating VFR. The BE200 had been in receipt of a TS from Linton (LIN) Zone up until 1627:40, 33sec prior to the CPA. Both crews reported VMC, with the Hawk pilot reporting a thin, solid layer of cloud with a base at 4000ft. The respective crew's assessment of in-flight visibility differed, with the Hawk reporting unlimited visibility and the BE200 reporting 8km.

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. Initial comparison of the radar replay and LEE tape transcript proved that a 42sec discrepancy existed between the 2 time-bases. Comparison of the radar replay and LIN tape transcript proved that a 15sec discrepancy existed between the 2 time-bases; transcript times were subsequently amended to correlate with the radar replay.

Analysis of the radar replay and tape transcript demonstrated that the BE200 crew free-called LEE Zone 3sec after the CPA. The BE200 had previously been in receipt of an ATS from LIN Zone, whilst conducting a flight check in the vicinity of Linton, on surveillance radar located at RAF Topcliffe, operated by 90 SU. However, due to the length of time taken to establish that the BE200 had been working LIN Zone and that the controller concerned was unavailable due to PDT, no report from LIN Zone was completed in time to inform this investigation.

LEE DIR was manned by a trainee under examination and the Unit's LEO and reported low workload and task complexity with only the reporting Hawk on frequency. LEE Zone reported their task load and complexity as low and, at the point of the CPA, were not working any traffic. Based on analysis of LIN Zone's tape transcript, their workload appeared to be moderate.

The incident sequence commenced at 1621:05 when the Hawk flight called LEE DIR on handover from LATCC(Mil), descending through FL148 for FL100, 9.2nm SSW of the BE200 which was indicating FL046. The Hawk flight was placed under a TS which was, "*reduced...due to limited surveillance performance.*"

[UKAB Note (1): Following RT exchanges it was established the Hawk pilot was requesting radar positioning to an ILS RW16 and DIR issued a turn onto 330° (L 10°) and a descent to 3500ft LEE QFE 1034hPa, which was all correctly read back.]

At 1622:03, LEE DIR contacted LIN Zone on landline to pass TI to them on the Hawk, due to its proximity to LIN and Church Fenton, stating the Hawk was inbound to Leeming for the ILS RW16 descending to 3500ft QFE.

Following an instruction to turn L onto heading 320°, at 1622:52, LEE DIR provided the Hawk pilot with TI on the BE200, stating "*(Hawk c/s) traffic right, two o'clock, five miles (radar replay shows 6.9nm), similar heading, four hundred feet below (radar replay shows 800ft above) Calibrator*", which was acknowledged.

At 1623:02, the 'live mic' facility captured a conversation between LIN Zone and LIN Supervisor. This involved the Zone controller moving to the APP position and band-boxing these two positions. From 1623:29, Zone had assumed responsibility for this band-boxed control position.

At 1623:08, the Hawk pilot, having levelled at 3500ft QFE and indicating FL029, requested LEE DIR to update him on the range of the BE200; LEE DIR replied, "*(Hawk c/s) that previously reported traffic is now right, three o'clock, six miles, similar heading, slow moving, indicating one thousand feet above (radar replay shows 1700ft above).*" During the incident sequence, the BE200 maintained between 200 and 225kt GS, broadly similar to the Hawk.

After being given TI on traffic in the LIN visual cct, at 1624:31 the Hawk pilot requested a, "*short pattern if able*" which was approved by LEE DIR and a vector onto 360° was given. At this point, the BE200 was 7.3nm NE of the Hawk maintaining FL046.

Between 1625:02 and approximately 1625:42, LIN Zone was involved in receiving a handover on an un-related LARS transit. Between these times, separation between the Hawk and BE200 closed from 6.5nm to 4.8nm, with both ac maintaining their indicated levels of FL029 and FL046 respectively.

After being given TI on traffic deemed to be in the Dishforth visual cct, at 1625:24 LEE DIR provided an accurate update of TI to the Hawk pilot stating, "*...that first called traffic the Calibrator right two o'clock, now five miles, crossing right to left, one thousand seven hundred feet above*", which was acknowledged by the pilot. Shortly afterwards at 1625:39, the Hawk pilot asked whether the Calibrator (BE200) was, "*...maintaining his height?*" There was no initial response from LEE DIR and at 1625:45 the Hawk asked again whether the Calibrator (BE200) was, "*maintaining his present level?*" LEE DIR replied, "*...affirm, maintaining flight level four-six on radar*" which was acknowledged.

Between 1626:05 and approximately 1626:41, LIN Zone was involved in landline liaison initially with LIN TWR then LIN Ground about un-related traffic. Between these times, separation between the Hawk and BE200 closed from 3.9nm to 2.6nm, with both ac maintaining their indicated levels of FL029 and FL046 respectively.

At 1626:22, LEE DIR provided a further, accurate update to the TI on the BE200 to the Hawk pilot stating, "...last reported Calibrator right, two o'clock, three miles, crossing right to left, one thousand six hundred feet above." The Hawk pilot replied, "...he's above the cloud layer, so unfortunately I can't [inaudible] I can't see him", which was acknowledged by LEE DIR.

Between 1626:44 and 1627:15, LIN Zone was involved with identifying and applying a BS to an unrelated rotary-wing undertaking a LARS transit to Dishforth. At the completion of this exchange of RT, 1.2nm lateral separation existed between the Hawk and BE200, with both ac maintaining their indicated levels of FL029 and FL046 respectively.

At 1627:10 LEE DIR provided a further update to the TI on the BE200 to the Hawk pilot stating, "...last reported track Calibrator now right, two o'clock at one and a half miles, crossing right to left, one thousand seven hundred feet above." The Hawk pilot replied that they were, "now visual (Hawk c/s)" later reporting that they gained visual through "a gap in the cloud" and remained visual throughout the remainder of the incident sequence.

At 1627:23, with 0.9nm lateral separation existing, LIN Zone asked the BE200 crew, "...whether I need to hand you back over to Topcliffe, are you err likely to be coming back out down towards Linton?" Initially, the BE200 crew asked LIN Zone to, "standby." Concurrently, at 1627:23, LEE DIR became involved in landline liaison with Durham Tees Valley radar, passing them TI on the Hawk, with the landline being transferred to LEE Zone at 1627:47 to receive a pre-note. At 1627:26, the BE200 commenced a descent and then, at 1627:38, with 0.3nm lateral and 1500ft indicated vertical separation, the crew stated that, "...it looks like we're complete now and request descent and V-F-R back in err Teesside." LIN Zone acknowledged the BE200 crew's transmission and suggested that they, "err free call err Leeming err correction, Topcliffe Approach, one-two-five-decimal-zero before going en-route." At this point, 0.2nm lateral and 1300ft indicated vertical separation existed. The BE200 crew acknowledged this instruction, going en-route at 1627:55.

At 1627:47 LEE DIR instructed the Hawk pilot to, "...turn right heading zero-one-zero degrees" which was acknowledged. At this point, the BE200 was 0.1nm NE of the Hawk, indicating descent through FL042 and had, simultaneously, also turned onto a track of 010°, as reported by the Hawk pilot. At 1627:50, 0.1nm lateral and 1300ft vertical separation existed between the 2 ac. At 1627:56, the Hawk pilot asked LEE DIR, "...is that the Calibrator directly above us?" and LEE DIR replied, "...affirm, directly above you." At this point, the BE200 was 0.1nm NNW of the Hawk indicating descent through FL038, vertical separation 900ft.

[UKAB Note (2): The CPA occurs at 1628:06, the Hawk pilot having commenced descent and turned onto a NNE'y track to deconflict from the BE200, as reported; the Hawk shown passing FL028 with the BE200 0.1nm to its W passing through FL035, 700ft above. The next sweep shows vertical separation as 600ft but lateral separation has increased to 0.2nm.]

The BE200 crew did not visually acquire the Hawk [until it was on L base leg and passing 2nm to its NE 700ft below] and reported that they had no indications on TCAS of the Hawk's presence. No TI was passed by LIN Zone to the BE200 flight at any point during the incident sequence. LEE DIR did not update the TI to the Hawk to state that the BE200 had commenced a descent.

[UKAB Note (3): At 1628:20 the Hawk pilot transmitted, "(Hawk c/s) approximately two hundred feet above (inaudible)" to which LEE DIR replied "...apologies say again". The Hawk pilot response was, at 1628:27, "Er now abeam the er Calibrator and about half a mile and he's 100ft above us". LEE DIR then instructed the Hawk pilot to descend to height 1600ft which was correctly read back.]

The BE200 flight free-called LEE Zone at 1628:16 stating that they were, "...descending altitude three thousand feet, one-zero-three-eight, requesting a traffic service and visual approach back into Durham Tees Valley."

In terms of the initial TI by LEE DIR at 1622:52, given the discrepancy between the transcript and radar replay and the fact that the Hawk was descending at this point, some difference between the

controller's reported height and that presented on the radar replay should be expected. Whilst a difference of 1200ft might suggest a perception/calculation error on the part of the controller, the LEO has confirmed that the initial TI was accurate. However, the LEO has stated that the controller may have made a perception/calculation error in terms of the update given to that TI at 1623:09. That said, given the presence of the cloud layer, this error did not affect the timeliness of the sighting of the BE200 by the Hawk pilot. Furthermore, the 3 further updates on the TI were accurate, enabling the Hawk pilot to continue to develop his mental picture and to visually acquire the BE200 at 1627:16 through the gap in the cloud. The Hawk pilot subsequently maintained visual contact with the BE200 and discharged his responsibility to avoid it, once he perceived that the BE200 was descending and had become a threat. Although a hindsight bias argument could be created to suggest that LEE DIR could have updated the TI to state that the BE200 was descending, this would not have affected the outcome of the Airprox as the Hawk pilot was visual with the BE200 from 1627:16. Moreover, beyond the Duty of Care laid down in CAP 774, there is no clear regulation or policy to determine a controller's responsibilities in these instances.

In terms of the ATS provided by LIN Zone, notwithstanding the pilot's responsibilities to "discharge his collision avoidance responsibility without assistance from the controller" there was a clear requirement for them to have passed TI to the BE200; it has not been possible to conclusively determine a cause for the lack of TI.

Given the respective tracks and vertical profiles of the Hawk and BE200, it might have been reasonable to expect that the TCAS equipment on the BE200 had given some indication of the Hawk's presence. The fact that it did not suggests either a malfunction or an incorrect mode selection on the part of the BE200 crew.

As an observation, given that this was neither a causal nor contributory factor, whilst the inclusion in TI of descriptions of relative speed should be encouraged as they assist the pilot in developing their mental picture, controllers must ensure that they are accurate. LEE DIR's inaccurate description of the BE200 as "*slow moving*" at 1623:08 could have painted an erroneous picture for the Hawk pilot, suggesting that he would rapidly overtake the BE200 down its port-side.

The BE200 and Hawk were on conflicting flight profiles within Class G airspace and the LEE ATM related safety barrier operated effectively, enabling the Hawk pilot to discharge his responsibility to "see and avoid."

**HQ AIR (OPS)** comments that it would perhaps have been prudent for the BE200 crew to take a DS from LIN, before commencing his descent. It is also surprising that no coordination took place between LIN and LEE ATC (other than the call at 1622:03) given the proximity of the 2 ac. However, ultimately the Hawk pilot was responsible for collision avoidance, and once he called 'visual' (or 'tally' in this case) he should have been aware that under CAP774 (ATSOCAS procedures) he was then required to take action as required to prevent the conflict with the BE200. If he had wanted ATC to provide vectors to ensure separation with the BE200 he should have asked for a DS. HQ Air has recently re-publicised the need for military aircrew to be familiar with the content of CAP774 and reiterated the responsibilities of aircrew with respect to collision avoidance. This will hopefully reduce the likelihood of reoccurrence of events of this sort.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

Military controller Members thought that LIN Zone had not given the BE200 crew a good service. When it became apparent to Zone that the BE200 had completed its task and was requesting descent, Zone had free-called the flight to Topcliffe APP without either a handover or, more importantly, TI being passed on the converging Hawk below. In the absence of TI, the BE200 crew

was unaware of the Hawk and descended into conflict with it, causing the Airprox. Members questioned the BE200 crew's flight rules (reported as VFR) and the appropriateness of the TS during their descent through a cloud layer, placing the flight in IMC. A DS would have been better in the circumstances to ensure that deconfliction minima were applied until the flight was able to become VMC. As it was, for whatever reason, the Hawk's presence was not detected on the BE200's ACAS and so the crew was descending effectively without any SA on the potential conflict. Fortunately LEE DIR had been watching the BE200 converge and had passed TI on several occasions to the Hawk pilot which built his SA on its passage. Military pilots Members wondered if the Hawk pilot, whilst being vectored under a TS, was expecting ATC to separate his ac from other traffic. Under the TS the pilot is responsible for maintaining his own separation from other traffic although ATC should not knowingly vector the ac into conflict with other traffic. During this encounter, the tactical vectoring given by LEE DIR steered the ac towards the radar cct pattern but vertical separation pertained up until the BE200 commenced its descent when NW of Topcliffe. Eventually as the BE200 descended through the cloud layer the Hawk pilot saw it directly above and took his own separation on it by turning and descending, which the Board concluded had removed any risk of collision.

The HQ Air Ops Members informed the Board that on the 14<sup>th</sup> Feb a Safety Bulletin was issued to military aircrew re-iterating the services available under ATSOCAS.

### **PART C: ASSESSMENT OF CAUSE AND RISK**

Cause: In the absence of TI from Linton Zone, the BE200 crew descended into conflict with the Hawk.

Degree of Risk: C.