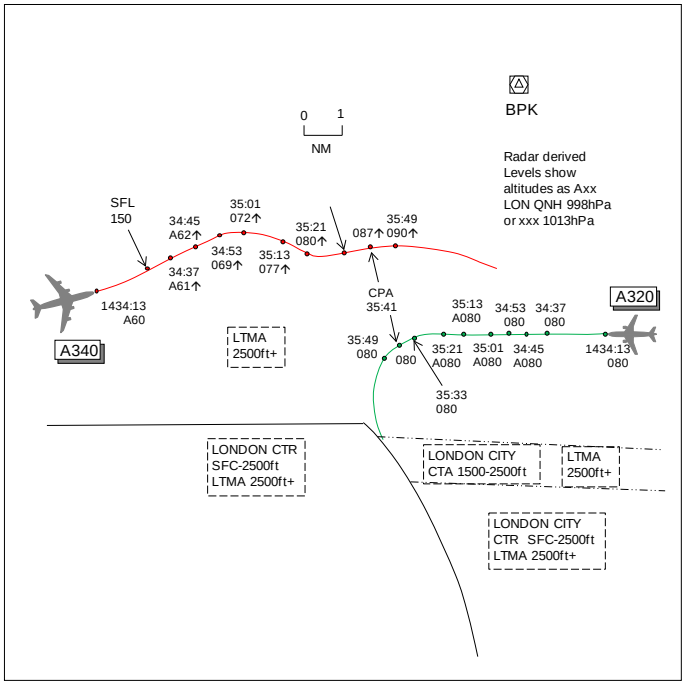
AIRPROX REPORT No 2012050

Date/Time:	17 Apr 2012 1436Z	
Position:	5139N 00012W (13nm W LAM)	
Airspace:	LTMA	(*Class: A*)
	Reporting Ac	*Reported Ac*
Type:	A320	A340
Operator:	CAT	CAT
Alt/FL:	FL080	↑FL150
Weather:	VMC NK	IMC NK
Visibility:	NK	NK
Reported Separation:	500ft V/2·5nm H	NK
Recorded Separation:	700ft V/2·6nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE A320 PILOT reports inbound to Heathrow, IFR, heading 270° at FL080 and 220kt as instructed by ATC. When 10nm W of LAM a TCAS TA was triggered by an A340 and ATC issued a L turn onto 110°. He estimated minimum separation was 2·5nm horizontally and 500ft vertically and he reported this to ATC.

THE A340 PILOT reports outbound from Heathrow, IFR, following a BPK7G SID; they were levelled at 6000ft in cloud with moderate turbulence and were under a high workload owing to thunderstorm activity. After some time ATC told them to, "maintain heading and climb FL150". However, as PF, he thought he heard 'heading 150° climb FL150'. He pulled for open climb, and the FO checked this, but he then also put the turn to 150° in whilst the FO was looking at the radar picture and outside at Wx. After a matter of seconds ATC told them to turn L immediately onto heading 040°, which was when the FO picked up the mistake. He (PF) disconnected the AP and turned the ac immediately onto heading. ATC asked if they had a problem as a navigational error had occurred. He apologised, admitted his error and explained that he had not heard the first word "maintain" and transposed the sentence to "heading 150° and climb FL150".

THE LTC HEATHROW INT N CONTROLLER reports the A320 was 7nm W LAM on radar heading 270° at FL080. The A340, on a BPK SID, was seen 3nm WNW of the A320 climbing through FL079 and in a R turn towards the A320. He gave the A320 flight a L turn onto 110° in order to ensure separation and passed TI. The A340 continued to turn towards the A320, whose crew told him that they had the A340 on TCAS and later that they were visual. He considered using the phrase 'avoiding action' but, as TI had been passed and the crew had the A340 on TCAS and were visual, he elected not to. At this point the only avoiding action available to him was a descent which may have contradicted TCAS and should not be passed. He continued to pass TI until the event was over.

THE LTC NE RADAR CONTROLLER reports the A340 flight on a BPK SID was instructed to continue present heading and climb FL150. He then observed the ac begin a R turn, while climbing through FL077, towards an A320 which was downwind traffic at FL080. The A340 flight was instructed to turn L 20° and it was realised immediately that this was not going to resolve the conflict so an avoiding action L turn heading 040° was issued. He, the mentor, stepped in to reiterate

avoiding action and pass TI. The A340 appeared to turn L briefly and then make another turn to the R. After querying this, the pilot advised that he had thought the instruction was to climb to FL150 and fly heading 150° and apologised for the mistake.

ATSI reports that the Airprox was reported in LTC airspace when an A340 and an A320 came into confliction at FL080 approximately 14nm W of LAM.

The A340 had departed London Heathrow for a flight to the Far East and was in receipt of a RCS from LTC NE on the NE Deps frequency 118·825MHz. The A340 was operating on SSR code 5204.

The A320 was inbound London Heathrow and was in receipt of a RCS from LTC Heathrow INT DIR N on frequency 119·725MHz. The A320 was operating on SSR code 3125.

The LTC NE sector was being operated by a trainee and mentor using surveillance from the Debden Radar. The NE sector included the LAM Sector and NE Deps at the time of the incident. ATSI assessed the traffic/RT on the NE sector as moderately light. The LTC DIR N was operating using Swanwick Multi-Radar Tracking (MRT).

ATSI had access to both pilot reports, NE and LL INT DIR N controller reports, recorded area surveillance and transcription of frequencies 118·825 and 119·725MHz.

The London Heathrow METARs were:-
EGLL 171420Z 25017KT CAVOK 13/01 Q0997= and METAR COR EGLL 171450Z 26015KT CAVOK 13/01 Q0997 TEMPO 4000 SHRA TSGR BKN012CB=

The A320 flight called LL INT DIR N at 1428:16 inbound LAM descending FL120. The A320 crew was instructed to leave LAM on a heading of 270° at 220kts. The A320 flight was then given stepped descent through consecutive flight levels.

The A340 flight called LTC NE at 1430:20 passing 2400ft for 6000ft on a BPK7F SID. The NE trainee requested the A340 flight to squawk ident.

Having just passed LAM, the A320 flight was instructed to descend FL080 at 1432:30. At the same time the A340 had reached altitude 6000ft and was inbound CHT in accordance with the SID. Once clear of traffic being vectored for arrival to London Heathrow, the A340 flight was instructed, at 1434:15, "…*continue present heading climb now flight level one five zero."* This was read back, "*continue present heading and climb flight level one five zero (A340 c/s)."* Mode S showed that the A340's heading at this time was 065° (inbound BPK).

The A340 continued on a Mode S reported heading of 065°for a further 30sec, after which, from 1434:45, Mode S indicated that a R turn was being executed. By 1434:53 the A340 was passing FL069, 8nm WNW of the A320, which was maintaining FL080. The A320 was continuing on its W'bound heading with approximately 3nm to run before it could be expected to be vectored L into the arrival sequence. Although the A340's turn had commenced it was not yet appreciably off the inbound BPK track.

At 1435:00 the A340 was 30° to the R of the SID track (Mode S heading 095°) and the NE trainee instructed the A340 flight to, "…*turn left twenty degrees*", and after a correct read back the NE trainee transmitted, *"(A340 c/s) avoiding action turn left now heading zero four zero degrees*." Immediately after the read back of the heading the NE mentor assumed control of the RT and passed TI, *(A340 c/s) twelve o'clock er flight level eight zero left turn immediately heading zero four five."* The A340 pilot responded, "*we're turning left this time (A340 c/s)."* The A340 was further instructed to, "…*expedite climb.*"

Low-Level STCA activated between the A340 and A320 at 1435:13. Separation between the 2 ac was 5·2nm/300ft (3nm or 1000ft required). See Figure 1.

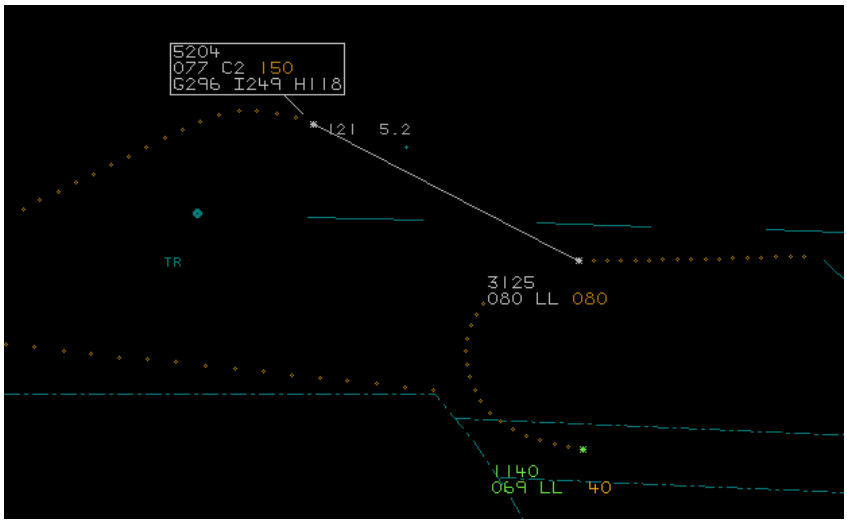


Figure 1: (Swanwick MRT) 1435:13 UTC

At 1435:15 LL INT DIR N instructed the A320 flight, *"(A320 c/s) turn left heading one one zero degrees."* Following a correct read back the LL INT DIR N controller stated, *"That's it there is traffic in your* (1435:20) *right er one o'clock range of four miles climbing er climbing above you*." The pilot responded, "*Thanks er yeah on TCAS.*" The LL INT DIR N then informed the A320 flight, "*He's turning away from you now (A320 c/s).*" The pilot replied, *"(A320 c/s) copied and er looking* (1435:40) *now visual*."

High Level STCA was activated at 1435:21 as the A340 passed FL080, Mode S heading 111°, 4·1nm NW of the A320. (See Figure 2). On the next update of the surveillance replay the STCA down-graded to Low Level and the A340 was observed to have turned L from a Mode S heading of 111° to 102°.

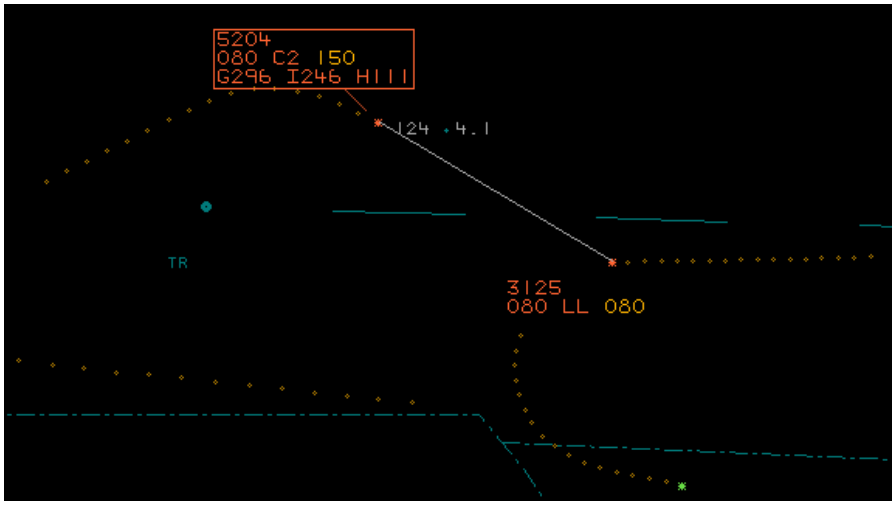


Figure 2: (Swanwick MRT) 1435:21

Separation was briefly lost at 1435:33 when the distance between the 2 ac fell to 2·8nm/400ft. (See Figure 3). At this time the A320 could be seen to be commencing its L turn and the A340 had turned L to heading 084°.

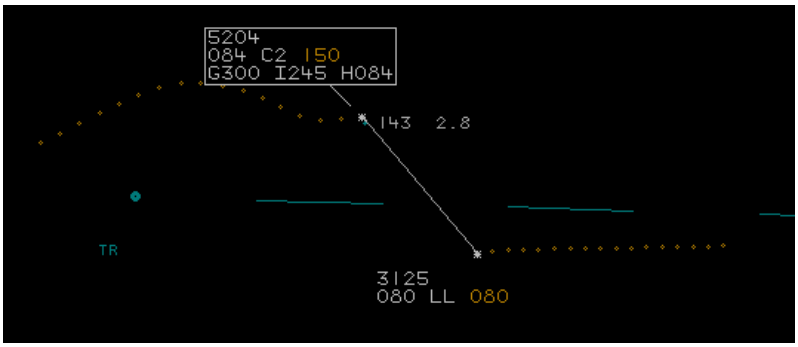


Figure 3: (Swanwick MRT) 1435:33

Surveillance Replay showed that STCA deactivated at 1435:41 but the A340's Mode S heading was beginning to show a R turn. The distance between the ac at 1435:41, the CPA, was 2·6nm/700ft.

Separation was restored at 1435:49 when the A340 passed FL090 (2·9nm/1000ft), the A320 now firmly established in its LH turn and moving away from the A340. At this time the A340's Mode S heading reported that the A340 had turned slightly further to the R onto heading 093° then onto 099°. (See Figure 4).

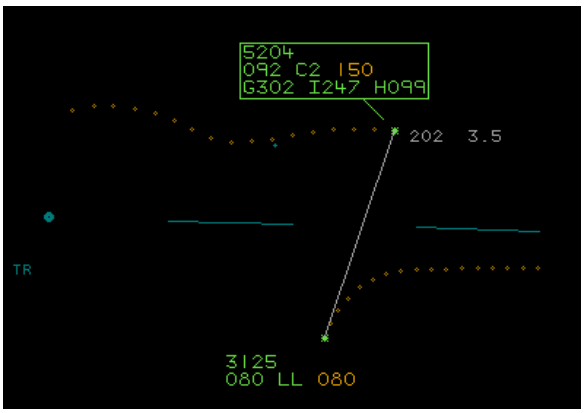


Figure 4: (Swanwick MRT) 1435:57

At 1435:57, the NE trainee, having resumed control of the sector, informed the A340 flight, *"(A340 c/s) you're turning right again turn left now heading zero four zero degrees."* The pilot replied, "*we're turning left zero four zero*." The NE mentor again assumed control of the sector and informed the A340 crew, "...*you seem to be tracking about er heading of er one hundred at the moment.*" The pilot replied, "*we're turning through zero eight zero for o- zero four zero.*"

The A340 eventually reached a Mode S heading of 114° at 1436:13 before commencing a L turn. Figure 5 shows the 4sec interval trail history of the A340 at 1436:42.

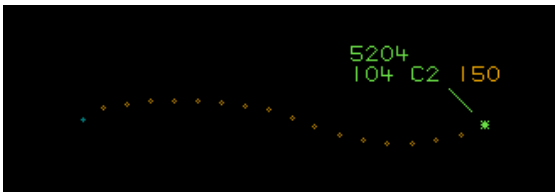


Figure 5: (Swanwick MRT) 1436:42

At 1437:30 the NE mentor asked the A340 pilot if there had been a navigational problem on departure. The A340 pilot responded, "*…apologies I thought you said heading of one five zero climb one five zero…"* The A340 flight was then instructed to resume its own navigation to REDFA and shortly thereafter transferred to the next en-route sector.

The A320 flight was issued with further vectors and descent for landing on RW27R.

The A340 pilot report indicates an increased flight deck workload due to thunderstorm activity in the area.

The NE trainee controller observed that the A340 was diverging from the SID route within 15sec (approximately 2–3 updates of a situation display using Debden radar). Avoiding action was issued immediately thereafter; however, the A340 was in a L turn for 20sec before appearing to re-establish to the R.

The re-engagement of a R turn that followed is not explained by this investigation.

The separation requirement between the 2 ac was either 3nm or 1000ft. Separation was lost for 16sec. The minimum distance between the 2 ac was 2·6nm and 700ft. At this time the 2 ac were diverging and no risk of collision existed.

ATSI did not have access to any TCAS information that may have been generated during the encounter.

An Airprox was reported following a loss of separation between an A340 and A320 in LTC airspace when the A340, having been instructed to continue on its present heading (065°) and climb FL150, commenced a R turn away from its assigned heading.

The pilot of the A340 believed the ac had been cleared on to heading 150° at the same time as being cleared FL150. This belief was likely pre-disposed by the increased flight-deck workload on the A340.

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 authorities.

CAT pilot Members agreed that this incident stemmed from a CRM issue on the A340 flightdeck. Although the crew reported high workload owing to thunderstorm activity, the crew needed to prioritise their tasks to ensure SOPs were carried out normally as well as the extraneous tasks. When the LTC NE controller issued the *"…continue present heading climb now flight level one five zero"* instruction, the FO had read it back correctly but did not monitor the actions of the PF. The FO monitored the PF selecting an 'open climb' on the FMS but did not notice the PF change from Nav to Hdg mode and then select 150°. As a result, the A340 deviated from its assigned heading and turned into conflict with the A320, which caused the Airprox. Pilot Members also discussed the different procedures used by different airlines with respect to pilot's actions in the event of being issued with avoiding action heading instructions by ATC. Some airlines require their crews to disconnect the A/P and fly the turn manually whereas others are required to fly the manoeuvre using the heading bug with A/P engaged, which can lead to a slower turn rate. In this case the A340 crew had reacted in reasonable time to the NE controller's avoiding action instruction, the manoeuvre requiring the crew to reverse from the ac's erroneous R turn into a turn to the L.

The NE trainee controller was very quick to notice the A340's deviation and acted before STCA activated by turning the ac L and then reinforcing the turn with avoiding action. The mentor then re-iterated the instruction as well as giving TI on the A320 before issuing an, *"…expedite climb"* instruction. Simultaneously with STCA activating, the Heathrow INT DIR N had issued the A320 with a L turn away from the A340 and then passed TI. The A320 crew had received a TCAS TA at about the same time and followed the ATC L turn instruction before visually acquiring the A340 passing clear on their R. As the L turns took effect the ac passed with 700ft/2·6nm separation at the CPA. With the actions taken by all parties leading to a minor loss of separation with the ac diverging the Board were able to conclude that any risk of collision had been effectively removed. The A340's

subsequent R turn occurred after the Airprox and the Board could not shed any light on why this had occurred.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The A340 crew deviated from their assigned heading and turned into conflict with the A320.

Degree of Risk: C.