

## **AIRPROX REPORT No 2014090**

Date/Time: 13 Jun 2014 1719Z

Position: 5130N 00014E  
(Aveley)

Airspace: London TMA/ (Class: A/G)  
London FIR

Aircraft 1                      Aircraft 2

Type: EMB170                      DA40

Operator: CAT                      Civ Trg

Alt/FL: 3000ft                      2200ft  
QNH (1022hPa)                      QNH (NK hPa)

Conditions: VMC                      VMC

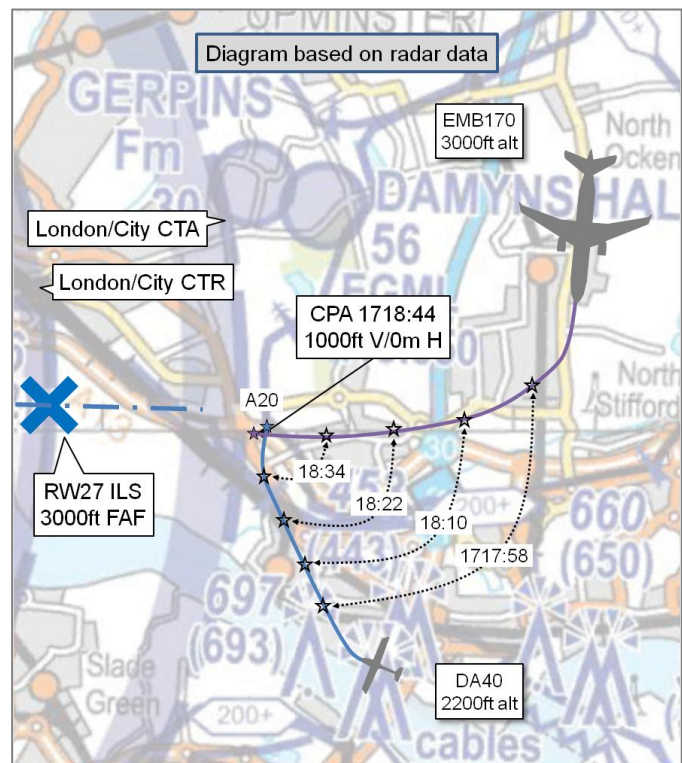
Visibility: 10km                      10km

Reported Separation:

700ft V/0m H                      Not Seen.

Recorded Separation:

1000ft V/0m H



## **PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

**THE EMBRAER 170 PILOT** reports conducting an instrument approach to London/City Airport RW27 in CAVOK conditions. The blue and white aircraft's lighting state was not reported, nor was the SSR transponder state; the aircraft was fitted with TCAS II. The pilot was operating under IFR in VMC, in receipt of a Radar Control Service in Class A airspace. On intercepting the RW27 localiser, heading 274° at 160kt and 3000ft, the crew had been informed of conflicting traffic 1000ft below, passing right to left. The traffic 'seemingly cleared' and the pilot was cleared to descend with the glide-slope. At glide-slope capture, the crew received a TCAS TA, and ATC informed them the traffic had 're-entered controlled airspace'. The PF levelled the aircraft and the PM looked for the traffic. He became visual with a light aircraft, a white single-engine Diamond or Cirrus type about 700ft below the nose, passing from left to right. The pilot stated that if they had continued to descend with the glide-slope both aircraft 'would have been incredibly close'. Once clear, they continued for a normal approach and landing. The pilot stated that they had 'committed to London/City airport' having held for 15min due to varying winds and numerous runway changes; 'they had amber gauges with 1100kg of fuel remaining'.

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

**THE DA40 PILOT** reports undertaking a solo navigation exercise. The white aircraft had strobe, position and navigation lights selected on, as was the SSR transponder with Modes A, C and S. It was not reported whether the aircraft was fitted with an ACAS or TAS. The pilot was operating under VFR in VMC. On the leg from Stokenchurch to Stapleford aerodrome, in receipt of a Basic Service from Farnborough LARS(W), he was asked to change frequency to Farnborough LARS(N) and, on approaching Elstree, he transferred to their frequency as he 'had to make a courtesy call since he would be routeing overhead their aerodrome'; he was given a Basic Service and reported overhead. Shortly afterwards he changed frequency to Stapleford where he was again given a Basic Service. He checked the time, assessed that he was 2min from Stapleford, and began looking for the aerodrome. He was unable to see Stapleford so turned on to his next planned leg, to Rochester, on time. He advised Stapleford that he could not see the aerodrome, that he was routeing to Rochester, and requested a frequency change to their frequency. He received no response from Rochester Information and continued the navigation exercise to his destination. He did not see the EMB170.

**THE LONDON/CITY DIRECTOR** reports that the traffic situation was busy due to repeated runway changes at London/City caused by wind direction changes. A number of aircraft on frequency had already broken off approaches from RW09 and were being repositioned to RW27. Immediately prior to the incident, the wind had again veered easterly and DIR was making plans should aircraft subsequently be unable to make approaches to RW27. As a result of the ongoing situation, his colleagues on Thames Radar were also very busy, which made co-ordination difficult at times. A contact was observed near LAM tracking southeast, indicating altitude 2200ft. The traffic continued on course and entered the London/City CTA. At this point, the EMB170 pilot was on a left base for RW27. DIR informed him of the unknown traffic and instructed him to continue on his current heading. Due to uncertainty as to what would happen, DIR immediately instructed London/City Tower to 'check' departures<sup>1</sup>. They asked for a departure release against the check which DIR refused. DIR continued to track the unknown contact, which continued on a southeasterly heading through the CTA. DIR vectored the EMB170 onto right-base and then to intercept the RW27 ILS. Just as he was about to transfer the EMB170 pilot to London/City Tower, the unknown contact reversed track and proceeded back towards the London/City CTR and into potential conflict again with the EMB170. DIR passed Traffic Information and cancelled the approach clearance, instructing the EMB170 pilot to maintain 3000ft. Subsequently, the EMB170 pilot reported he was visual with the traffic and was happy to make an approach. The unknown traffic 'bounced off' the CTR boundary directly underneath the EMB170. Workload remained very high for some time as a consequence of this infringement.

## Factual Background

The weather at London/City was recorded as follows:

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METAR EGLC 131650Z 32008KT 270V030 CAVOK 25/11 Q1022=
METAR EGLC 131720Z 01008KT 330V050 CAVOK 25/10 Q1022=
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## Analysis and Investigation

### CAA ATSI

The EMB170 pilot was operating under IFR, inbound to London/City and in receipt of a Radar Control Service from Swanwick TC-Thames (City Radar). The DA40 pilot was on a navigation exercise operating under VFR. At the time of the Airprox the DA40 pilot was in communication with Stapleford Radio.

CAA ATSI had access to RTF and area radar recording, together with the written report from the City Radar controller, the EMB170 pilot and the DA40 pilot.

The Thames Radar and London/City Radar controllers' workloads were assessed as medium/high due to the level of traffic combined with the complexity of runway changes caused by variations in wind direction. A number of aircraft had broken off their approaches to RW09 and were repositioned for RW27. Just prior to the incident the wind had veered easterly and the controller was making plans in the event that the aircraft were unable to make an approach to RW27.

At 1655:03, radar recording showed the DA40 16nm west of Elstree tracking east at an altitude of 2200ft. The DA40 was observed to change from a Farnborough LARS(N) squawk to a squawk of 1200 (a code allocated to NATO). It was considered likely that the DA40 pilot had selected the code in error and had intended to select either SSR code 7000 or the pilot might have intended to select 0012, a code which may be used when flying in the vicinity of London/City and monitoring the Thames Radar frequencies.

At 1710:02, the EMB170 pilot contacted City Radar and was advised he was number 3 in traffic. The EMB170 was 21.7nm east of London/City. At 1711:54, radar showed the DA40 2nm

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<sup>1</sup> Stop traffic from departing.

southwest of Stapleford turning from an easterly to southeasterly track towards the boundary of the London/City CTA, base 1500ft. The EMB170 pilot was descended to 3000ft and given a right turn onto a heading of 350° for left base. At 1713:24, radar recording showed the EMB170 in the right turn with the DA40 entering the London/City CTA without a clearance, see Figure 1.

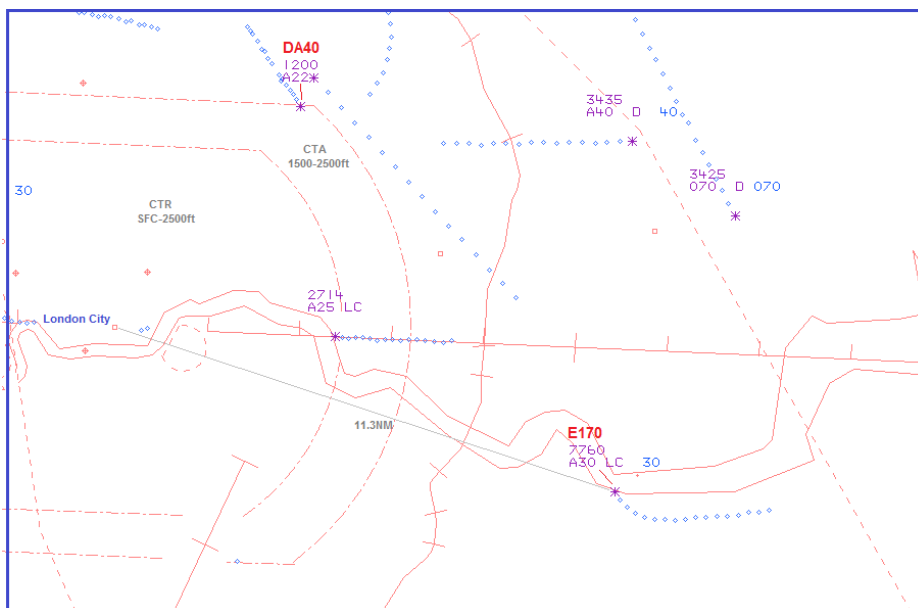


Figure 1: Swanwick MRT at 1713:24

At 1714:08, the controller apologised and advised the EMB170 pilot that due to an aircraft infringing CAS he should expect vectors around the infringing aircraft. The controller gave the EMB170 pilot a tactical heading of 010°, followed by a repositioning left turn onto heading 180° towards right base. The EMB170 pilot advised that he was getting tight on fuel, which the controller acknowledged. The DA40 pilot continued on heading, exiting the London/City CTA into the Class G airspace to the east.

At 1716:34, the DA40 was shown crossing the London/City RW27 centreline on a southeasterly track with the EMB170 turning onto a right base, see Figure 2.

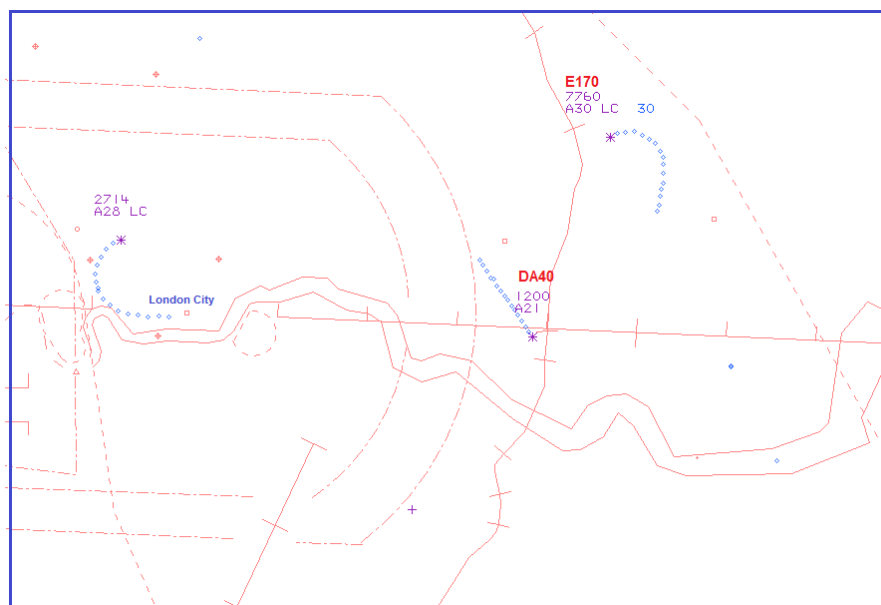


Figure 2: Swanwick MRT at 1716:34

The controller turned the EMB170 onto a closing heading from the right for the ILS. Radar showed that the DA40 pilot had made a right turn onto a northerly track and, at 1717:56, the DA40 was

indicating 2200ft, 2.4nm southwest of the EMB170. The base of CAS (LTMA-1) was 2500ft, see Figure 3.

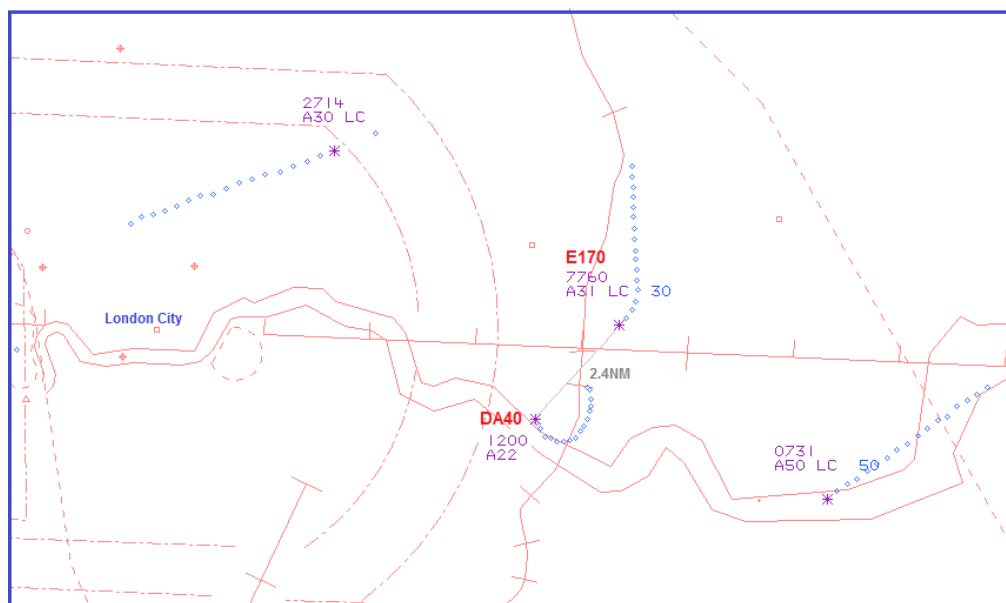


Figure 3: Swanwick MRT at 1717:56

At 1718:00, the EMB170 pilot reported established and the controller responded “[EMB170 C/S] roger contact tower callsign only - one one eight decimal zero seven - in fact just before you go sir the previously mentioned traffic did leave controlled airspace but he’s now in your left at ten o’clock showing two thousand two hundred feet, he’s about to enter controlled airspace again, can you see that traffic”. The EMB170 pilot responded “Er we just got a TCAS off him I can’t see him at the moment he’s eight hundred feet below”. The controller instructed the EMB170 pilot to maintain 3000ft and shortly afterwards, at 1718:28, the EMB170 pilot reported “Oh we’re visual now it’s a small er light aircraft just going below us now we’re clear”, see Figure 4.

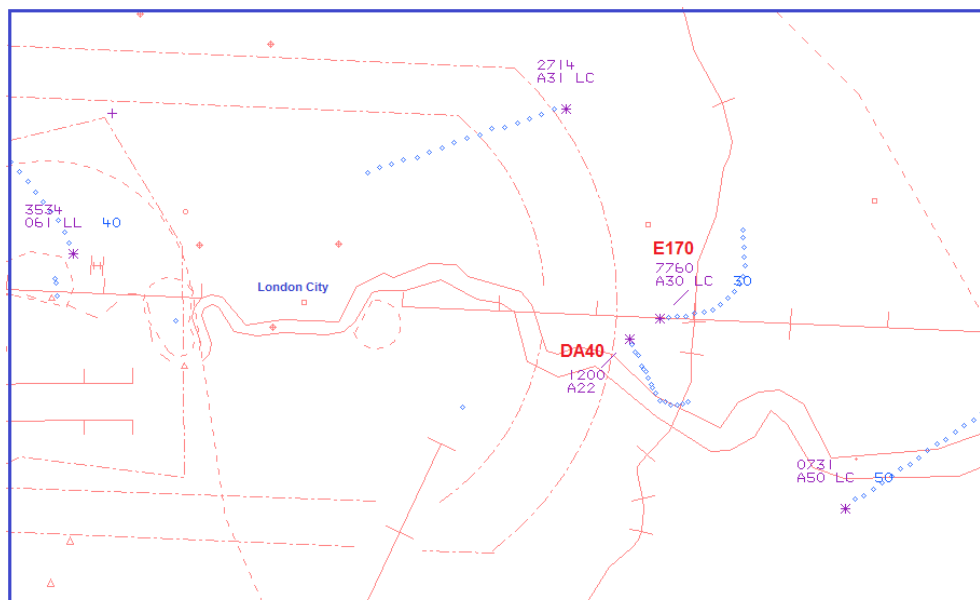


Figure 4: Swanwick MRT at 1718:28

The EMB170 pilot confirmed that he was happy to continue and, at 1718:42, the controller cleared the EMB170 pilot for the approach. At this point the DA40 pilot had turned right onto a northerly track and was in the EMB170’s 11 o’clock at a range of 0.1nm crossing from left to right and 900ft below, see Figure 5.

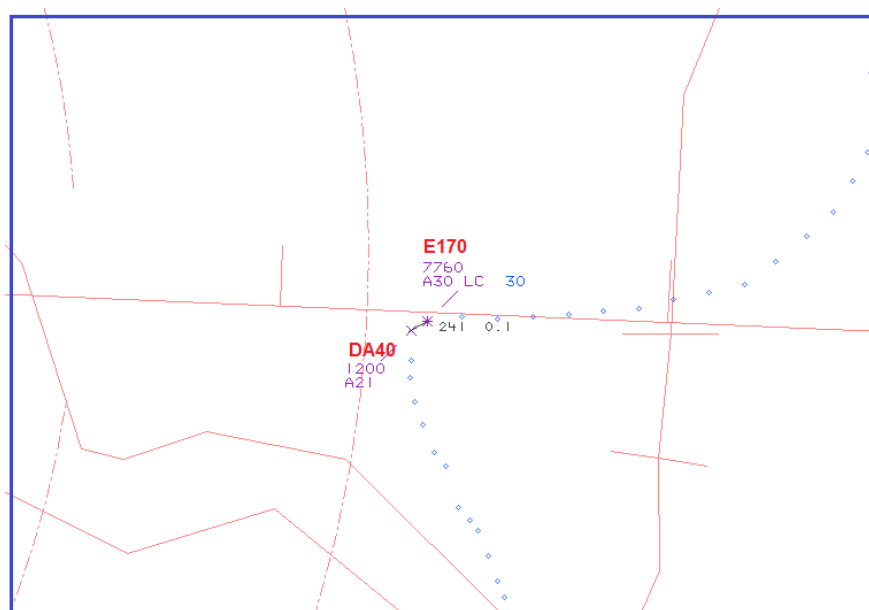


Figure 5: Swanwick MRT at 1718:42

On the next radar update the two aircraft had passed and were diverging. The EMB170 pilot was transferred to the Tower and continued without further incident. The DA40 pilot then made a further right turn and continued to leave the area on an east-southeasterly track. The DA40 was 400ft below the base of CAS and 900ft below the EMB170.

The Manual of Air Traffic Services (MATS) Part 1, Section 1, Chapter 6, paragraph 6.77, states:

‘... aircraft operating in controlled airspace are deemed to be separated from unknown aircraft flying in adjoining uncontrolled airspace...’

MATS Part 1, Section 1, Chapter 7, paragraph 7.30, states:

‘...controllers should not normally allocate a level to an aircraft which provides less than 500 feet vertical separation above the base of a control area or airway. This will provide some vertical separation from aircraft operating beneath the base of controlled airspace...’

The controller responded correctly and ensured that the EMB170 pilot maintained 3000ft until passing clear of the DA40. The Airprox occurred when the EMB170 pilot was concerned regarding the proximity of the DA40 which had turned to cross 900ft below the EMB170, which was established on final approach.

### UKAB Secretariat

Both pilots shared an equal responsibility for collision avoidance and not to fly into such proximity as to create a danger of collision<sup>2</sup>. The RW27 ILS approach at London/City uses a 5.5° glide-slope. For an aircraft at altitude 3000ft, this places the start of the glide-slope at a range of 5nm from the threshold, in this case on the London/City CTR boundary. MATS Part 1, Section 1, Chapter 6, paragraph 6.84 states:

‘The action to be taken by controllers when they observe an unknown aircraft, which they consider to be in unsafe proximity to traffic under their control, in various types of airspace is as follows:

Type of Airspace	Action to be taken by the Controller
Class A	If radar derived, or other information, indicates that an aircraft is making an unauthorised penetration of the airspace, is lost, or has experienced radio failure:

<sup>2</sup> Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions).

IFR flights shall be given avoiding action and traffic information shall be passed.

SVFR flights shall be given traffic information and if requested, avoiding action.\*

\* When providing avoiding action, controllers shall remind pilots of their responsibility to remain clear of cloud with the surface in sight.'

The term 'minimum fuel' is defined in Amendment 36 to ICAO Annex 6 Part I and Amendment 4 to PANS-ATM (Doc 4444), which took effect on 12<sup>th</sup> November 2012. This is reflected in CAP 413 (Radiotelephony Manual), Chapter 8 (Emergency Phraseology), paragraphs 8.29 and 8.30 (Fuel Shortage), which states:

'Pilots should advise ATC of a minimum fuel state by broadcasting 'MINIMUM FUEL', when further delays may result in landing at the destination aerodrome with less than the planned final reserve fuel. Controllers are not required to provide priority to pilots of aircraft that have indicated or suggested that they are becoming short of fuel or have used the RTF phraseology 'MINIMUM FUEL'.

Controllers shall respond to pilots who indicate or suggest that they are becoming short of fuel, or who have declared 'MINIMUM FUEL', by asking the pilot to confirm whether or not he wishes to declare an emergency after confirming to the pilot:

1. the estimated delay he can expect to receive expressed in minutes, if the pilot is en-route to, is joining, or is established in an airborne hold; or
2. by expressing the remaining track mileage from touchdown, if the aircraft is being vectored to an approach.'

Guidance on declaring minimum fuel is contained in ICAO Doc 9976 (Flight Planning and Fuel Management Manual).

## Summary

An Airprox was reported when an EMB170 and a DA40 flew into proximity at 1719 on Friday 13<sup>th</sup> June 2014. The Embraer 170 pilot was operating under IFR in VMC in the Class A airspace of the London TMA, in receipt of a Radar Control Service. The DA40 pilot was operating under VFR in VMC in Class G airspace, in receipt of a Basic Service from Stapleford Radio.

## **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 considered the actions of the pilots concerned. The Board noted that, certainly prior to the Airprox, the DA40 pilot could best be described as being unaware or unsure of his position and had infringed CAS. The Board noted that this CAS infringement was not directly related to the Airprox but that it did give the controller valuable information as to the state of awareness of the DA40 pilot of his position. In the event, the DA40 pilot subsequently remained within Class G airspace, and clear of CAS, as he reversed his track and routed northwards, but they felt that the London City Director was justifiably concerned that he might inadvertently penetrate CAS again. Given the busy airspace in the area, although the DA40 pilot was *de facto* entitled to operate where he did, the Board opined that he would have been better served by contacting Farnborough LARS and seeking a position fix in order to ensure that he did not infringe any airspace, and also perhaps to provide ATC with some idea as to his intentions. The Board further noted that the DA40 pilot had not seen the EMB170 pass 1000ft above him, and surmised that he had become biased towards his navigation

task to the expense of a robust lookout scan. Turning to the EMB170 pilot, the Board noted that he had been forced to hold to accommodate 'runway changes', had already been vectored to avoid the DA40 once, and was thus committed to landing at the airport. The Board thought that the crew were probably no doubt concerned at the possibility of being further radar vectored away from their initial closing track to the localiser, and members felt that this may have contributed to their added concern when the previously conflicting DA40 reversed track and started to head back northwards towards them.

Considering the controller's actions, members generally agreed that he was justified in thinking that the DA40 pilot was probably lost, in which case he would have been obliged to anticipate issuing avoiding action to the EMB170 pilot as the DA40 pilot approached the London/City CTA again on a track and at an altitude which would have taken him inside had he not turned right just before reaching the CTA boundary. Given the EMB170's fuel state, Board members pointed out the need for an expeditious approach, and it was suggested that the use of the phrase 'minimum fuel' by the EMB170 pilot may have been an option. In pursuing this debate, it became apparent that some controller members considered the use of this phraseology by traffic within busy TMAs to be impracticable, given the requirement to estimate delay or track mileage remaining and make extra RT transmissions in an already busy environment. London TMA controller members in particular were of the opinion that traffic levels were such that 'minimum fuel' planning and extra RT could frequently not be accomplished. On the other hand, airline members thought that the use of the phrase 'minimum fuel' was a useful call that they expected to be associated with a degree of priority in completing the approach; that ATC did not seemingly apply any such priority was a cause for their concern. As a result, and although recognising that this was not specifically germane to the Airprox itself, Board members were of the opinion that there was scope for potential confusion over the use of the phrase 'minimum fuel' and therefore resolved to recommend that the CAA investigate its use and application in order to ensure that both ATC and aircrew were clear on its meaning and usefulness.

Returning to the Airprox, CPA occurred some 1.7 track miles before the EMB170 crew reached the start of the RW27 ILS glide-slope, with 1000ft vertical separation and the DA40 in Class G airspace below; an everyday occurrence under less stressful circumstances, but which caused the EMB170 crew concern on the day due to their perception of its proximity and effect on their recovery to London/City airport. Notwithstanding the actions of the DA40 pilot in flying in such a way as to place in doubt his positional awareness, the Board determined nonetheless that, with regard to the Airprox, normal procedures, safety standards and parameters had pertained.

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

<u>Cause:</u>	The EMB170 pilot was concerned by the proximity of the DA40.
<u>Degree of Risk:</u>	E.
<u>ERC Score</u> <sup>3</sup> :	2.
<u>Recommendation(s):</u>	The CAA investigate the use of the phrase 'minimum fuel' and its application.

<sup>3</sup> Although the Event Risk Classification (ERC) trial had been formally terminated for future development at the time of the Board, for data continuity and consistency purposes, Director UKAB and the UKAB Secretariat provided a shadow assessment of ERC.