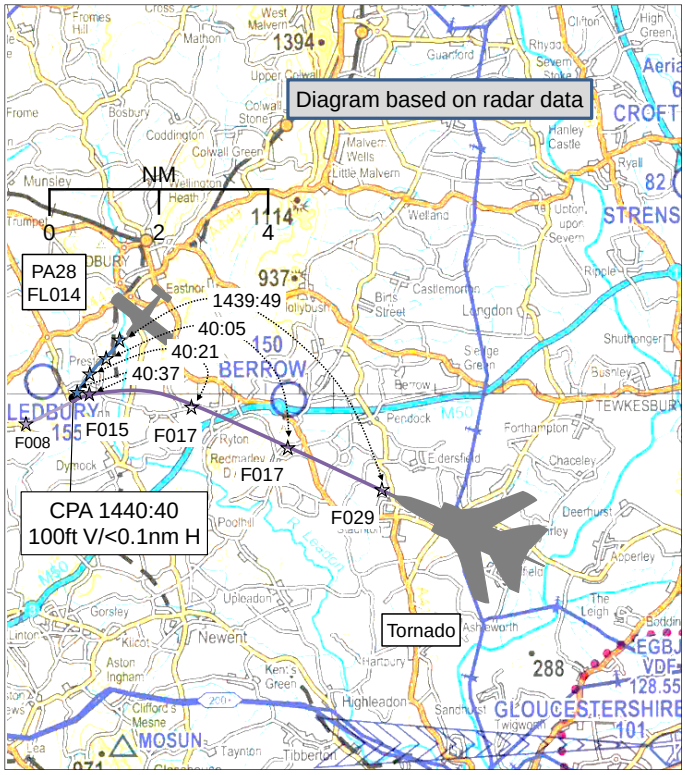
AIRPROX REPORT No 2013171

Date/Time: 2 Dec 2013 1441Z

Position: 5200N 00227W (12.5nm WNW Gloucester)

Airspace: Lon FIR/LFA 4 (*Class*: G)

	Aircraft 1	*Aircraft 2*
Type:	PA28	Tornado GR4
Operator:	Civ Trg	HQ Air (Trg)
Alt/FL:	1700ft QNH (1033hPa)	NK
Conditions:	VMC	NK
Visibility:	>10km	NK
Reported Separation:	200ft V/0.5nm H	Not Seen
Recorded Separation:	100ft V/<0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PA28 PILOT reports conducting a navigation instructional sortie. The white and blue aircraft had navigation lights and red strobe light selected on, as was the SSR transponder with Modes A and C. The aircraft was not equipped with a TAS or ACAS. The pilot was operating under VFR in VMC, in receipt of a Basic Service from Gloucester Approach. Whilst in level flight, heading 220° at 1700ft and 100kt, a descending Tornado appeared directly above them, rapidly overtook whilst travelling on the same heading, and levelled below and ahead. The pilot commented that the total time visual with the Tornado was about 10sec, and that he 'assumed they were visual with us whilst approaching from behind, or had us on TCAS as we were squawking 7000 Mode C'.

The PA28 pilot did not make an assessment of the risk.

THE TORNADO PILOT reports in the descent to low-level. The grey camouflaged aircraft's lighting state was not reported. The SSR transponder was selected on with Modes A, C and S. The aircraft was not fitted with a TAS or ACAS. The pilot did not see any other aircraft in close proximity during the sortie, and was only made aware that an Airprox had been filed after landing. Once aware of the location of the reported Airprox, he stated that he had transited through the Daventry radar corridor at medium-level and had observed a solid cloud layer beneath which required a radar let-down from London with a handover to Brize Norton. Brize Norton provided a Traffic Service during the descent to low-level, and they had gone en-route once VMC below the cloud layer.

The Tornado pilot did not see the PA28 and did not make an assessment of the risk of collision.

THE LARS CONTROLLER reports that an Airprox was not reported on his frequency. London Mil handed over [Tornado C/S], which was 'another Tornado' descending to low-level from the Daventry corridor. The aircraft was identified at FL100 under a Traffic Service, and descended to FL50. He asked whether the pilot required to route to the north or south of Gloucester's overhead, the pilot opted for the north. Unknown traffic to the north of Gloucester was called, indicating 3100ft below the Tornado pilot's cleared level[1]. The Tornado pilot was not visual, and was skirting close to the northern edge of the Gloucester overhead, so he informed the pilot to expect a further descent in 1-2 track miles to take him into a clear area northwest of Gloucester. Once to the northwest, the pilot

[1] Not the subject PA28

was informed that he was clear of the previous traffic, put on the Brize Norton QNH, and descended to 2300ft. The pilot reported good VMC before reaching this altitude and went en-route, squawking 7001. Details regarding the Airprox are unknown as nothing was reported at the time, or seen conflicting on the controller's display.

THE SUPERVISOR reports that nothing was reported to him at the time, and that he did not recall witnessing an Airprox situation.

Factual Background

The weather at Gloucestershire and Brize Norton was recorded as follows:

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METAR EGBJ 021420Z 00000KT 9999 FEW027 BKN032 08/05 Q1033
METAR EGBJ 021450Z 00000KT 9999 FEW026 BKN032 09/03 Q1033
METAR EGVN 021450Z 06003KT 9999 OVC028 08/03 Q1033 BLU NOSIG
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Analysis and Investigation

CAA ATSI

The reported Airprox occurred at 1440:40, 12.2nm northwest of Gloucestershire Airport (Gloster), within Class G uncontrolled airspace, between a Piper PA28-161 Cadet (PA28) and a Tornado GR4A (Tornado). CAA ATSI had access to the RTF and area radar recording, the written report from the controller, together with reports from the PA28 and Tornado pilots. The Gloster Approach controller reported that no report or mention of the incident was made by RTF, but that the PA28 pilot subsequently visited ATC and advised of his intention to file an Airprox report, at which point Gloster ATC took appropriate reporting action.

The PA28 pilot was operating on a local VFR flight from Gloster Airport and was in receipt of a Basic Service from Gloster Approach. After departure from Gloster he was transferred to Gloster Approach. At 1414:18, a Basic Service was agreed, and the PA28 pilot continued to the northwest of Gloster. At 1421:35, the PA28 pilot advised Gloster, *"Just to let you know we're doing low-level nav over towards the Evesham direction; I will be on frequency but I may lose two-way communication with you".* This was acknowledged by the Gloster controller.

At 1439:06, the Tornado was 2.2nm north of Gloster, squawking 3711 (Brize Norton), and was tracking northwest maintaining FL050. The Tornado pilot continued northwest and started to descend. At 1439:52, the Tornado was passing FL028 and the PA28 was at FL014 tracking southwest; the lateral distance between the two aircraft was 5.3nm, see Figure 1.

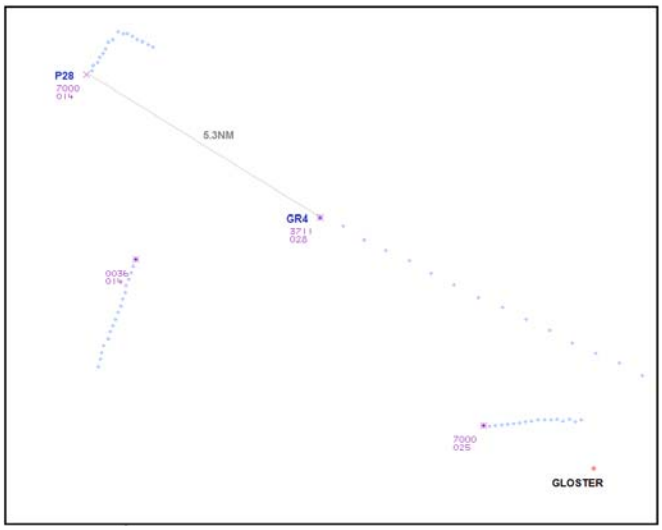

Figure 1: Swanwick MRT at 1439:52.

At 1440:35, the horizontal distance between the aircraft had reduced to 0.6nm with a vertical distance of 300ft. The groundspeed of the PA28 was shown as 95kt and the Tornado as 423kt, see Figure 2.

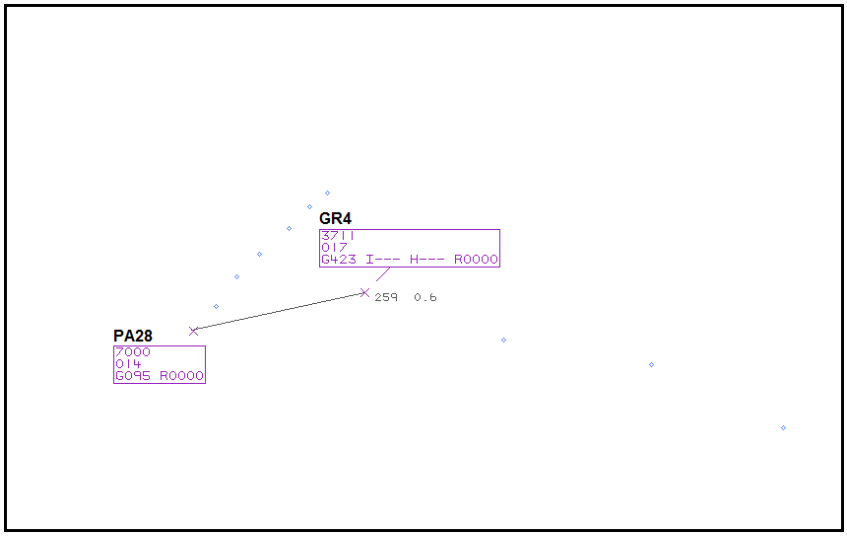

Figure 2: Swanwick MRT at 1440:35.

The Tornado pilot turned left towards the PA28, and its SSR code changed to the low-level conspicuity code, 7001. On the next radar update, at 1440:39, the aircraft are shown converging at a range of 0.1nm with the Tornado 100ft above the PA28, see Figure 3.

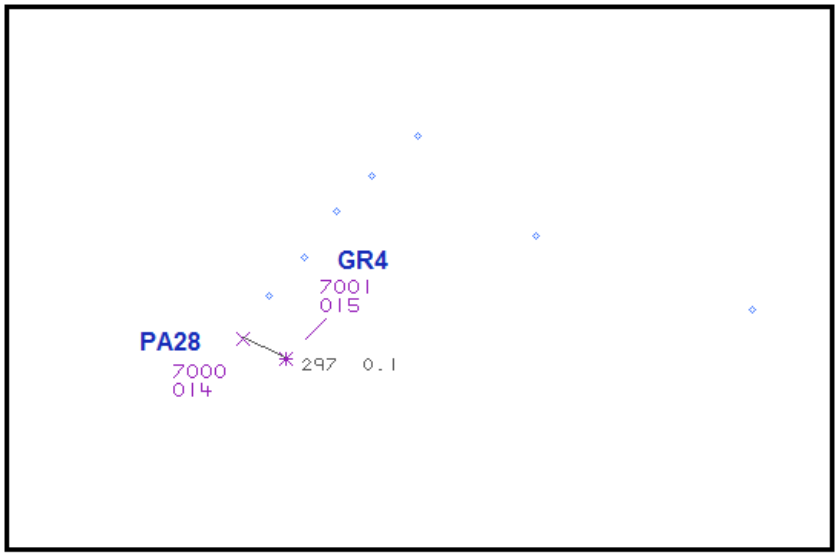

Figure 3: Swanwick MRT at 1440:39.

The CPA was estimated to have occurred at 1440:40, as the Tornado and PA28 tracks crossed. At 1440:43 the Tornado was 0.3nm ahead of the PA28 at the same level, see Figure 4. Lateral and horizontal distance then continued to increase as the Tornado pilot continued descent to low-level.

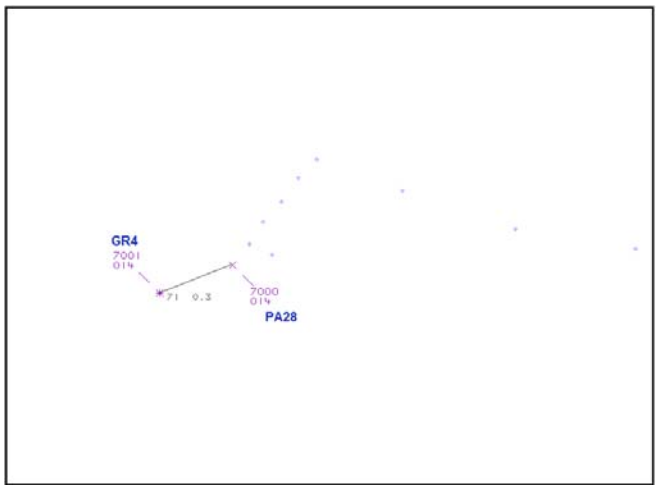

Figure 4: Swanwick MRT at 1440:43.

At 1453:24, the PA28 pilot contacted Gloster for rejoining instructions; there was no mention on frequency of an Airprox. The PA28 pilot was in receipt of a Basic Service from Gloster Approach, who were operating without the aid of surveillance equipment. The controller was unaware of the Tornado and was therefore not able to provide any generic traffic information or warning to the PA28 pilot. The PA28 pilot did not visually acquire the Tornado until it descended in front of him, from above.

Military ATM

This incident occurred at 1440 on 02 Dec 13, 2nm southwest of Ledbury. The incident involved a Tornado GR4 pilot, under a Traffic Service from RAF Brize Norton LARS controller, and a PA28 pilot receiving a Basic Service from Gloucester APP. All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The Tornado pilot was handed over to Brize following exit from the Daventry corridor, en-route to Low Flying Areas 4 and 7. A Traffic Service was applied at 1437:28 by LARS, with a descent to FL50. The LARS controller asked the Tornado pilot if he was routing to the north or south of the Gloucester ATZ, who confirmed a routing north with a right turn. At 1438:12, the LARS controller called traffic information (not on the PA28), "[Tornado C/S] *traffic uh north west, three miles, tracking north east outbound Gloucester, indicating uh, three thousand feet below your cleared level*", (Fig 1).

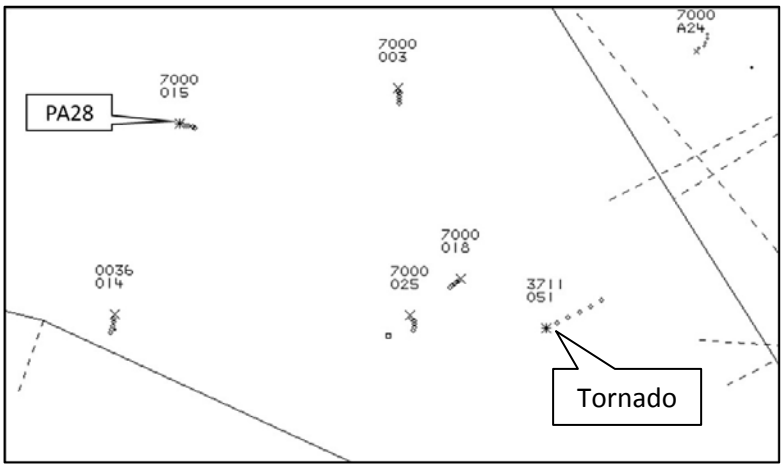

Fig 1: Aircraft geometry at TI at 1438:12 (Tornado '3711' and PA28 '7000').

At 1438:53, LARS informed the Tornado pilot to expect a further descent in '1 track mile' to keep him clear of the Gloucester ATZ. At 1439:14, the Tornado pilot was provided a further descent to 2300ft on the Brize QNH, 1033hPa, (Fig 2).

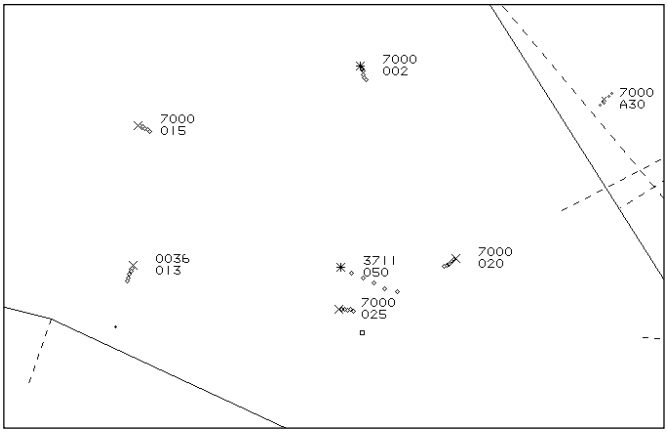

Fig 2: Aircraft geometry at descent point at 1439:14.

At 1439:58, the Tornado pilot reported VMC and happy to change to en-route frequency (Fig 3). The PA28 was approximately 35nm from Brize Norton, at 1400ft on London QNH 1033hPa, and the Tornado was approximately 30nm away at 2500ft on London QNH 1033hPa.

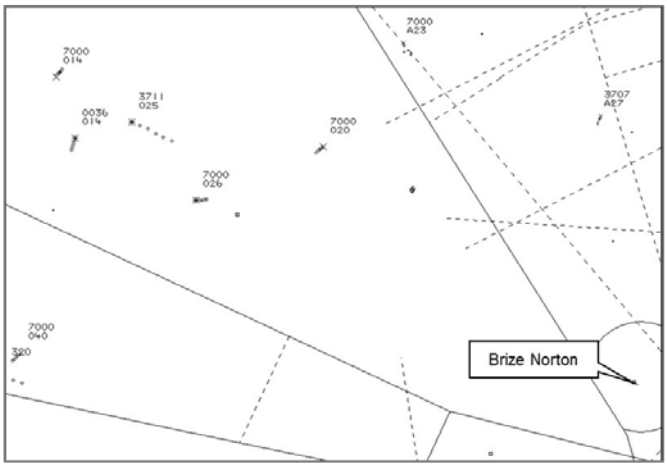

Fig 3: Aircraft position from Brize at 1439:58.

The Tornado pilot did not pick up the next LARS transmission and, after a repeat, at 1440:21 he was instructed to squawk 7001 and change to en-route frequency. At that point the incident aircraft were separated by about 2.2nm, with the Tornado approximately 35nm from Brize, (Fig 4). No updated traffic information had been provided to the Tornado after the initial call as it was approaching Gloucester at 1438:12.

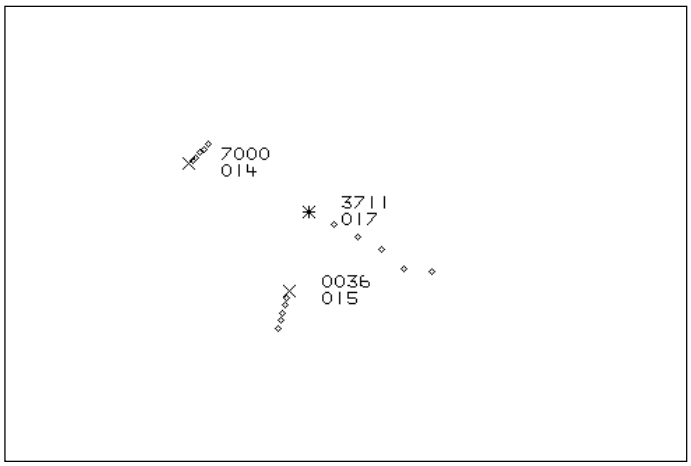

Fig 4: Aircraft geometry at 1440:21

An estimated CPA of 0.2nm occurred shortly after at 1440:37, (Fig 5). The Tornado crew were only aware of the Airprox after being informed after their sortie. As a result, the LARS controller was not aware at the time and the Supervisor was unable to recall the event when eventually informed. At the time of the incident, the LARS controller reported a low workload and a low-medium task difficulty, with two aircraft on frequency. The LARS controller reported that the only potential displayed confliction was when the Tornado pilot had levelled at FL50, and that no other Airprox or conflicting event was evident on the radar display (the Radar Analysis Cell took the radar replays displayed in this report from the Clee Hill Radar). The LARS controller had fully serviceable primary and secondary radar from Brize Norton.

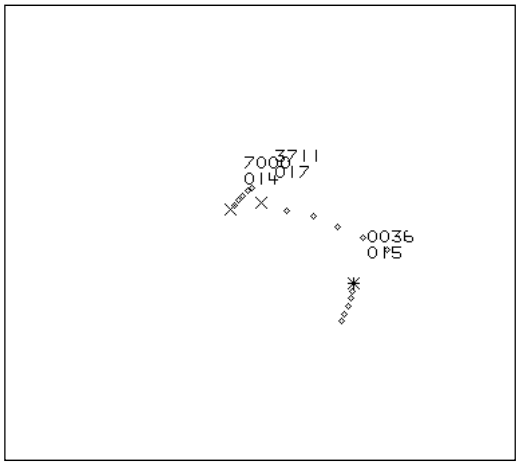

Fig 5: CPA at 1440:37.

The LARS controller did not see the PA28 on radar but, given its height and range from the Brize radar, (35nm at 1400ft amsl) this was understandable and explains why Traffic Information was not passed. The controller was functioning in a low-workload environment, indicating that he had the capacity to scan for conflictions; he had already called accurate traffic information and assisted the Tornado crew in remaining clear of the Gloucester ATZ. The Tornado pilot was under an appropriate ATS for the transit, and had reported VMC 39sec prior to the CPA. At the point that the Tornado pilot initially reported VMC and content to change frequency, the Tornado was 30nm from Brize and 2500ft amsl (RAF Brize Norton elevation 287ft). A reminder of the limits of the Traffic Service, due to Brize radar coverage at that range and altitude, was not provided to the Tornado pilot. However, an unheard transmission and repeated instruction to change frequency meant that there was a 27sec delay in the Tornado pilot changing frequency and by this point, he would have been close to the base of radar cover.

The Tornado crew and Brize controller were not immediately aware of the Airprox and the delay in reporting/notification meant that the Brize Supervisor could not accurately recall the incident.

UKAB Secretariat

The CPA as shown on the diagram has been calculated by interpolation of radar returns. Both pilots had equal responsibility for collision avoidance[2]. If the geometry is considered to be 'converging' then the Tornado pilot was required to give way[3], if considered to be 'overtaking' then the PA28 pilot had right of way[4].

Comments

[2] Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions)
[3] ibid., Rule 9 (Converging)
[4] ibid., Rule 11 (Overtaking)

HQ Air Command

Despite the Rules of the Air governing collision avoidance and who has right of way, it is only possible to implement these if one aircraft is aware of the other. On this occasion, neither ac was detected by the crews involved, and neither ATC agency had SA of the potential conflict (the PA28 was not displayed on the Brize radar screen). In addition, from the rear-aspect, it is possible that the PA28's IR signature would have been masked, preventing detection by the Tornado's FLIR. As the conflict occurred in VMC, after the Tornado entered the UK LFS and was en route, the Airprox appears to be the result of non-sighting by the Tornado crew.

Summary

An Airprox was reported when a PA28 and a Tornado flew into proximity on 2nd December 2013, in the vicinity of Ledbury. Both pilots were operating under VFR, in VMC, in Class G airspace: the PA28 pilot in receipt of a non-surveillance Basic Service from Gloster APP; and the Tornado pilot not in receipt of an ATS, having just gone en-route from Brize LARS to autonomous low-level operations.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included 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. The Tornado pilot had descended to low-level after leaving the Daventry corridor and was operating under VFR in receipt of a Traffic Service from Brize LARS. He was cleared en-route just prior to the incident, albeit that the first radio call was not acknowledged: importantly, the LARS controller did not have surveillance coverage at the range and altitude of the Airprox position and hence could not pass Traffic Information to the Tornado pilot.

The radar replay picture indicated that the aircraft were initially on a near 90° crossing angle, with associated lack of relative movement in either cockpit. The Board further discussed the geometry of the incident and opined that the PA28 may have been under the nose of the Tornado and therefore obscured. For the PA28 pilot, the Tornado would have initially appeared as a small, albeit rapidly growing, grey aircraft, nose-on against an overcast grey cloudbase.

Ultimately, both pilots were operating under VFR in Class G airspace with equal collision avoidance responsibility and the Tornado pilot was required to give way. The cause was therefore determined to be that that the GR4 crew did not see the PA28. The Board quickly agreed that the degree of risk was high. The Tornado pilot had been in a descent to low-level and had passed about 100ft 'directly above' the PA28, having closed from behind. The PA28 pilot only saw the Tornado at CPA and the Tornado pilot did not see the PA28 at all. Consequently, the Board agreed unanimously that separation had been reduced to the minimum, that chance had played a major part in events and that the situation had stopped just short of an actual collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A non-sighting by the GR4 crew.

Degree of Risk: A.

ERC Score[5]: 100.

[5] 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.