

## AIRPROX REPORT No 2012133

Date/Time: 1 Sep 2012 1754Z (Saturday)

Position: 52 33.10N 001 48.08W  
(6nm N of Birmingham -  
elev 328ft)

Airspace: Birmingham CTR (*Class: D*)

Reporting Ac      Reported Ac

Type: B737-800      Cessna C208B

Operator: CAT      Civ Comm

Alt/FL: 2000ft↑      2500ft  
QNH (1022hPa)      QNH (1022hPa)

Weather: VMC CLBL      VMC No cloud

Visibility: >10km      >10km

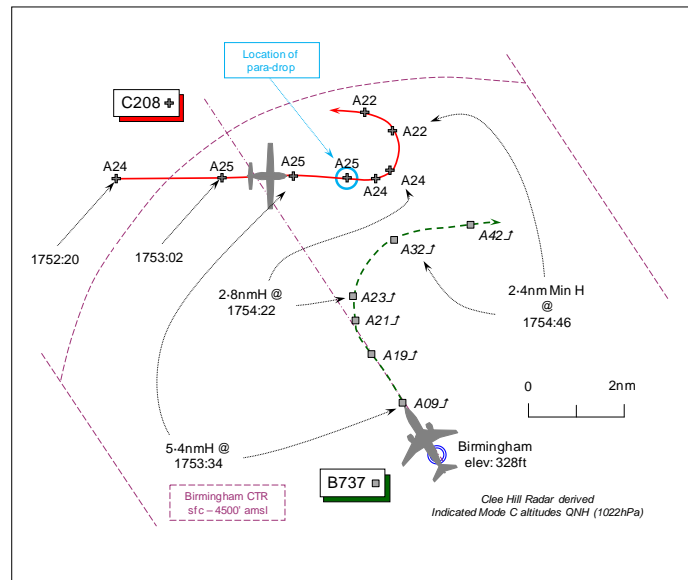
Reported Separation:

200ft V/2.5nm H NR

Recorded Separation:

2.4nm Min H/1000ft V

100ft V @ 2.8nm H



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE BOEING B737-800 (B737) PILOT** reports that he was departing Birmingham under IFR on a DTY 5D SID. Before take-off TOWER notified the crew of VFR traffic 10nm NW of the Airport flying to Sutton Coldfield, which is about 5nm on extended centreline of RW33. His flight was then cleared for take-off from RW33 to follow the SID.

Climbing through about 1000ft Birmingham QNH (1022hPa) the reported traffic – the C208 - was observed on TCAS about 5nm ahead. Heading 328° at 200kt passing about 2000ft QNH whilst in receipt of a RCS from APP on 118.05MHz and approaching 2DME IBM, the closing distance between his ac and the VFR C208 was reducing considerably it was now showing as proximate traffic and >200ft above his ac. The projected SID track on the navigation display was taking his B737 within 2.5nm of the position of the proximate traffic, which was still routing towards the SID track. Taking into consideration their ac's projected routeing and the position of the VFR traffic, which at this stage was still showing above the B737's current altitude, he considered that a loss of separation and a TCAS RA were highly likely and to avoid the C208 he immediately instructed the 1<sup>st</sup> Officer PF to turn R onto a heading of 090°; they had no visual contact with the C208. ATC was informed and the response from the controller was that the traffic was in sight and that they had been made aware of it. However, the B737 crew had not been given any information that the C208 would 'infringe' the SID routeing. Neither a TA nor RA was enunciated by TCAS.

Minimum separation was 2.5nm horizontally/200ft vertically and he assessed the Risk as Medium. He stated that the crew's workload was high during his ac's initial climb/acceleration and flap retraction. An Airprox was reported to ATC on RT.

**THE CESSNA C208B PILOT** reports she was conducting a parachute drop to a drop-zone (DZ) at Sutton Coldfield some 5½nm N of the N end of Birmingham's RW33, offset to the R of the RW centreline by 1½nm. [UKAB Note: RW15/33 has a length of 8526ft - 1.40nm.] A Parachute Display Notification had been issued by London Control (Swanwick) - SWN PDN 053A/2012.

Whilst in receipt of a RCS from Birmingham APP on 118.05MHz, she had been given clearance to fly to the display site. Operating VFR at 100kt, she was informed by APP that the B737 would turn R after take-off and, as the B737 crew knew she was holding level, she thought at 2000ft in the area noted above but actually at 2500ft Birmingham QNH, she believed that the B737 crew would have no problem keeping safe height separation (by climbing) above her ac. On the RT the B737 pilot was reminded by APP that he had already been warned about the VFR traffic – her C208, which he could see on his TCAS. The C208 co-pilot, with a ‘frozen’ ATPL and currently a flying instructor, was listening out on the RT and watched the B737 fly past above them and climbing. The co-pilot could not accurately judge the B737’s altitude or the separation but heard ATC give the B737 crew the warning about VFR traffic – the C208 - and heard all further RT exchanges between APP and the B737 crew. The Risk was assessed as ‘none’.

**THE BIRMINGHAM AERODROME CONTROLLER (ADC)** reports there was a steady flow of inbound and outbound IFR traffic to RW33. At 1751 RADAR rang on the landline when, at the same time, the B737 crew reported ready for departure on the RT. As it was a tight gap he asked the B737 crew if they were ready for an immediate departure, which they were and the flight was lined-up on RW33 via E1. RADAR 1 advised him of VFR traffic - the C208 - 11.5nm NW of the Airport at 2500ft routeing to Sutton Coldfield – 355°/7nm; he advised RADAR that he would pass TI to the departing B737 crew. He then told the B737 crew there was VFR traffic to the NW of the airfield by 10nm at 2500ft going to Sutton Coldfield. The B737 pilot just replied ‘thank you’. At 1752, with landing traffic at 3.5nm from touchdown, the B737 crew was cleared for T/O with a wind check. The B737 pilot read back the take-off clearance and said ‘goodbye’. The C208 was 9nm NW at 2400ft. The B737 was airborne at 1753 by which time the C208 was routeing E through the climb-out, but further S than he had anticipated. However, he knew RADAR had passed TI. Nothing further was said to the B737 crew as there was other traffic to attend to and there is an ‘automatic’ frequency change on the SID to RADAR’s frequency. The B737 crew said nothing else to TOWER, but did tell RADAR they were turning onto a heading of 090° because of the VFR traffic.

**THE BIRMINGHAM RADAR 1 CONTROLLER (RADAR)** reports light to moderate traffic conditions prevailed when he was called on the RT by the C208 crew, airborne from Halfpenny Green to carry out a parachute drop at Sutton Coldfield. The flight was identified and cleared to enter CAS not above 2500ft under their own navigation. When the C208 was about 10nm NW of the Airport TI was passed to the ADC together with the flight’s intentions, which had been pre-notified. The duty RW was RW33 and as the C208 was approaching Sutton Coldfield TI was passed on the departing B737, which would be turning S at 3nm and climbing. He updated the C208 crew when the B737 was airborne and 500ft ALT. The departing B737 crew called passing 2000ft ALT and initiating a R turn to avoid the VFR traffic, which had now commenced a LH orbit. The departure was then transferred to LTC.

**ATSI** reports that an Airprox was reported by the B737 pilot on departure from Birmingham Airport RW33, when it came into proximity with the C208 at altitude 2000ft.

The B737 departed Birmingham for an IFR flight to E Europe and had been in receipt of an Aerodrome Control Service from Birmingham TOWER on 118.3 MHz before changing frequency to Birmingham RADAR on 118.050MHz.

The C208 departed VFR from Wolverhampton to undertake a parachute display at a location near Sutton Coldfield and was in contact with Birmingham RADAR on 118.050MHz. The parachute display was subject to a Parachute Display Notification and the C208 had been afforded Priority Category Z, i.e. a non-standard flight not having priority over normal flights.

The drop zone was 5.6nm on a bearing of 341° from the upwind end of Birmingham’s RW33 and was situated within the Class D Birmingham CTR (surface to altitude 4500ft). The drop zone was 1.1nm SSE of Sutton Coldfield town centre.

The Birmingham Approach RADAR controller was providing Approach Control Services with the assistance of SSR data from the Clee Hill Radar.

ATSI had access to pilot reports from the B737 and C208, the Birmingham TOWER and RADAR controllers' reports, the ATC unit report, recorded area surveillance and transcripts of the TOWER and RADAR frequencies.

The Birmingham METAR: 1750Z 21008KT CAVOK 19/12 Q1022=

The C208 departed Wolverhampton at 1744:00 (UTC) and took-up an easterly track climbing to 2600ft LTC Midland QNH (1022hPa). The C208 crew called Birmingham RADAR and at 1747:50 was instructed to standby and remain outside CAS, which was acknowledged. At 1748:40, RADAR instructed the C208 to squawk A0401. RADAR identified the C208 and requested the crew's requirements. These were given as, "...a parachute display at Sutton Coldfield going there at 2 thousand 5 hundred feet." RADAR responded, "Roger you can route Sutton Coldfield not above 2 thousand 5 hundred feet Q N H 1-0-2-2." This was read-back by the C208 pilot.

The C208 entered CAS at 1750:46 at 2400ft (within the Class D Birmingham CTA-1 1500-4500ft) on an easterly track 13nm NW of Birmingham Airport.

At 1751:11, RADAR called TOWER and the line remained open for 20sec as, at 1751:30, TOWER instructed the B737 to line-up on RW33. RADAR then spoke to TOWER at 1751:34 stating, "do you see that [C208 C/S] northwest he's the parachute [ac] going to Sutton Coldfield VFR 2 point 5." Tower replied, "OK I've [B737 C/S] to depart ... I'll just give him traffic."

At 1752:00, TOWER passed TI to the B737, "There's VFR traffic to the northwest of the field by 10 miles at the moment 2500 feet going to Sutton Coldfield", which was acknowledged by the B737 crew, "thank you". The B737 crew was cleared for take-off at 1752:10.

From the position at which the B737 commenced its take-off roll (runway 33 via E1), the DZ was 10° R of the B737's departure course at a range of 6.75nm.

The B737 was flying a Daventry 5D SID. This requires ac to:

'climb straight ahead to I-BM D2 or 500ft QFE whichever is later, then turn right to intercept DTY VOR R318 by DTY D26, then continue to DTY VOR. Aircraft are required to cross DTY D18 at 5000ft or above (approx. 4.8%) and cross DTY D9 at 6000ft'. Unless otherwise instructed departing aircraft are to contact Birmingham Radar on 118.050MHz as soon as practicable after passing 2000ft QNH.

At 1752:20, RADAR instructed the C208 crew, "no further right than your present track there is traffic rolling now to depart runway 3-3 it's a 7-3-7 will be climbing through your level." This was acknowledged by the C208 crew, "okay thanks we'll..look out". Figure 1 below shows the Clee Hill radar picture at 1752:20. The DZ is marked with a cross to the E of the line depicting Birmingham's RW15/33 extended centreline.

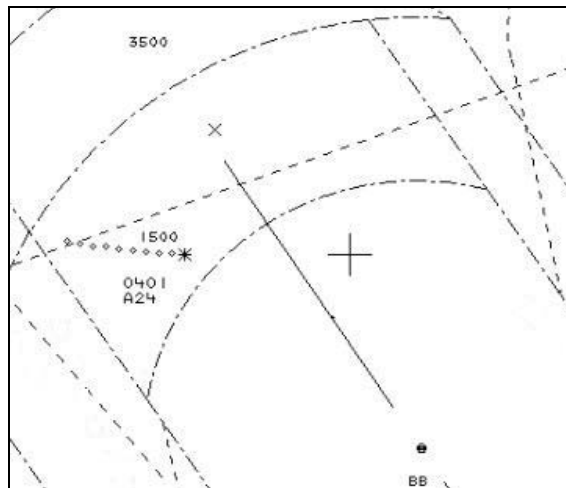


Figure 1: Clee Hill 1752:20

At 1753:00 RADAR updated the C208 crew about the B737, *“the traffic 7-3-7 is just lifting off now and he’ll be turning..right at a range of 3 miles when he’s airborne climbing through your level report visual.”* The C208 was now inside the Birmingham CTR at 2400ft QNH, 7.8nm NW of the Airport (See Figure 2 below)

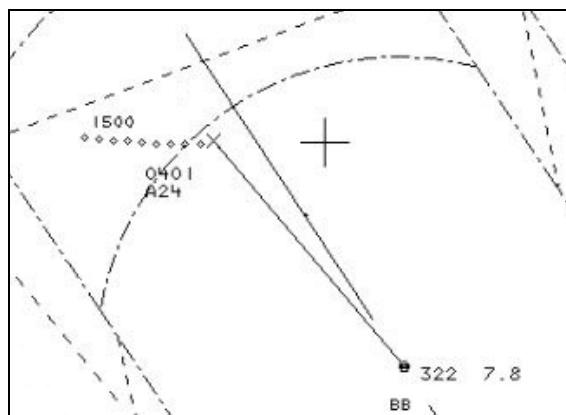


Figure 2: Clee Hill 1753:00

RADAR updated the C208 crew again at 1753:30, as the C208 flew through the RW33 climb-out 7nm from the Airport (Figure 3), *“the traffic’s now just passing through 5 hundred feet in the climb,”* to which the C208 crew replied, *“we’re watching the traffic we have him in sight.”*

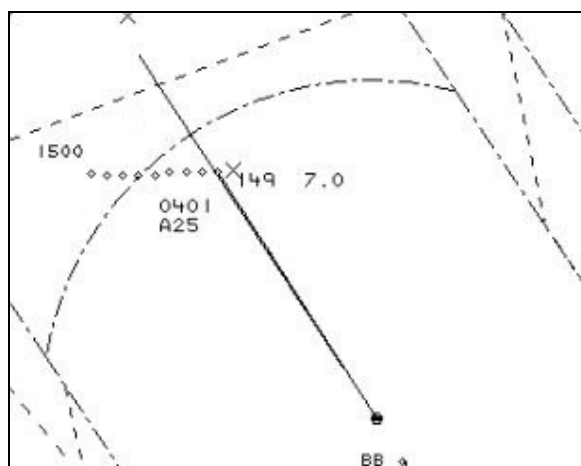


Figure 3: Clee Hill 1753:30

The B737 first 'painted' on the Clee Hill Radar at 1753:34 (Figure 4) as it passed altitude 900ft. The B737's initial rate of climb was in excess of 3000ft/min.

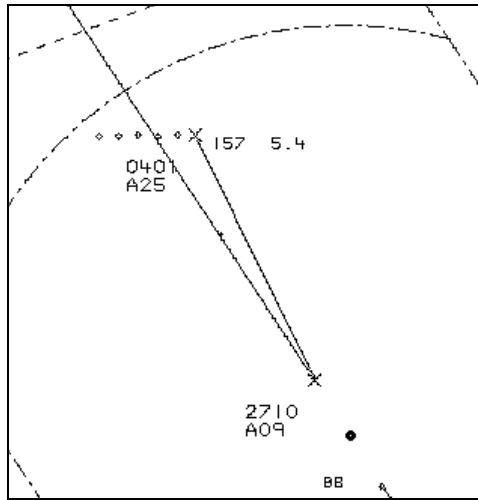


Figure 4: Clee Hill 1753:34

At 1754:00, RADAR informed the C208 crew that the B737 would be turning R shortly and the C208 crew requested, "okay and I'd like to orbit here" (Figure 5), whereupon RADAR instructed the C208 crew, "roger orbit left".

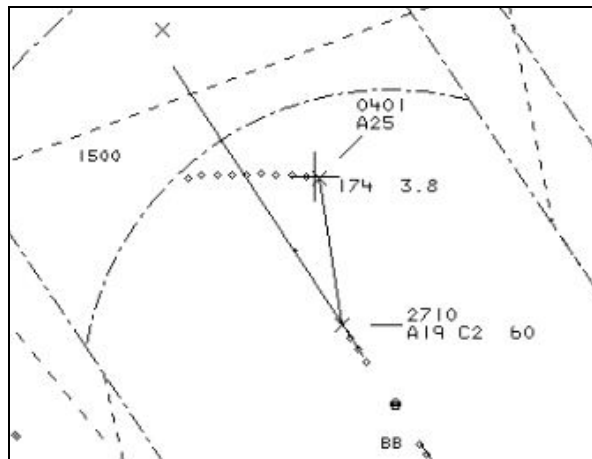


Figure 5: Clee Hill 1754:00

The B737 crosses I-BM D2 at 1754:06, at 2000ft ALT from where it commences a R turn. The B737's ROC had decreased to 1248ft/min. The C208 crew's DZ was 3.5nm from the B737's position at this time.

The B737 crew called RADAR at 1754:10, "...turning onto heading 0-9-0 to avoid..proximate traffic at our level 2 and a half miles." RADAR responded, "Roger... that's the VFR traffic orbiting left you're cleared..right turn and climb to 6 thousand feet." The B737's ROC had now reduced to 512ft/min. By 1754:24, the B737crew's R turn could be seen to be taking effect (Figure 6), as was the commencement of the C208's L orbit. The ac were indicating 2300ft and 2400ft ALT respectively with the C208 in the B737's 12 o'clock 2.8nm.

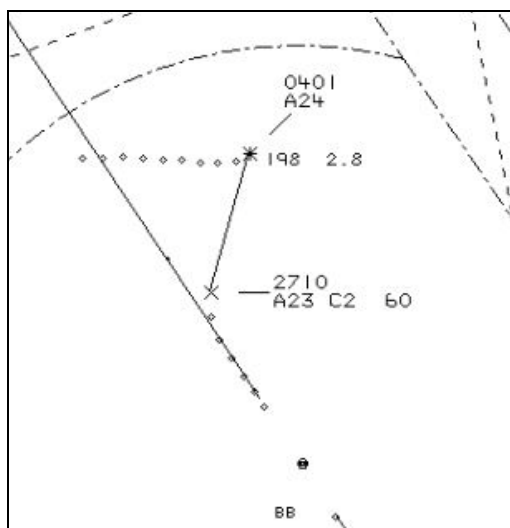


Figure 6: Clew Hill 1754:24

On the next update of the surveillance replay, the B737 is shown climbed through 2600ft ALT, 300ft above the C208, which had descended to 2300ft ALT in its L turn. Lateral distance between the two ac had reduced to 2.7nm. The B737's ROC had increased to over 2000ft/min. Minimum lateral separation occurred at 1754:46, as the two ac turned away from each other with the C208 in the B737's 10 o'clock range 2.4nm, with 1000ft vertical distance between the two ac (see Figure 7).

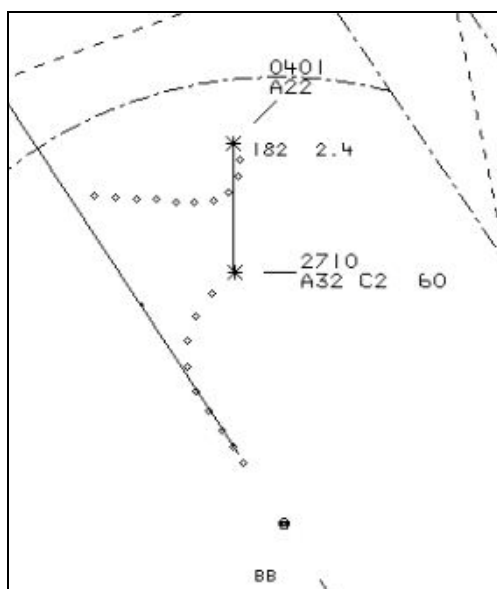


Figure 7: Clew Hill 1754:46

The B737's rate of turn after passing I-BM D2 was approximately 20° every 8sec between 1754:06 and 1754:48 and it was established on the heading of 090° by 1755:04.

At 1754:50, the B737 crew reported to RADAR, "that traffic was quite close to us we didn't get an R-A off it but I'm very surprised we didn't." RADAR acknowledged this call replying that the C208 crew had reported visual with the B737 and that traffic had been called. The B737 was then transferred to London CONTROL at 1755:10. The distance between the two ac continued to increase and the C208 crew went on to complete their display before leaving CAS.

As notified in UK AIP ENR 1.4, TI will be provided to IFR flights on conflicting VFR flights. This was fulfilled by the TOWER controller passing TI to the B737 crew about the C208. Additionally, VFR

flights will be provided with TI on IFR flights in order to enable VFR pilots to effect their own traffic avoidance and integration. This was fulfilled by the Birmingham Radar controller passing TI to the C208 crew. Under both sets of flight rules an ATC clearance is required for flights in Class D airspace and ATC instructions are mandatory.

Comparison of the track published by Birmingham Airport for RW33 departures via DTY and the B737's actual track showed that, between crossing I-BM D2 at 1754:06 and the point of minimum lateral distance from the C208 at 1754:46, the B737's track followed the published track profile. Selection of a heading of 090° by the B737 crew did not take effect until after the CPA.

Although the minimum lateral distance between the two ac was 2.4nm, the C208 had flown directly over its planned DZ at 1754:00 (Figure 5 above), ahead of the B737. As it flew over the DZ, the C208 was 1.69nm NW of the track about to be flown by the B737, as shown in Figure 8 below.

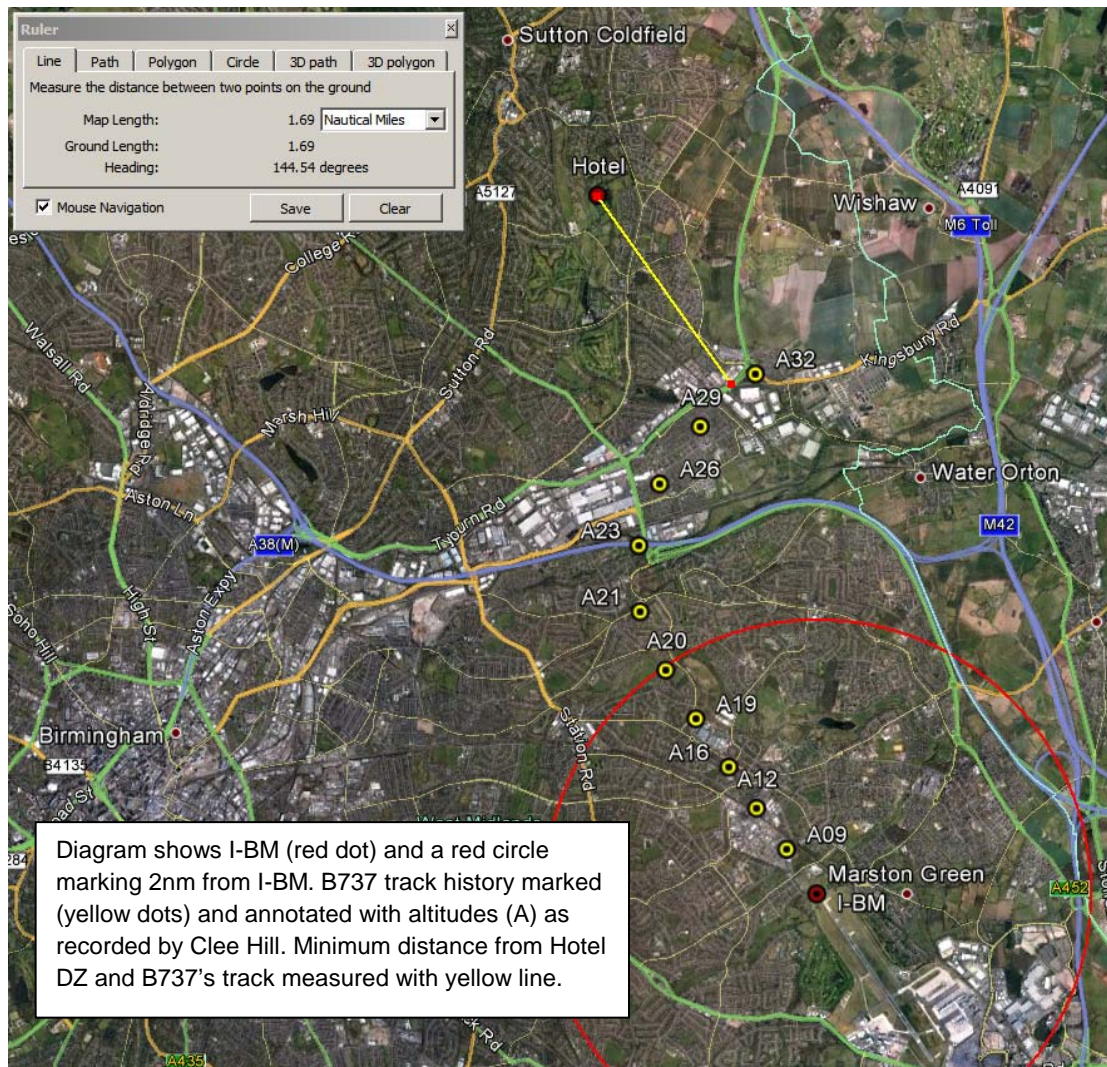


Figure 8

Prior to take-off the B737 crew was informed that the C208 was 10nm to the NW of the Airport routing towards Sutton Coldfield. The B737's pilot report indicates that at the time of writing the pilot understood that Sutton Coldfield was at a position 5nm on the extended centreline of RW33. Whereas, the actual position to which the C208 was routing was 10° R of the B737's take-off starting position at a distance of 6.75nm. It is not known how the B737 crew assimilated the TI they had been given prior to take-off; nor what their expectations were with regard to their interaction with this traffic on departure. As the B737 passed through 900ft ALT (Figure 4) the C208 had passed

through the B737's 12 o'clock at 5.4nm and was on a track that appeared to converge with the B737's intended track.

The Manual of Air Traffic Services Part 1 (CAP493) Section 3 Chapter 4 paragraph 3.1 states that:

ATC has a responsibility to prevent collisions between known flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other.

The RADAR controller took steps to limit the flight path of the C208 by instructing it to fly no further R. As the C208 overflew the DZ the RADAR controller again took steps to minimise the interaction of the two ac by instructing the C208 to orbit L. However, as the B737 was not yet on the RADAR controller's frequency the B737 crew would have had no information upon which to update their assimilation of how the two ac were going to interact. Radar derived information indicates that the B737 crew reduced their ROC through 1900ft to 2600ft ALT, which may have been part of their decision making processes, ultimately leading to a selection of heading 090°. Therefore it is likely that, although all requirements for the provision of TI and necessary instructions were met, the TI given was insufficient for the B737 crew to complete their initial climb-out on the SID without believing they were flying into conflict with the C208.

Further to the incident controllers at Birmingham were briefed that enhanced TI (such as range and bearing of the traffic) for the purposes of improving pilots SA, together with information to IFR flights that potentially conflicting VFR flights had visually acquired their ac, would assist in the successful integration of traffic flying differing flight rules.

The requirements for the provision of TI to VFR and IFR flights in Class D airspace were fulfilled by ATC; however, the TI provided to the B737 was insufficient to prevent the B737 crew from believing that a conflict was occurring and then electing to fly a heading off the SID.

UKAB Note: NOTAM H4349 promulgated the parachute display within 2nm radius of 5233N 00148W (Sutton Coldfield), 1745 – 1815UTC, from the surface to 10,500ft amsl subject to ATC clearance.

## **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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authority.

The Board noted that the para drop had been planned, coordinated and notified correctly and that the C208 had been cleared to enter CAS. A pilot Member observed that the DZ was notified to the B737 crew as Sutton Coldfield. The actual DZ was S of the town, which is largely indistinguishable from all the other joined-up conurbations to the NW of the airport. He opined that the reference to a town name was poor practice since it relied on the pilots being familiar with the local geography; range and bearing should be used instead. That said, the B737 crew did not request further information when they were given TI on the C208 including the reference to Sutton Coldfield; they simply responded, 'Thank you'. Members noted that in other Airprox in Class D airspace, pilots operating under IFR have been unaware that they will not be deconflicted from VFR traffic unless they request it from ATC. Another option prior to take off is to delay the take-off until satisfied that there will be no conflict with the VFR traffic. However, in this Airprox the B737 crew had already been asked whether they were ready for an immediate departure and would have been aware of the ac at 3.5nm on the approach to land. This awareness of landing traffic and routine commercial scheduling requirements would likely have influenced the B737 crew's decision not to delay. Once airborne the B737 crew became concerned by the proximity and flight path of the C208 as observed on their TCAS. Pilot Members emphasised that the lateral depiction on TCAS displays are not reliable but the vertical element is accurate and can be trusted. Although the B737 crew elected to turn R based on their assessment of the C208's track seen on TCAS, their ground track did not deviate from the SID



profile. Ironically however, by reducing their rate of climb, possibly with the intention of gaining visual contact with the C208, the B737 was closer to the C208 when it climbed through its altitude than would have been the case with a normal climb profile. A controller Member observed that if the B737 crew had been informed that the C208 pilot had them in sight, they would have been less concerned.

The Board considered that the ATC plan was sound and complied with existing regulations and practices. It might have been helpful if the C208 pilot had planned to enter CAS from the N rather than to cross the extended centreline. A pilot Member emphasised that in the event of an engine failure during or shortly after takeoff, standard operating procedure for twin-engine airliners is to climb straight ahead. Pilots and controllers should remain cognisant of this contingency when planning events in the proximity of airports. As it was, the C208's flight path and orbit were managed by the APP to remain clear of the SID and the ac were 2.8nm separated as the B737 climbed through the C208's altitude. Taking all these factors into consideration, the Board concluded that the Airprox was a perception issue caused by the C208's cleared flight path causing the B737 crew concern.

The Board was unanimous in agreeing that there had been no risk of collision but there was a difference of opinion about the Risk classification. A pilot Member considered that the B737 pilot's intended early turn away from the C208 using TCAS azimuth information was not in accordance with normal practice. However, a large majority of Members were satisfied that normal safety standards and procedures pertained: Risk Category E.

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

Cause: The cleared routeing of VFR traffic in the Class D Birmingham CTR caused the B737 crew concern.

Degree of Risk: E.