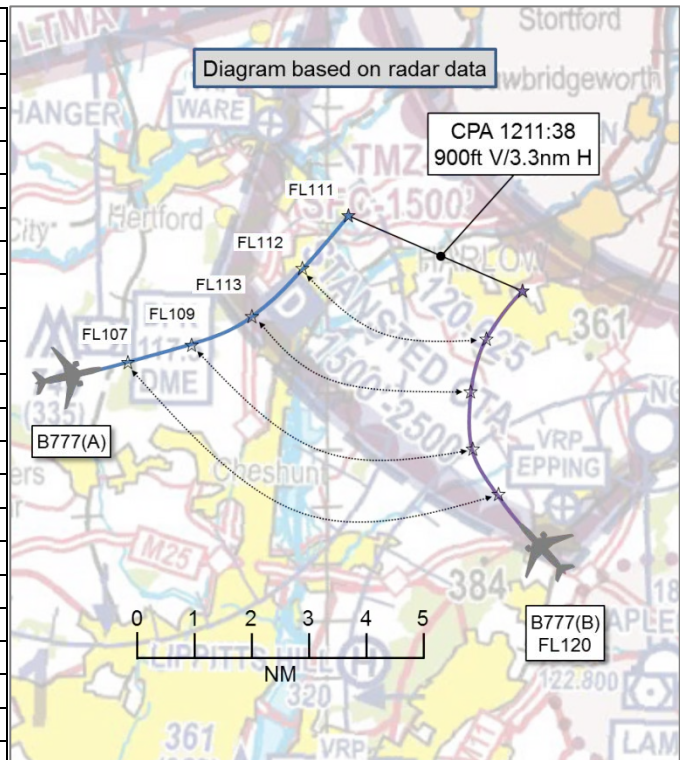


**AIRPROX REPORT No 2016156**

Date: 28 Jul 2016 Time: 1211Z Position: 5146N 00003E Location: Lambourne hold

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	B777(A)	B777(B)
Operator	CAT	CAT
Airspace	London TMA	London TMA
Class	A	A
Rules	IFR	IFR
Service	Radar Control	Radar Control
Provider	Swanwick TC	Swanwick TC
Altitude/FL	FL111	FL120
Transponder	A, C, S	A, C, S
<b>Reported</b>		
Colours	Company	Company
Lighting	NK	NK
Conditions	VMC	NK
Visibility	>10km	>10km
Altitude/FL	FL110	FL:120
Heading	040°	NK
Speed	259kt	235kt
ACAS/TAS	TCAS II	TCAS II
Alert	TA	Unknown
<b>Separation</b>		
Reported	800ft V/3nm H	NK
Recorded	800ft V/3.3nm H	



**THE BOEING 777(A) PILOT** reports that the other B777, which was in the LAM hold, turned right rather than left at FL120. The B777(A) was in a climb to FL150 direct REDFA when ATC gave them avoiding action instructions; left heading 040°, to stop climb at FL110. Given their rate of climb and the timing of the instruction, there was a subsequent altitude bust to FL114. ATC were made aware and they returned to FL110.

He assessed the risk of collision as ‘Low’.

**THE B777(B) PILOT** reports that during approach to Heathrow they were instructed to hold at LAM for 5-10 minutes. The First Officer checked the holding pattern over that point in the Flight Management Computer (FMC) and found it different from the chart as it was to the right in the FMC, while in the chart it was to the left. An inbound course of 084° for holding was inserted into the FMC and over LAM the aircraft started to establish the holding as a tear-drop entry when ATC instructed them to turn right heading 105° (he recollected). At that moment, he realised that they should have set the inbound course as 264° and not 084° because it was the inbound radial to LAM and not the inbound course that they use in other holding points on Heathrow charts. Because there was no insert in the chart for holding, they used the inbound radial to LAM and not its reversal. Subsequently, they were vectored to RW27R.

**THE SWANWICK TC EAST CONTROLLER** reports that he was operating the East Sector bandboxed. He received a priority telephone call from TC NE to tell him that B777(B), at FL120 in the hold at LAM, had turned right in the hold instead of left and was in conflict with B777(A), which had just checked in on his frequency, outbound from Heathrow climbing to FL150. He gave immediate avoiding action to the B777(A) pilot, left on to heading 045°, then issued Traffic Information. He also then decided to stop the aircraft’s climb at FL110 as an added precaution, although he was happy the aircraft were no longer at risk at this time. B777(A) levelled at FL113 (he thought) before descending again to FL110. He believed that lateral separation had been maintained throughout. He gave a

brief explanation to the B777(A) pilot, who advised he would file a report. His only concern would be that the incident was either just off the edge of his radar range, or just at the edge, due to the size of the sector, and, if he had not received the telephone call, he might not have seen the STCA.

## Factual Background

The weather at Heathrow was recorded as follows:

EGLL 281150Z 24012KT 9999 BKN046 21/10 Q1014 NOSIG=

## Analysis and Investigation

### CAA ATSI

The area radar recordings and London frequencies were obtained and reviewed. ATSI also had access to reports from the pilot of B777(A) and the controller at London TC East. The unit report into the occurrence was also obtained.

At 1201:45 the B777(B) pilot was instructed by the TC LAM controller to hold at Lambourne and to expect a five minute delay.

At 1209:33 (Figure 1) the B777(B) pilot was instructed to descend to FL120 and then transferred to Heathrow Director (LL INT N).

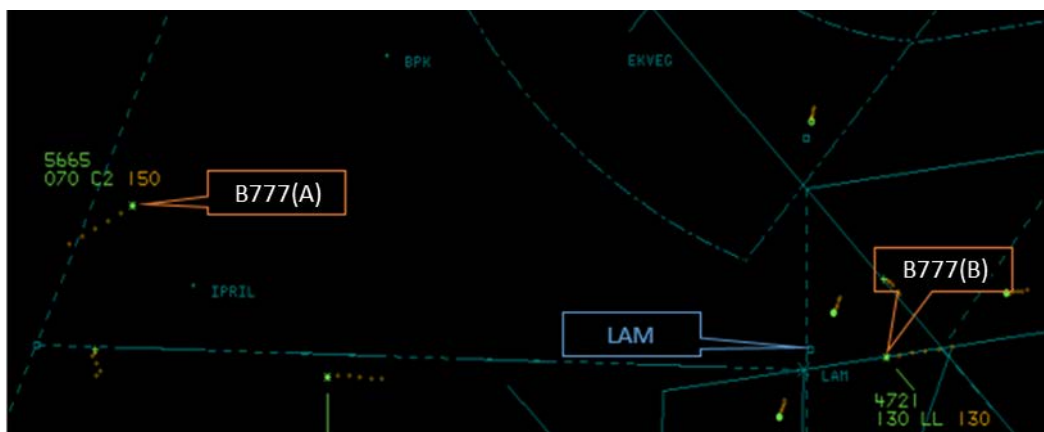


Figure 1 – 1209:33

The LAM hold is a left-hand holding pattern as depicted in Figure 2 below.

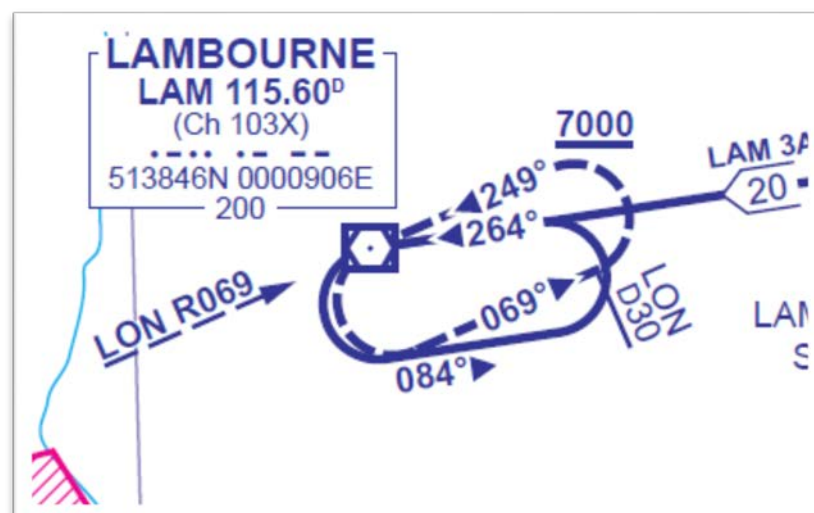


Figure 2 Lambourne hold.

The B777(B) flew over LAM at 1209:54 and commenced a right turn.

At 1210:10 the B777(A) pilot called London Control TC E climbing to FL150 heading towards REDFA. The controller acknowledged the call.

The B777(B) pilot called the LL INT N controller at 1210:18 descending to FL120. As the LL INT N controller responded they noticed the B777(B) turning right and not left into the expected holding procedure.

At 1210:25 the LL INT Support controller commenced a telephone call to the TC North Sector who, by using a priority call function, alerted the TC East controller and suggested a left turn for the B777(B).

At 1210:40 (Figure 3) the TC East controller issued an avoiding action turn to the B777(A) pilot onto a heading of 040°. At the same time the LL INT controller issued a turn to the B777(B) pilot onto a westerly heading. Both controllers issued Traffic Information to their respective aircraft.



Figure 3 at 1210:40.

At 1210:52 (Figure 4) the Short Term Conflict Alert activated.

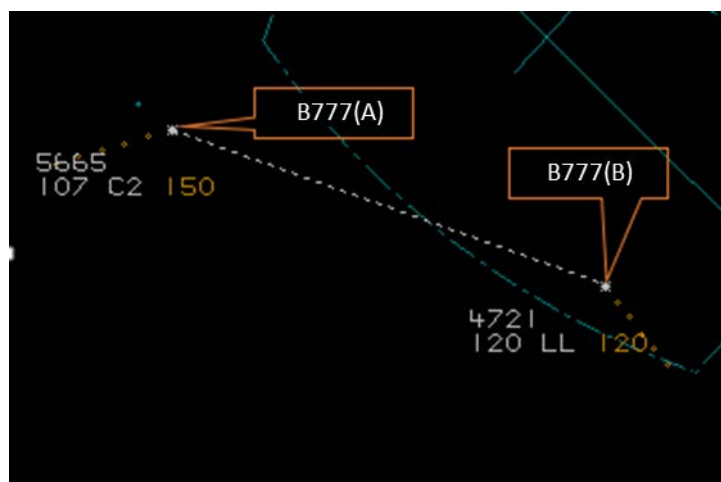


Figure 4 – 1210:52.

At 1210:58 the TC East controller stopped the climb of the B777(A) at FL110. The pilot subsequently reported exceeding their cleared flight level to FL113 (because they were climbing at the time of the instruction).

CPA occurred at 1211:34 (Figure 5) when the aircraft were 800ft vertically and 3.3nm horizontally apart. The pilot of the B777(A) reported visual with B777(B) and later filed an Airprox report. Standard Radar separation was maintained. [3nm]

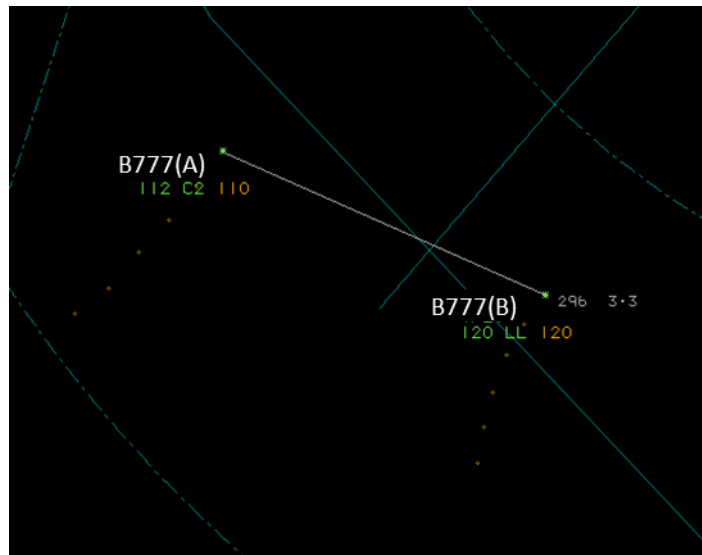


Figure 5 at 1211:34 – CPA.

According to the unit report, the pilot of B777(B) reported that a discrepancy between the charts and the programming of the FMS had caused the error, which he had not become aware of until the aircraft began a right turn. The aircraft were operating in Class A airspace where ATC are responsible for separating the aircraft. Separation was maintained due to the timely action taken by the controllers involved.

### UKAB Secretariat

The B777(A) and B777(B) 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>.

### Summary

An Airprox was reported when B777(A) and B777(B) flew into proximity at 1211 Thursday 28<sup>th</sup> July 2016. Both pilots were operating under IFR in receipt of a Radar Control Service from TC Swanwick. B777(B) pilot did not comply with the joining procedures published for the Lambourne hold, resulting in it turning towards B777(A).

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

Information available included reports from both pilots, the controller concerned, area radar and RTF recordings and reports from the appropriate ATC and operating authorities.

Looking first at the actions of the B777(B) pilot. The Board noted that the pilot was inbound to Heathrow, routing from the east to Lambourne (LAM), to take up the hold. The entry pattern to the LAM hold, approaching from the east, was to make a left turn heading 084°. However, on reaching LAM the aircraft turned right. The pilot subsequently reported that an incorrect inbound course had been entered into the Flight Management System(FMS). Heading 084° had been entered instead of

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

the reciprocal heading of 264°. This had resulted in the aircraft turning right at LAM to set up a 'tear-drop' entry to an inbound course of 084°.

Civil Airline Pilot members explained that functions performed by FMS can vary with both aircraft manufacturer and models. Consequently, there are differing automatic and manual programming systems. Some are set up prior to departure when the route can be entered; this can be refined en route. Other systems rely on the pilot inputting the correct information into the FMS, as would have appeared to have happened to B777(B). Whatever the system, they opined that it was the pilots' responsibility to check that the input information was correct. In conclusion, they summed up by saying that the aircraft was simply complying with what it had been told to do by the pilots.

The Board commended the actions of the controllers concerned. The Heathrow INT N controller noticed the unexpected turn by B777(B) at LAM as the pilot reported overhead. Following a telephone call by the Support controller, the TC East controller, who was controlling B777(B), was advised of the situation and asked to turn his aircraft left, which he did. Meanwhile the INT N controller issued an avoiding action turn to the B777(B) pilot. The action taken by the controllers prevented a loss of separation between the two aircraft.

The Board then turned its attention to the cause and risk of the Airprox. It was quickly and unanimously agreed that the Airprox had occurred because the B777(B) pilots had incorrectly programmed their FMS and turned towards the B777(A). In debating the risk, some members felt that although standard separation had been maintained, this was not a usual occurrence in controlled airspace and so normal procedures should not be considered to have pertained. However, the majority view was that although it was recognised as an unusual occurrence for an aircraft to turn in the wrong direction when entering a hold, the action taken by ATC had ensured that normal safety standards and parameters had been maintained between the aircraft. They opined that, although the incident met the criteria for reporting, subsequent analysis had showed that this was a benign, non-proximate situation with no possibility of a collision. The majority view prevailed, and the Airprox was assessed accordingly as risk Category E.

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

Cause: The B777(B) pilots incorrectly programmed their FMS and turned towards the B777(A).

Degree of Risk: E.