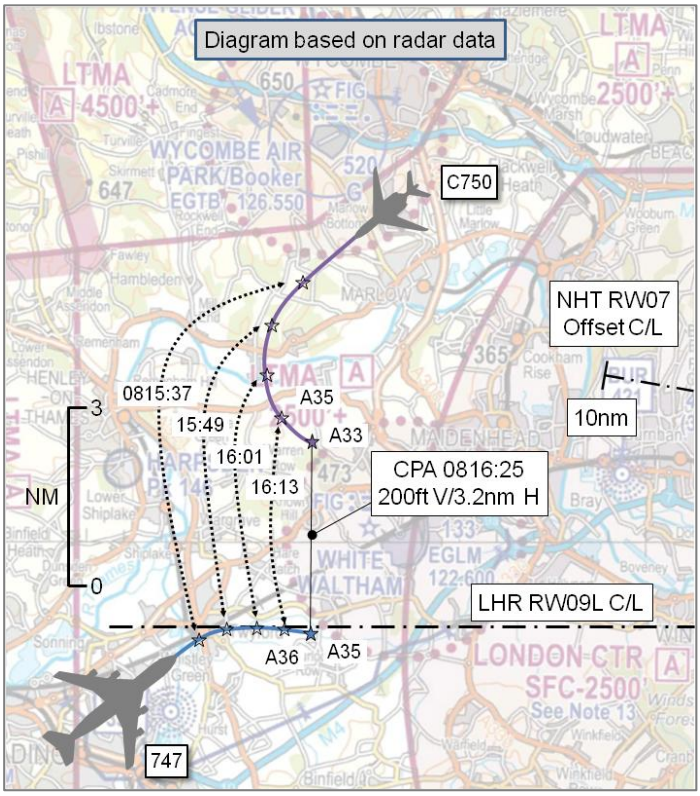
AIRPROX REPORT No 2013161

Date/Time:	21 Nov 2013 0815Z	
Position:	5130N 00049W (10nm W Heathrow airport)	
Airspace:	London TMA	(*Class*: A)
	Aircraft 1	*Aircraft 2*
Type:	B747	C750
Operator:	CAT	Civ Comm
Alt/FL:	3500ft QNH (1001hPa)	>2000ft QNH (1000hPa)
Conditions:	IMC	IMC
Visibility:	0km	0.5nm
Reported Separation:	0ft V/4nm H	0ft V/3nm H
Recorded Separation:	200ft V/3.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BOEING 747 (B747) PILOT reports inbound, IFR in cloud, in the descent to Heathrow airport (LHR); the First Officer was Pilot Flying (PF). Strobes and navigation lights were illuminated; SSR Modes C and S were selected. Whilst established on the Localiser for RW09L passing 3500ft on descent to 3000ft, he received an avoiding action instruction from Heathrow Director 'Avoiding Action turn right heading 150 degrees.' The conflict aircraft was acquired on TCAS at a range of approximately 3nm at the same altitude. The PF promptly disengaged the autopilot and followed the turn instruction. At no point was the TCAS contact anything other than 'proximate' traffic, no warnings or advisories were given. ATC commented that the conflicting aircraft was inbound to Northolt RW07 and had 'caught the wind'. The spot-wind was approximately 020°/35kt. Further instructions were given to rejoin the Localiser and the rest of the flight was uneventful.

He assessed the risk of collision as 'Low'.

THE CESSNA 750 CITATION X (C750) PILOT reports inbound, IFR in cloud, to RAF Northolt (NHT). White strobes, red anti-collision, navigation and recognition lights were illuminated; SSR Modes C and S were selected. He was under the control of LHR Approach and was given a heading of 160° from Bovingdon (BNN) VOR. He was issued with step-descents to 1800ft on QNH 1000hPa to feed in for a PAR to RW07 at NHT. There was a very strong northerly airstream covering the area. After what seemed a 'late' hand-over to the NHT Director he was immediately passed a rapid sequence of left turn heading changes towards the NE. Prior to this he monitored the Heathrow approach 'stream' on TCAS, with one particular return identified at the same level, with the same direction of travel, at approximately 3nm. However, as he was turning away at this point, this was not considered a threat. No TCAS warning was received. He remained IMC throughout. The NHT Director and Talkdown resumed the PAR to land on RW07.

He assessed the risk of collision as 'None'.

THE LHR FINAL (FIN) DIRECTOR (DIR) reports that he observed the C750, which was inbound to NHT, go through the off-set centre-line for RW07 at NHT in the descent to 3000ft. This created a conflict with the B747, which was established on the Localiser RW09L at 4000ft and cleared for descent with the glide path. Avoiding action was issued to the B747 pilot to break-off the approach and turn right heading 150°. This instruction was correctly read-back and complied with. Traffic

Information was passed, and he believed that standard separation was maintained. Once the C750 was observed to have turned back towards NHT and out of conflict with the RW09L approach, the B747 pilot was turned back to establish ILS RW09L again and the aircraft completed its approach.

Factual Background

The LHR weather was:

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EGLL 210750Z 02010KT 350V050 9999 SCT014 BKN022 06/03 Q1000 TEMPO BKN014
EGLL 210820Z 02011G22KT 340V050 9999 FEW019 BKN029 06/03 Q1001 NOSIG
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The NHT weather was:

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EGWU 210750Z 03018KT 9999 -RA SCT018 SCT022 BKN050 05/02 Q1000 TEMPO SCT014
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Analysis and Investigation

CAA ATSI

ATSI had access to reports from both pilots, the LHR FIN DIR's report, the initial LTC watch report and final unit report, recorded area surveillance and transcriptions of 120.4MHz (LHR FIN DIR) and 119.725MHz (LHR Intermediate (INT) DIR North (N)). The B747 was an IFR flight inbound to LHR's RW09L, in receipt of a Radar Control Service from the TC LHR FIN DIR on 120.4MHz. The B747 was transponding Mode A code 5472. The C750 was an IFR flight inbound NHT, in receipt of a Radar Control Service from NHT Approach on 130.350MHz. The C750 pilot was in receipt of vectors for the off-set final approach to NHT's RW07. The C750 was transponding Mode A code 5476. The LHR FIN DIR was providing services with the use of Swanwick Multi Radar Tracking (MRT). The sector was manned by a trainee and mentor. There were no reported unserviceabilities or distractions.

The LHR FIN DIR trainee and mentor had assimilated the prevailing wind conditions, having discussed the problems that may occur on their sector. Both the B747 and C750 pilots reported conditions as IMC.

The C750 pilot was inbound to NHT via BNN and had been instructed to descend to altitude 4000ft on heading 230° at speed 210kt or less[1]. At 0815:00, the LHR INT DIR N instructed the C750 pilot to report his heading to NHT on 130.350MHz. The UK AIP notifies pilots of aircraft inbound to NHT that, after receiving vectors and descent from LHR DIR, aircraft will be instructed to contact NHT DIR at least 10nm before touch-down[2]. At this point, the C750 pilot had approximately 12nm to run and its Ground Speed (GS) was 64kt greater than its Indicated Air Speed (IAS) (Figure 1). By this time, the B747 pilot had received clearance to establish on the LHR 09L ILS from altitude 3000ft.

[1] When NHT are on easterly operations, LTC LHR controllers are instructed to transfer traffic (by silent handover arrangement) at or in the descent to altitude 4000ft on the London QNH. Aircraft speed at handover should be 210kt or less. [LTC MATS Part 2, Edition 2/13]

[2] UK AIP AD 2.EGWU-8, paragraph AD 2.22 (2b)

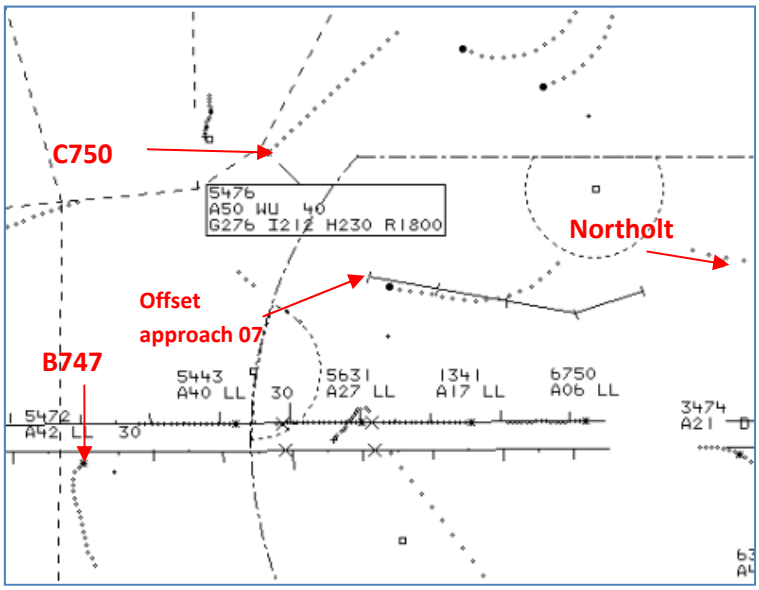

Figure 1: Swanwick MRT – 0815:00

The C750 pilot contacted NHT Approach at 0815:11 and the NHT controller instructed the C750 pilot, '…turn left immediately, 090 degrees, descend to altitude 3000 feet…' [Analysis of the C750's Mode S heading data indicated that the left turn was commenced approximately 19sec after the instruction was issued]. At 0815:52 NHT instructed the C750 pilot to turn left heading 080° (Figure 2). The C750 was now through the extended off-set centreline and its GS was 54kt greater than its IAS.

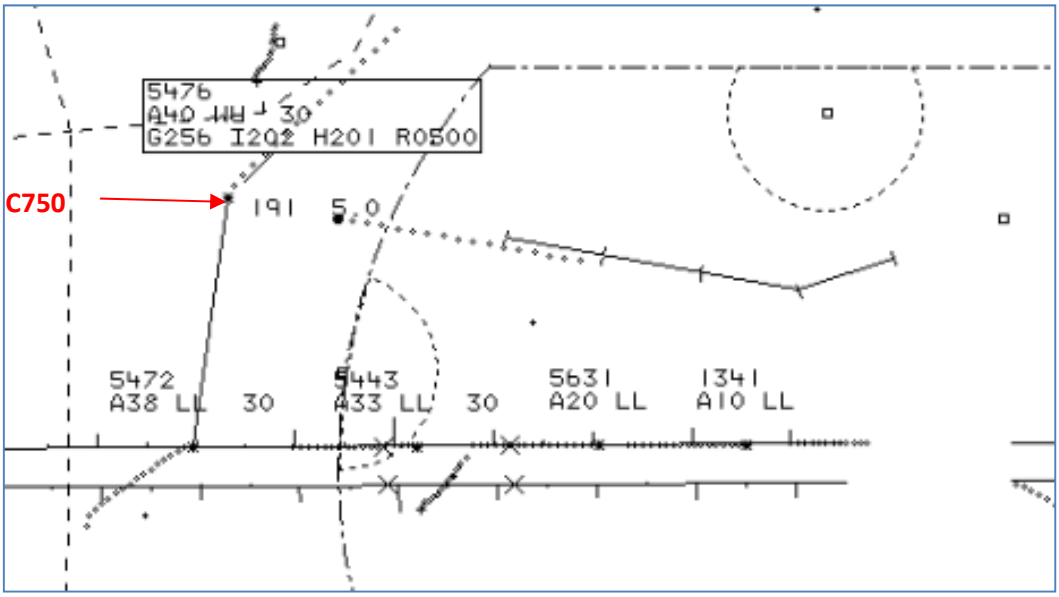

Figure 2: Swanwick MRT – 0815:52

At 0816:04 the LHR FIN DIR mentor took control of the frequency and instructed the B747 pilot, *"avoiding action turn right now heading 150 degrees."* (Figure 3). Three sec later the NHT controller instructed the C750 pilot to turn further left heading 050°. The C750 was 4.2nm north of the B747 with both aircraft at altitude 3700ft. Mode S data showed the C750 turning through heading 169°, albeit that the aircraft's track was southerly. After the B747 pilot's read-back, the LHR FIN DIR passed Traffic Information on the C750.

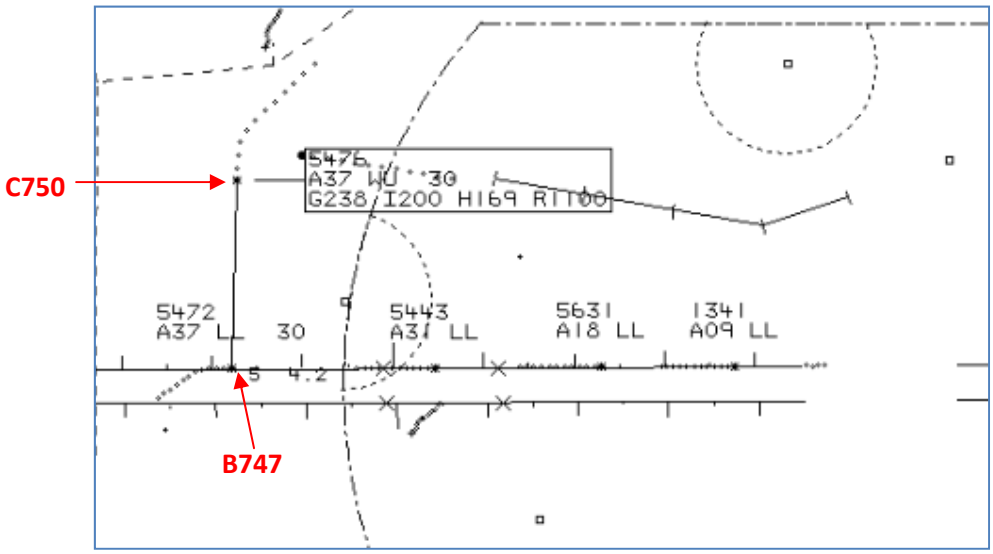

Figure 3: Swanwick MRT – 0816:04

At 0816:28 the C750 was 200ft below and 3.2nm north of the B747 with the C750's Mode S indicating that the aircraft was turning through heading 104° (Figure 4). The B747 pilot's right turn was also beginning to take effect. On the next update of the situation display, 4 sec later, the distance between the two aircraft remained the same, after which the lateral distance began to increase. Neither pilot visually acquired the other aircraft.

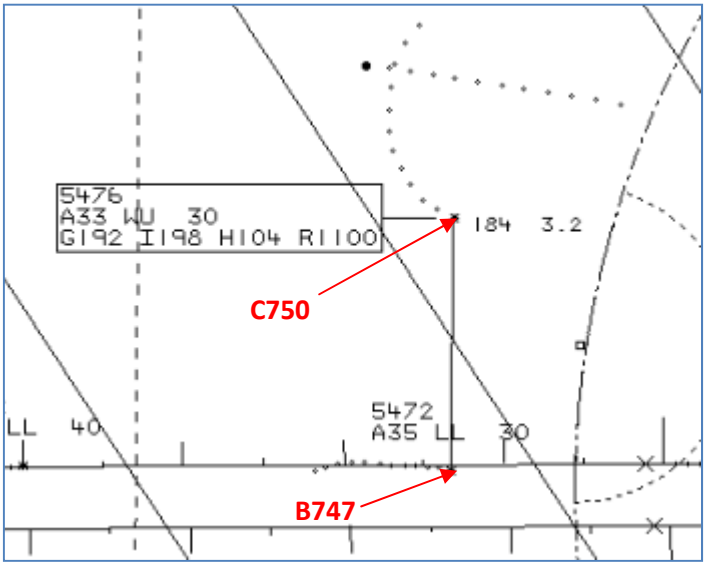

Figure 4: Swanwick MRT – 0816:28. Note: diagonal cursor indicates 150/330°.

At 0816:40 the FIN DIR instructed the B747 pilot to turn left heading 060° to re-establish.

Data from the radar processing system and Mode S data from the C750 showed that when the C750 pilot was tracking south-westerly there was a significant difference between the C750's GS and its IAS. Even though the C750 pilot had complied with the speed control instruction of 210kt, its GS was 30% greater than its IAS. Given the prevailing wind and the resultant GS, the C750 pilot's initial turn towards the off-set final approach track was insufficient to prevent it from passing through the extended centreline. The apparent delay in the commencement of the left turn would have also compounded the situation.

The continued heading updates from NHT Approach and the avoiding action issued by the LHR FIN DIR were effective in maintaining the required lateral separation (3nm or greater) between the two aircraft.

Military ATM

The NHT Radar Director (DIR) was a first tourist controller with two months experience as a solo DIR. NHT do not operate with a Supervisor but did have an ATCO I/C who was bandboxing Approach and Departures at the time, which is standard practice.

At 0814:58 LHR INT DIR N instructed the C750 pilot to report his heading to NHT. At 0815:12, the C750 pilot checked-in with NHT DIR descending to 4000ft, heading 230°. At 0815:23 the NHT DIR responded with quickly delivered RT, *"*[C750 C/S] *Northolt Director, identified, turn left immediately heading zero nine zero degrees, descend to altitude three thousand feet Northolt QNH one thousand, Radar Control."* Figure 1 demonstrates the aspect and relative speed of the respective aircraft; the C750 was showing a GS of 272kt.

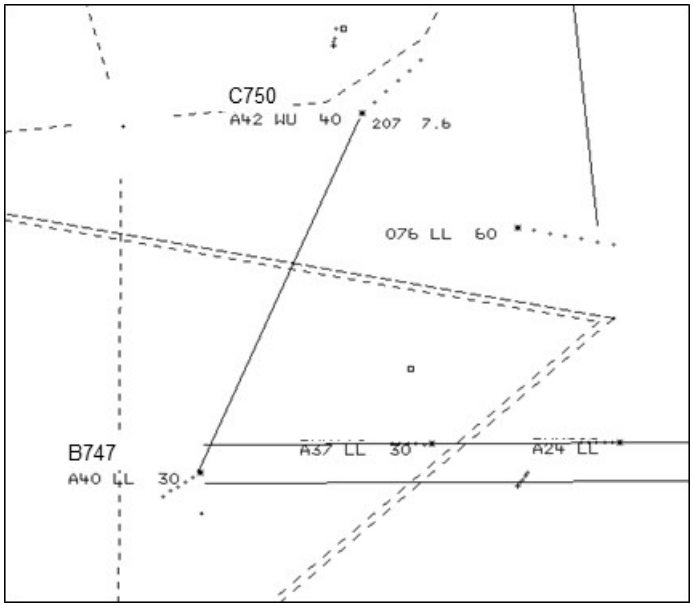

Figure 1: Aircraft geometry at 0815:23 when NHT DIR identified the C750 (7.6 nm separation from the B747).

At 0815:52 NHT DIR updated the C750's heading turn to 080° (Figure 2).

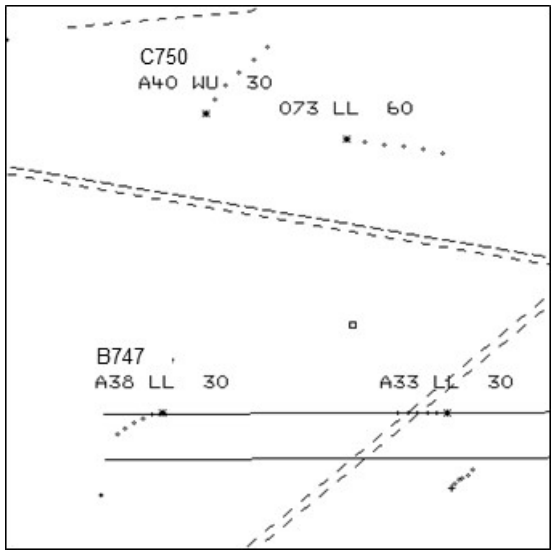

Figure 2: Aircraft geometry at 0815:52..

At 0815:57, LHR INT DIR N telephoned Northolt, "*Hello, it's Heathrow, just checking [C750 C/S] is turning."* NHT DIR replied, *"Yes, I'm busy turning zero eight zero now."* Upon completing the

landline call, NHT DIR directed a further turn to 070° (at 0816:06) and this was updated with a turn to head 050° at 0816:20 (Figure 3).

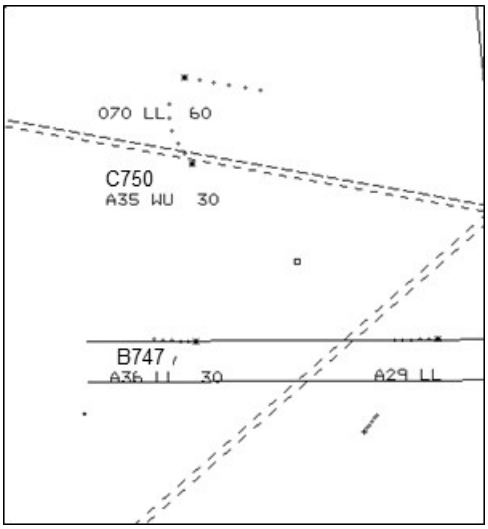

Figure 3: Aircraft geometry at 0816:20 as left turn 050° is passed.

No Traffic Information was passed to the C750 pilot by NHT DIR. Once clear of the LHR inbound the C750 pilot was given radar vectors for a GCA and handed over to the Talkdown controller.

To add context to the actions, the NHT DIR was an inexperienced controller who had recently endorsed as a DIR. The procedure for IFR inbounds to NHT is unusual because of the close proximity to the LHR extended centreline. As a result, recoveries to NHT RW07, when LHR RW09 is in use, are subject to dog-leg turns of approx 35° at 4nm final, leaving controllers with little room to manoeuvre. Although the prescribed separation was not lost, the turning circle of the C750 caused concern at LHR and led to the B747 pilot being temporarily broken-off his approach. The landline call from LHR appears to have triggered a further turn from NHT DIR.

The turns provided by the NHT DIR were not sufficient and may not have fully taken into account the C750 pilot's speed and the effects of a strong northerly wind. Further contextual factors include the unique nature of operations at NHT and a late handover would have tested the inexperienced NHT DIR. The rushed and constant RT delivery strongly suggests that the NHT DIR had to work hard to achieve separation and had to constantly re-appraise the effects of their turns, resulting in a heavier than normal workload. Although NHT DIR was only controlling one aircraft, there was reduced time and space for the NHT DIR to feed the aircraft onto final approach. NHT is not established for a Supervisor although the ATCO I/C did witness the incident and commented that the controller did his best with the traffic that was presented to him.

The unit investigation reminded controllers of the need to provide timely avoiding action and Traffic Information. The unit has also asked NATS to consider a trial to reduce the speed of NHT inbounds to RW07 from 210 to 180kt.

BM SPA contend that not having a dedicated Supervisor is an absent barrier that could have provided support to the NHT DIR in terms of effective avoiding action turns and/or negotiating suitable handover points. A review of the Supervisor position at NHT will be conducted by the unit.

Summary

The Airprox was reported following the passing of avoiding action to the B747 pilot on final approach to LHR's RW09L, which was issued to maintain separation from the C750 inbound to NHT. Although the LHR INT DIR N transferred the C750 pilot to NHT in accordance with ATC requirements and as notified to pilots in the UK AIP, the prevailing strong north-easterly wind affected the C750 pilot's GS and turning circle, which, compounded by a delayed turn by the C750 (despite the controllers use of

the word 'immediately'), meant that even the continuously updated headings from the NHT DIR could not prevent the C750 pilot from routing south of NHT's RW07 off-set extended centre-line and into potential confliction with the B747. The LHR FIN controllers (trainee and mentor) were alert to the prevailing strong north-easterly wind and reacted promptly when the C750 pilot flew through the extended off-set centreline for NHT's RW07. Separation minima were maintained.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from both pilots, transcripts of the relevant RTF frequencies, area radar recordings, reports from the controllers concerned and reports from the appropriate ATC and operating authorities.

The Board first considered the actions of the NHT DIR. It was noted that when the C750 pilot contacted Northolt, after transfer from the LHR INT DIR N, the NHT DIR had realised that due to the strong north-easterly wind it was necessary to take immediate action. Consequently, he issued the pilot of the C750 an 'immediate' left turn, with the intention of doing his best to keep the aircraft, as required, north of the offset centre-line to RW07. However, radar recordings revealed that the pilot delayed commencing the turn for 19 seconds, a significant distance travelled given his high groundspeed. Further continuously updated headings were issued but NHT DIR could not prevent the aircraft crossing the offset centre-line. The Board realised that the NHT DIR had been placed in a very difficult position when the C750 was transferred to him tracking south-west with higher than normal groundspeed because of the strong north-easterly wind. He was commended by the Board for taking immediate and continuous action to control the situation. Taking into account the wind conditions and the delayed turn by the C750 pilot, it was considered that it would not have been possible for the NHT DIR to stop the C750 passing through the offset centre-line.

The Board also commended the action taken by the LHR FIN DIR after recognising the emerging situation and issuing an avoiding action turn to the B747 pilot. His action, together with that taken by the NHT DIR, prevented any loss of standard separation.

Discussion then centred on the hand-over procedures between LHR and Northolt and why the NHT DIR had been placed in such an unenviable position. It was noted that the LHR INT DIR N had complied with the requirements of the LTC Manual of Air Traffic Services (MATS) Part 2 and UK AIP procedures: the C750 pilot was descending to 4000ft at an airspeed of 210kt before being transferred to Northolt on a silent hand-over; and the aircraft was transferred at approximately 12nm from touch-down when 'at least 10nm' was the requirement. However, despite the handover meeting and in fact exceeding the letter of the procedures, the Board wondered whether these procedures were robust enough to take account of the conditions of the day, and whether the LHR INT DIR N could have done more to assist the NHT DIR in recognition of the high groundspeed that the C750 was displaying. Members also considered whether the NHT DIR could have taken any other action to control the situation; what was the 'Plan B' if he could not turn the C750 in time?. One Member wondered if he could have instructed the C750 pilot to turn right to gain extra vectoring space and dumbbell back to the approach path, but this was not considered to be a viable option by the Board because it would have resulted in the C750 pilot turning towards traffic descending inbound to LHR or possibly leading to the aircraft leaving CAS. Although the speed of the C750 was an issue, the Military ATC member commented that military controllers are not used to using speed control, albeit by the time that the NHT DIR had established contact, speed control would not likely have offered much relief anyway. Because it was apparent that the NHT DIR's options were limited, some members wondered whether the LHR INT DIR N could have transferred the C750 pilot to Northolt earlier. Civil airline pilot and ATC members commented that, from their experience, this would be difficult because of the sequencing that the LHR DIR has to do to separate Northolt inbounds from the BNN hold and then ensure that aircraft are 'clean' before being transferred to Northolt.

Finally, the Board considered the actions of the C750 pilot and considered that he also had a key role to play in this incident. Not only had he delayed his turn by 19secs after being given an 'immediate' turn by the NHT DIR, but he had not seemed to be thinking ahead and modulating his own speed in order to anticipate the ensuing tight pattern that he was bound to experience. Allowing for some time

to assimilate and initiate the turn, 19secs was considered excessive by the civil airline pilot members and, at 276kts ground-speed, this equated to approximately 1.5nm extra travel down-track before he turned. Had the C750 pilot turned promptly, and had he modified his own indicated airspeed to achieve as close to 210kts ground-speed as his aircraft would allow, he would have greatly assisted ATC in their endeavours.

The Board discussed the cause of the Airprox. Some members believed that the cause was the delayed turn of the C750 but, after further consideration this was considered to be only a contributory factor. After continued discussion, it was agreed that the root cause was the lack of robustness in the Northolt inbound procedures. These allowed a hand-over that was not timely for the wind conditions on the day. Consequently, the Board went on to consider whether a recommendation should be made to address the robustness of the handover procedure but was then heartened to hear that the procedures were already being reviewed and, therefore, a recommendation was not necessary. When considering the overall risk, the Board considered that, although it was appropriate for the B747 pilot to have reported an Airprox, the actions taken had, in the end, ensured that normal safety standards and parameters had pertained. Consequently, the risk was categorised as E.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Northolt inbound procedure led to a hand-over that was not timely for the wind conditions on the day.

Contributory Factor: The C750 pilot did not turn immediately when instructed.

Degree of Risk: E

ERC Score[3]: 50

[3] 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.