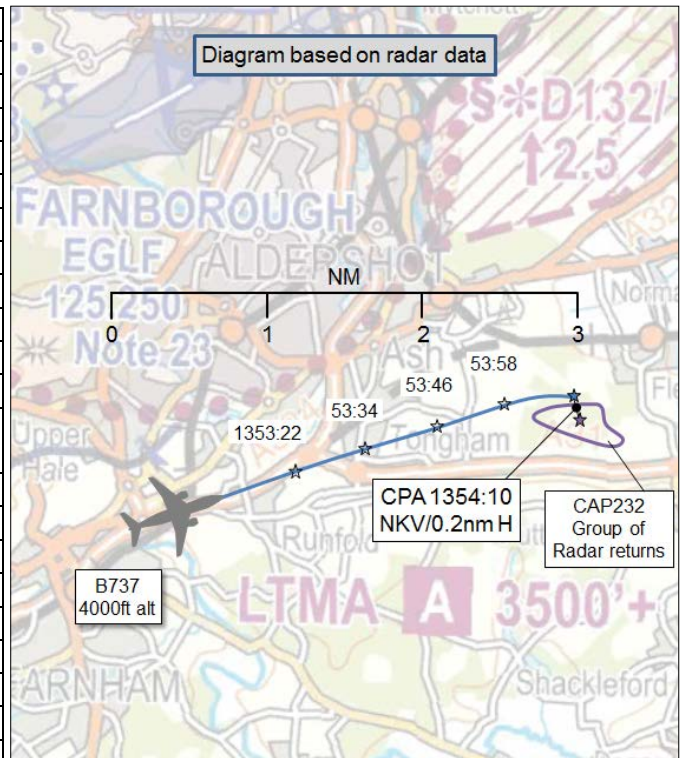


**AIRPROX REPORT No 2016040**

Date: 25 Mar 2016 Time: 1354Z Position: 5114N 00041W Location: 3nm SE Farnborough

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	B737	CAP232
Operator	Civ Pte	Civ Pte
Airspace	London TMA	London FIR
Class	A	G
Rules	IFR	VFR
Service	Radar Control	Basic
Provider	Farnborough	Farnborough
Altitude/FL	4000ft	NK
Transponder	A, C, S	A, Mode C off
Reported		
Colours	White, beige	Blue
Lighting	Anti-col, strobes, nav	None
Conditions	VMC	VMC
Visibility	10km	NK
Altitude/FL	4000ft	NK
Altimeter	QNH (1015hPa)	NK
Heading	060°	NK
Speed	160kt	NK
ACAS/TAS	TCAS II	Not fitted
Alert	TA	N/A
Separation		
Reported	200ft V/500ft H	Not seen
Recorded	NK V/0.2nm (~1200ft) H	



**THE B737 PILOT** reports being in receipt of radar vectors downwind for an ILS approach to Farnborough RW24 under a ‘de conflicting service’, he recalled. He had intermittent visual contact with an aerobatic aircraft at lower altitude, together with other aircraft indicated on TCAS, and Traffic Information issued by ATC. The aerobatic aircraft was ‘verified by TCAS indication’ but with no height information. Visual sighting of it was lost due to both aircrafts’ flight paths and visibility constraints from his cockpit. The aerobatic aircraft was next seen performing a vertical climb from below with approximately 500ft lateral and 200ft vertical separation in the two o’clock position. A TA warning was issued by TCAS; the autopilot was disconnected and an immediate avoiding action left turn made due to the proximity and unknown intentions of the conflicting aerobatic aircraft’s flight path. The B737 pilot returned to the original cleared altitude and heading once visual contact was re-established with the aerobatic aircraft and it was determined no longer to be conflicting. ATC was advised of his actions and his opinion that the aerobatic aircraft was within the London TMA. The B737 pilot noted that he was operating with a high workload due to numerous GA aircraft in the vicinity of Farnborough airport.

He assessed the risk of collision as ‘Medium’.

**THE CAP232 PILOT** reports carrying out an ‘unlimited’ aerobatic detail between Guildford and Aldershot, north of the A31 (Hogs Back), between 1500ft and 3400ft. In subsequent correspondence with an Airprox Inspector, it was established that the SSR transponder Mode C was not consciously selected off but that it was the pilot’s understanding that the rapidly changing altitudes could cause a very confusing picture within ATC and possibly set off unnecessary alerts for TCAS-equipped aircraft in the controlled airspace above. The pilot stated that when operating southeast of Farnborough, they were always in radio contact with Farnborough ATC with a transponder code selected. The pilot did not recall seeing the B737.

**THE FARNBOROUGH RADAR CONTROLLER** reports the inbound B737 was orbited at altitude 4000ft inside CAS just south of the Hogs Back to allow for spacing with an inbound aircraft ahead and for other LARS tracks to pass through the final approach. Beneath the B737, outside CAS, a locally based aircraft was doing aerobatics over the Hogs Back. The B737 pilot reported stopping his turn as the aerobatic aircraft got within 200ft of him, despite him being inside controlled airspace, and the aerobatic aircraft reportedly outside. The B737 pilot reported on frequency that he had lost sight of the aerobatic aircraft but was happy to continue a right hand turn to roll out on a westerly heading; the controller could see that this kept him south of the aerobatic aircraft. The controller stated that the aerobatic aircraft was regularly on LARS West and it was fairly usual to remain 'inside [controlled airspace] to avoid', as it never used Mode C during aerobatics. The controller noted that the incident occurred as his position was being handed over.

## Factual Background

The weather at Farnborough was recorded as follows:

METAR EGLF 251350Z 31007KT 260V340 9999 FEW046 13/03 Q1016=

A transcript of the Farnborough Radar frequency was provided as follows:

From	To	Speech Transcription
737	RAD	Farnborough good afternoon it's [737 C/S], we're a seven three seven, information Lima, level five thousand feet, Q N H one zero one four
RAD	737	(1351:00) [737 C/S] Farnborough Radar, information Mike, current Farnborough Q N H one zero one six, radar vectors I L S approach runway two four, you're number two
737	RAD	Roger radar vectors er (1351:10) two four, Q N H one zero one six
RAD	737	[737 C/S] er reduce speed to minimum please, turn right heading er zero seven zero degrees, descend to altitude four thousand feet
737	RAD	Right heading zero seven zero, (1352:00) descend four thousand and coming back to minimum speed [737 C/S]
RAD	737	[737 C/S] turn right right an orb- a right hand orbit, rollout heading zero eight zero (1353:50) degrees
737	RAD	-oger right hand orbit to rollout on the zero eight zero [737 C/S]
737	RAD	And [737 C/S] we just er stopped our turn, we just had an aerobatic aeroplane come up ????? us about two hundred feet (1354:20) away I think
RAD	737	Roger nothing on er { <i>momentary break in transmission</i> } and [737 C/S] was that
737	RAD	Yes er we just had an aerobatic aeroplane on the right hand side er (1354:30) but we've lost sight of it now
RAD	737	[737 C/S] it's behind you without a mode charlie, should have been outside of controlled airspace, er are you able er just route back er heading two four(1354:40) two four zero degrees
737	RAD	Er yeah we've got it in sight again now, we're just in the right hand turn
RAD	737	[737 C/S] roger

## Analysis and Investigation

### UKAB Secretariat

The B737 and CAP232 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard<sup>1</sup>.

<sup>1</sup> SERA.3205 Proximity.

## Summary

An Airprox was reported when a B737 and a CAP232 flew into proximity at 1354 on Friday 25<sup>th</sup> March 2016. Both pilots were operating in VMC, the B737 pilot under IFR in receipt of a Radar Control Service and the CAP232 pilot under VFR in receipt of a Basic Service, both from Farnborough.

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

Information available consisted of reports from both pilots, radar photographs/video recordings and a report from the air traffic controller involved.

Members first discussed the circumstances of this incident, in that it occurred ostensibly with each aircraft in a different class of airspace, the B737 in the Class A of the London TMA and the CAP232 in the Class G of the London FIR below the TMA. Some time was spent discussing the likelihood that the CAP232 pilot had inadvertently flown into the TMA but it was agreed that this was an unlikely scenario given that the pilot was an experienced aerobatic pilot who regularly operated in this location. That being said, it could not be ruled out given that any pilot can make errors of judgement. Unfortunately, without radar height information, it was not possible to conclusively come to a conclusion either way.

Members understood that with the B737 in the TMA and the CAP232 in the open FIR, the two aircraft would rightly have been deemed separated by the Farnborough controller although it was thought that Traffic Information could have been passed to the B737 pilot, thereby increasing his confidence that the CAP232 was probably not in the TMA. Members noted that the B737 pilot had been in receipt of TCAS information on the CAP232 position, and that he had seen it, but it appeared that he had accepted a turn towards the CAP232. Some members felt he may have been better served by voicing his concern to the Farnborough controller earlier, and requesting a turn away from the CAP232 if he was concerned. Other members felt that he could not know the future vertical profile of the CAP232 and had understandably complied with ATC vectors.

Members also discussed the lack of Mode C from the CAP232 and the Airprox Board's advice that SSR transponders should be selected on with all available Modes in order to enhance electronic conspicuity. The likelihood of transient TCAS alerts generated in aircraft above the CAP232 by a short-term vertical profile could not be discounted, and some members felt that in the circumstances described in this Airprox it was prudent to select the Mode C off. Other members felt that all available modes should be selected on because the nature of the aerobatic manoeuvres was such that they would generate only a short-term RA at worst, and the benefits of Mode C information for pilots, controllers and alerting equipment far outweighed the inconvenience of short-term TCAS RAs.

Turning to cause and risk, although the fact that the CAP232 did not have Mode C selected on meant that the Board could not be conclusive, members considered that the balance of probabilities was that it had remained below the vertical limit of the TMA and hence that the B737 and CAP232 had been separated by dint of their being in Class A and G airspace respectively. The cause of the Airprox was therefore agreed to be one of perception in that the B737 pilot had been concerned by the proximity of the CAP232. It was a facet of airspace and procedure design that in circumstances such as this, near the boundary of controlled airspace, traffic inside Class A airspace could have less vertical separation from traffic outside than they would expect from other traffic inside. Visual assessment of height separation is difficult at the best of times, even for experienced pilots, and members appreciated that the B737 pilot could easily have become concerned by traffic approaching closer vertically than he would normally expect; however, in the Board's opinion, in this case normal procedures, safety standards and parameters had probably pertained.

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

Cause: The B737 pilot was concerned by the proximity of the CAP232.

Degree of Risk: E.