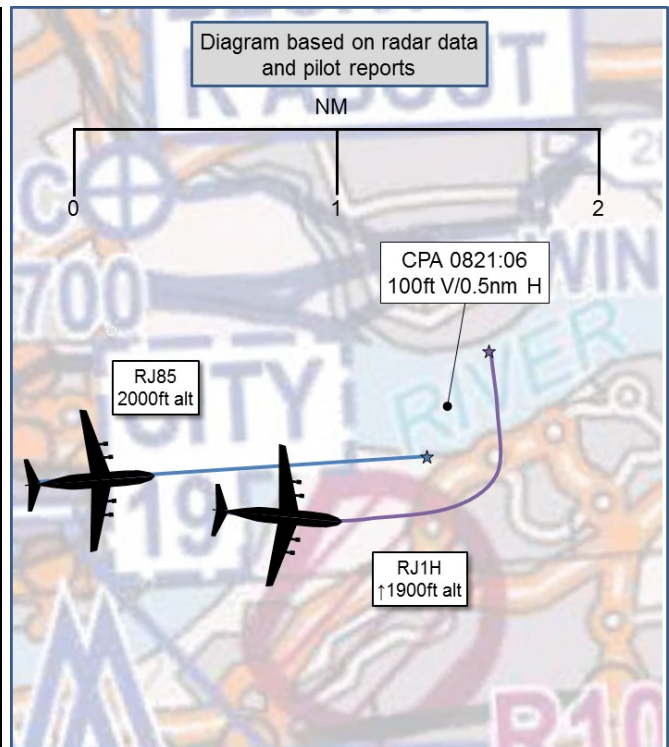


**AIRPROX REPORT No 2016030**

Date: 14 Mar 2016 Time: 0821Z Position: 5130N 00006E Location: London City Airport

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	RJ85	RJ1H
Operator	CAT	CAT
Airspace	London City CTR	London City CTR
Class	D	D
Rules	IFR	IFR
Service	Aerodrome	Aerodrome
Provider	London City Tower	London City Tower
Altitude/FL	2000ft	1900ft
Transponder	On, S	On, S
<b>Reported</b>		
Colours	White	NK
Lighting	Strobe, Nav	NK
Conditions	IMC	IMC
Visibility	0km	NK
Altitude/FL	2000ft	1200ft
Altimeter	QNH	QNH
Heading	094°	360°
Speed	200kt	140kt
ACAS/TAS	TCAS II	TCAS II
Alert	RA	RA
<b>Separation</b>		
Reported	100ft V/600m H	100ft V/1.5nm H
Recorded	100ft V/0.5nm H	



**THE RJ85 PILOT** reports that he was on an ILS approach to RW09 LCY but, due to late aircraft configuration, he discontinued his approach as per SOP and resumed 2000ft straight ahead. He was unable to inform the tower because the frequency was very busy with aircraft departure clearances. He was approximately 1.5nm from the threshold by the time he could talk to ATC; by this time an RJ1H was taking off. He was instructed to remain on runway heading and maintain 2000ft. He could see the RJ1H on his TCAS, who was asked to turn north ASAP. His FO called ATC to suggest they make a turn also, but received no reply. He then received a TCAS RA Climb, which he followed, and a 'Clear of Conflict' quite soon after. He was in IMC and at no time was he visual with the other aircraft or the ground at 2000ft.

He assessed the risk of collision as 'Medium'.

**THE RJ1H PILOT** reports that he was climbing out after takeoff from RW09 when he heard another flight announcing a go-around during approach. He followed the SID since no other instruction was received. He was passing approximately 1000ft AGL, still in takeoff configuration, when he was instructed to turn away from the SID onto a heading of 360°. No altitude restriction was issued. He observed traffic on TCAS flying in the vicinity of his 6 o'clock, at almost the same altitude, maybe slightly above. As he passed around 1200ft, a TCAS RA "Descend, Descend" was generated. He followed procedures, with an altitude loss of about 250ft; he may have been flying in uncontrolled airspace by then. He observed separation on TCAS as 100ft (+01), 1.5nm.

He assessed the risk of collision as 'Medium'.

**THE LONDON CITY CONTROLLER** reports he was on duty as the aerodrome controller. He had just cleared the RJ1H for takeoff with the RJ85 inbound but not yet in communication. As the RJ1H aircraft rotated, he looked towards the RJ85 and saw that it was in a nose-up attitude and appeared to be making a missed approach. A quick glance at the ATM confirmed this, because the aircraft was climbing; he reported this to his colleague in the Coordinator role, who agreed and activated the Missed Approach Indicator (MAI). The RJ85 pilot then called up, informing him they were climbing back to altitude two thousand feet. He told him to conduct a standard missed approach, reaffirming this was straight ahead to two thousand feet. He then instructed the departing RJ1H to turn left heading 360 degrees when he could, and informed him of the missed approach behind him. The RJ1H pilot responded with 'Roger' and that he was turning now. He saw the RJ1H turning as it disappeared into cloud (which was BKN017). As the RJ85 (who was already in cloud) passed behind the RJ1H, the RJ1H reported a TCAS RA and a closest approach of 200ft. The RJ1H then reported he'd be filing on the incident, to which the London City controller said 'Roger', and that so would he. The RJ85 then also reported a TCAS RA, and said he'd be filing too. Both aircraft were then transferred to Thames Director.

## **Factual Background**

The weather at London Heathrow was recorded as follows:

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METAR EGLL 140820Z AUTO 06010KT 030V100 8000 BKN018 05/01 Q1034 NOSIG
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## **Analysis and Investigation**

### **CAA ATSI**

An Airprox was reported by the pilot of a BAE Systems Avro RJ85 (RJ85) when the aircraft came into proximity with a BAE Systems Avro RJ100 (RJ1H) 1.8NM east of London City Airport. The RJ85 (code 7344) was operating IFR on an inbound scheduled passenger flight in receipt of an Aerodrome Control Service from City Tower on frequency 118.075MHz. The RJ1H (code 0336) was operating IFR on an outbound scheduled passenger flight departing from RW09 also in receipt of an Aerodrome Control Service from City Tower on frequency 118.075MHz.

ATSI had access to reports from the pilots of both aircraft, the City Tower controller, the area radar recordings and recordings of both the City Director and City Tower frequencies. The City Tower controller was also interviewed by ATSI. Screenshots produced in this report are provided using the area radar recordings. Levels indicated are altitudes. All times UTC.

At 0801:56, the City Tower controller passed departure clearance to the RJ1H via the EKNIV1H Standard Instrument Departure. The City Tower controller advised the RJ1H pilot of his Calculated Take-Off Time (CTOT) of 0817.

At 0807:20, the RJ1H pilot requested to start engines, this was approved by the City Tower controller who also advised him that the earliest airborne time in order to comply with the CTOT was in five minutes time (0812).

At 0811:53, the RJ1H pilot requested taxi clearance and the City Tower controller cleared him to follow a Dornier (who was ahead in the departure sequence), to holding point Alpha for RW09.

At 0817:21 (Figure 1), the City Tower controller gave the RJ1H clearance to line-up and wait on RW09. At this time, the inbound RJ85 was 6.6nm west-south-west of London City Airport on a right-hand base leg for the ILS approach to RW09 having been vectored by the City Director controller in accordance with standard Terminal Control London City RW09 arrival procedures.

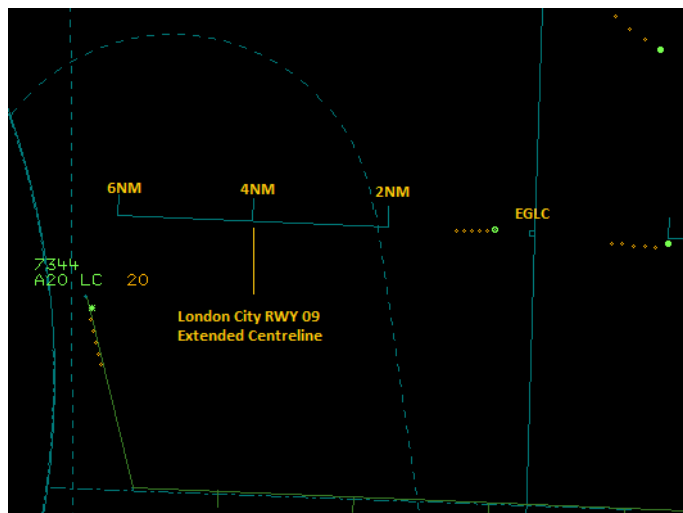


Figure 1 – Swanwick MRT at 0817:21

At 0818:15 (Figure 2), the RJ85 established on the final approach track for RW09 at 4.7nm.

At 0818:20 the RJ85 (at 4.6nm) was transferred by the City Director controller to the City Tower controller.

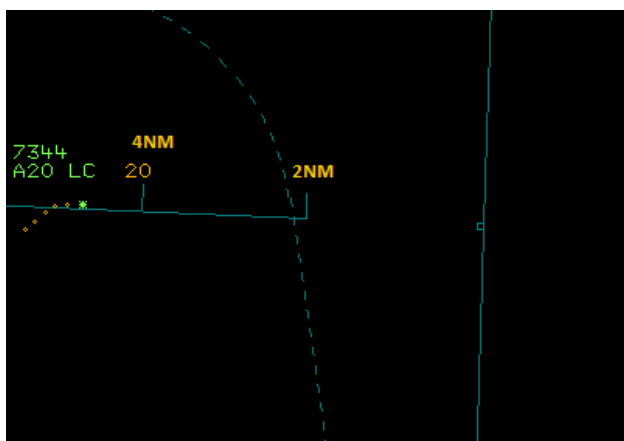


Figure 2 – Swanwick MRT at 0818:15

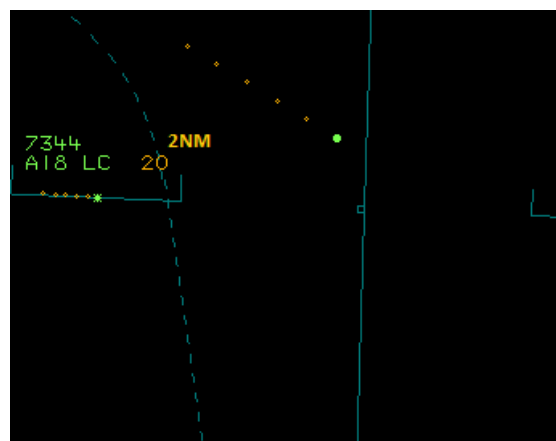


Figure 3 – Swanwick MRT at 0819:02

At 0819:02 (Figure 3), the City Tower controller issued take-off clearance to the RJ1H. According to the recorded surveillance data, at 0819:26 (Figure 4), the RJ85 initiated a climb at approximately 2.3nm final with the data-block showing a rate of climb of 400FPM.

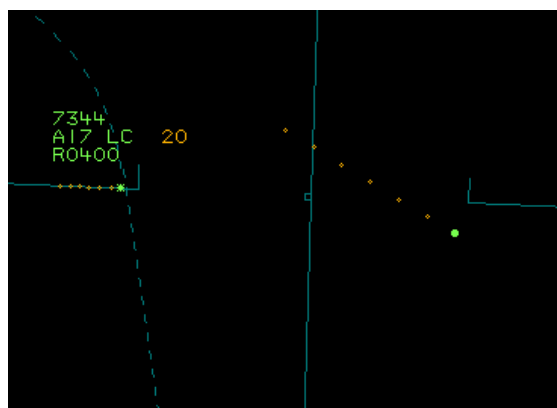


Figure 4 – Swanwick MRT at 0819:26

Eighteen seconds later, at 0819:44, the RJ85 (now at 1.3nm) informed the City Tower controller that he was going-around and returning to 2000ft. The City Tower controller issued a clearance to continue straight ahead to altitude 2000ft, passed traffic information on the departing RJ1H, and advised the RJ85 pilot that the RJ1H would turn “*shortly*”.

At 0820:10 (Figure 5), the departing RJ1H’s SSR return appears on the area radar recording for the first time. At this point, the RJ85 had levelled off at 2000ft and was displaying a groundspeed of 124kt with the lateral distance between the two aircraft being 1.7nm.

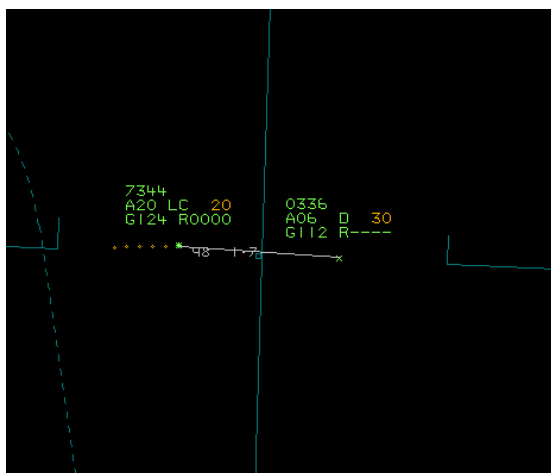


Figure 5 – Swanwick MRT at 0820:10

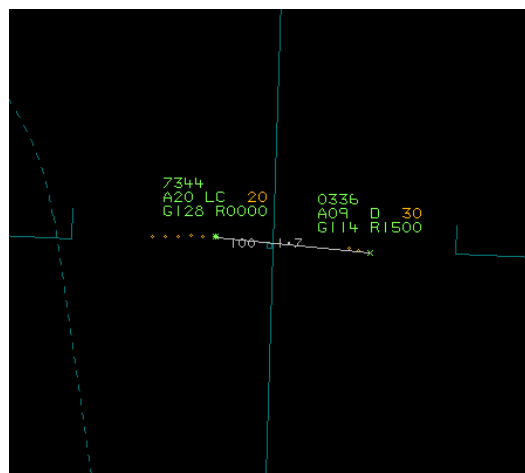


Figure 6 – Swanwick MRT at 0820:20

Ten seconds later, at 0820:20 (Figure 6), the City Tower controller instructed the RJ1H to “*make an early turn when able please, left heading of 360°*”. The RJ85 was displaying a groundspeed of 128kt and the lateral distance between the two aircraft was still 1.7nm.

At 0820:39 (Figure 7), the City Tower controller provided updated traffic information to the RJ85 in respect of the departing RJ1H’s allocated heading of 360°. After the traffic information was acknowledged, the pilot of the RJ85 then enquired whether the City Tower controller wanted him to turn; however, this second call was not acknowledged. The RJ85 was now displaying a groundspeed of 178kt versus the RJ1H’s groundspeed of 106kt. The lateral distance between the two aircraft had reduced to 1.4nm.

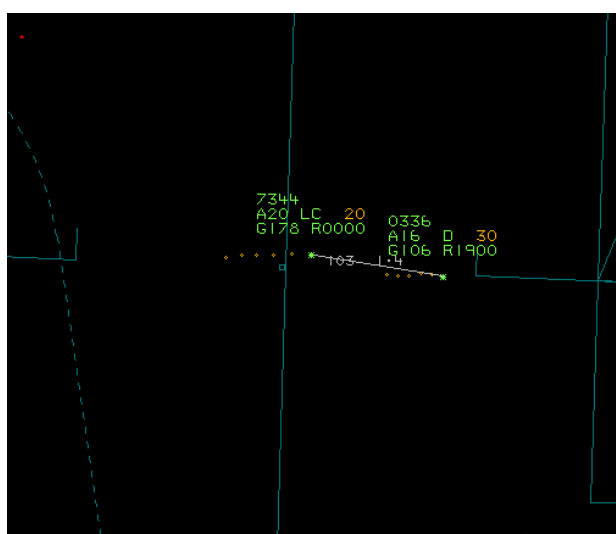


Figure 7 – Swanwick MRT at 0820:39

At 0821:04, the RJ1H reported a TCAS RA. CPA occurred very shortly afterwards at 0821:06 (Figure 8), with a lateral distance of 0.5nm and a vertical distance of 100ft.

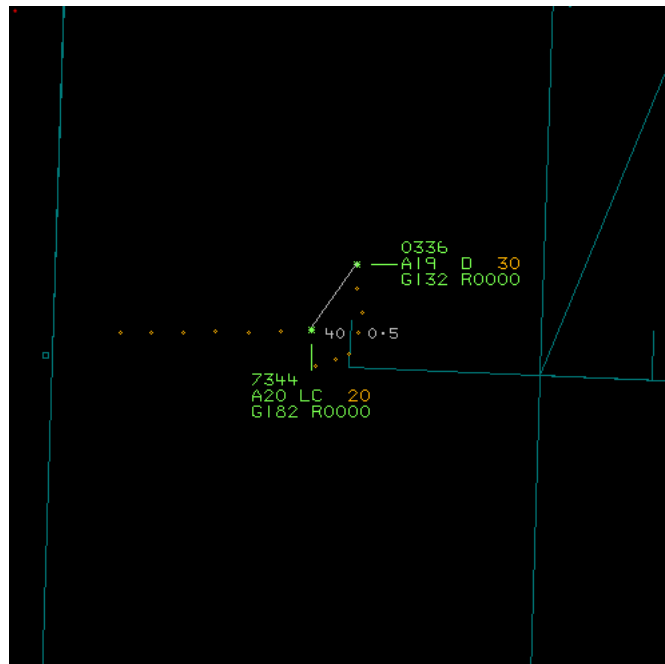


Figure 8 – Swanwick MRT at 0821:06 (CPA)

The City Tower controller was providing an Aerodrome Control Service in band-boxed configuration and, as such, was fulfilling the duties of both the Ground Movement Controller (GMC) and Air Controller (AIR). At interview, the City Tower controller stated that this configuration was Standard Operating Procedure for the time of day, and that there were additional staff available to split GMC and AIR if traffic loading and/or prevailing weather conditions required. Another controller was manning the adjacent operational position in the Visual Control Room, fulfilling the duties of Co-ordinator. Controllers manning the Co-ordinator position are responsible for being the primary point of contact for all telephone calls within the VCR, co-ordination, liaison/notification and Emergency/Unusual Circumstances Actions. An assessment had been carried out prior to the Airprox regarding whether to split GMC and AIR, but this had been considered unnecessary.

Coincident with the City Tower controller issuing line-up clearance to the RJ1H, there was a relatively short-lived but noticeable increase in R/T loading on the City Tower frequency. In the RJ85 pilot's written report he comments that he "was unable to inform tower (of the missed approach) as they were giving departure clearance to another aircraft".

At interview, the City Tower controller stated that the traffic loading in the VCR was low-medium. Similarly, he described his overall workload prior to the Airprox as being low. He had no recollection of the R/T loading increasing; however, he did describe being momentarily distracted by another aircraft who required a conventional, rather than an RNAV Standard Instrument Departure. Having to change the SID status relating to this aircraft on the City Tower controller's EFPS (Electronic Flight Progress Strip) system caused an increase in workload coincident with the RJ85 executing the missed approach.

According to the Manual of Air Traffic Services Part 2 for London City, traffic making an ILS approach would normally be transferred by Thames to City Tower at 6nm. The inbound RJ85 was transferred from the Thames Director controller to the City Tower controller when the aircraft was at approximately 4.5nm final for RW09. At interview, the City Tower controller explained that the latest he would expect to have traffic transferred to him on final approach would be 3nm.

The inbound RJ85 did not initially check in with City Tower as the aircraft established on the approach, and the first call from the RJ85 to City Tower was to advise the controller that they were making a missed approach. No reason for the missed approach was given at the time but, subsequent to the Airprox, the pilot of the RJ85 reported to the Thames Director controller that the reason was that they were late to configure and that they were concerned about the approach becoming unstable. According to the RJ85 pilot's report, he had become momentarily distracted on approach through monitoring his GNS (Global Navigation System); as a result, at top of descent the aircraft had only been configured to Flap 24 and, therefore, he decided to discontinue the approach.

The published Missed Approach Procedure for RW09 at London City is based on a 2.5% climb gradient, straight ahead to 2000ft to I-LST DME 5 (LON DME 24.8), then turn left to NDB(L) LCY at 2000ft, or as directed.

The departing RJ1H was cleared to fly the EKNIV1H RNAV Standard Instrument Departure (Figure 9) from RW09. The initial part of the SID involves climbing straight ahead to 1.1DME followed by a left turn onto a track of 026°.

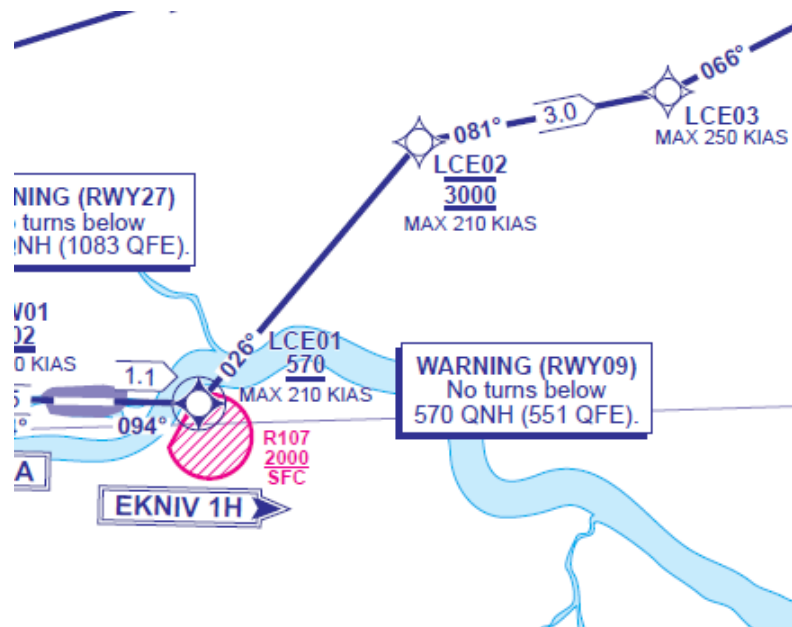


Figure 9 – Extract from RNAV1 SID Chart (UK AIP AD-2-EGLC-6-4)

At interview, the City Tower controller described observing the inbound RJ85 in the missed approach attitude and discussing this with his Co-ordinator who confirmed that the aircraft was going around. The Co-ordinator then activated the Missed Approach Indicator (MAI). The City Tower controller's initial plan was to keep the RJ85 climbing straight ahead to 3000ft. The first R/T transmission from the RJ85 to City Tower included the following: "...1.3 miles we're going around, going back to two thousand feet". During the interview with the controller, he described being distracted by this, with the feeling that he had now lost that plan. The City Tower controller then responded with "...continue straight ahead to altitude two thousand feet..." and then passed traffic information on the departing RJ1H. In passing the traffic information, the City Tower controller made a slip, incorrectly describing the departure as being from RW27 rather than 09; however, this appears not to have been picked up by the RJ85 pilot and had no impact on the overall event.

Shortly afterwards, the City Tower controller took the RJ1H off the SID, instructing its pilot to "make an early turn when able please, left heading 360 degrees". Updated traffic information was then passed to the RJ85 pilot in respect of the RJ1H's clearance to turn left 360°. The City Tower controller then co-ordinated the RJ85's missed approach with the City Director controller who issued a Standard Missed Approach. After co-ordinating the missed approach with City Director,

the City Tower controller then realised that the situation had deteriorated, and that the RJ85 and the RJ1H were in closer proximity than he had been expecting; by this time, he recalled that the RJ85 had passed astern the RJ1H and that both aircraft had called respective TCAS RAs.

Although traffic information was passed to the RJ85 on the RJ1H, avoiding action was not given to either aircraft. At interview, the City Tower controller stated that his experience of similar events at London City involving similar aircraft types led him to believe that the rate of 'catch-up' would be less significant than was actually the case. He also expressed considerable surprise at how quickly the RJ85 climbed and accelerated.

Separation was lost as the RJ1H turned left and entered cloud, at which point the City Tower Controller was unable to use reduced separation in the vicinity of the aerodrome (which requires the aircraft to be VMC). Notwithstanding, the City Tower controller took positive control as soon as he realised that separation was going to be lost by turning the RJ1H left onto 360°. However, not turning the inbound RJ85 (especially because the RJ85 pilot indicated that he was able to accept a turn), was a missed opportunity. Had the City Tower controller turned the RJ85, separation may have been restored earlier than was the case. At interview, the City Tower controller recalled hearing the RJ85 pilot ask if he wanted him to turn, but at the time he was on the phone to City Director and engaged in co-ordinating the missed approach. During interview, the controller expressed frustration in not turning the RJ85 when the pilot offered to do so, and reported that had he not been engaged in co-ordinating with City Director he probably would have done so.

Due to an increase in R/T loading coincident with the RJ85 executing the missed approach, the RJ85 pilot was unable to alert the City Tower controller to this fact until he was already established in the go-around. The City Tower controller only became aware of the situation when his attention shifted from watching the departing RJ1H to looking up the final approach at the inbound RJ85 which he saw in a climbing attitude. The City Tower controller's previous experience of missed approaches involving similar aircraft types led him into a false sense of security regarding the inbound RJ85's rate of climb and acceleration after the aircraft had executed the missed approach. The lateral distance between the RJ85 and the RJ1H rapidly eroded with a significant groundspeed differential between the two aircraft. The City Tower controller was slow to recognise the rate at which this separation was being eroded, and this caused him to consider that issuing avoiding action was unnecessary. Turning the outbound RJ1H onto a heading of 360°, although an attempt at positively controlling the situation, was less effective in restoring separation than had been the City Tower controller's expectation. Also, having formulated a plan to continue climbing the RJ85 to 3000ft, and on realising that the RJ85 had in fact stopped his climb at the Standard Missed Approach altitude of 2000ft, the controller became momentarily distracted. Separation was then lost when the RJ1H entered cloud whilst in the turn, just before both aircraft responded to TCAS RAs as the RJ85 passed 0.5nm astern the RJ1H, with a vertical separation of 100ft.

The nature of the operation at London City means that missed approaches are a relatively common occurrence, particularly if weather conditions conducive to windshear are present. If there is also a low cloud base, inbound traffic making a missed approach as traffic is departing can result in a loss of separation. The ATSU includes various missed approach scenarios as part its TRUCE (Training in Unusual Circumstances and Emergencies) plan for the recurrent training of ATCOs within the unit. Up until this particular event, turning the departing traffic early on the SID had been considered an effective means of restoring separation. However, as a result of this Airprox, the ATSU has concluded that issuing avoiding action is a more appropriate course of action in order to restore separation as soon as possible. In addition, although there is an awareness within the unit that pilot workload during a missed approach is high, and climbing straight ahead is preferable, should a controller deem it necessary in order to restore separation, issuing an avoiding action turn to pilots conducting a missed approach is considered appropriate.

After this Airprox the ATSU issued a Unit Safety Notice regarding the use of avoiding action. In addition, the ATSU is in the process of briefing the 'lessons learned' in this Airprox to all ATCOs

via the Unit Competency Examiners. The ATSU intends to reissue this guidance to all ATCOs before the start of the Winter 2016/17 season.

### **UKAB Secretariat**

The RJ85 and RJ1H 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>. Notwithstanding, in Class D (Controlled Airspace) it is the responsibility of the ATCU to separate IFR flights from other IFR flights.

### **Summary**

An Airprox was reported when a RJ85 and a RJ1H flew into proximity at 0830 on Monday 14<sup>th</sup> March 2016. Both pilots were operating under IFR in IMC, both pilots in receipt of an Aerodrome Service from London City Tower.

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

Information available consisted of 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 discussed the airspace surrounding London City Airport and the options available to the controller in such situations as this. The Terminal ATC member pointed out that the position of the aerodrome restricts the flexibility a controller has for deconfliction of aircraft going around due to the height of the local buildings to the South and the location of the visual circuit. These factors limit aircraft departing from RW09 to turning left only, as per the SID, and aircraft going around to initially maintaining straight ahead. It was further noted that there is a height restriction of initially 3000ft for departures due to Heathrow traffic, which restricts the missed approach to 2000ft. The Terminal ATC member further pointed out that, because the restricted airspace for London City required tighter than normal approach patterns, there is more likelihood of aircraft going around than at other aerodromes; as a result, ATCO's are very alert to the potential situation. Noting all these factors, members were concerned that the Missed Approach Procedure and the Standard Instrument Departure may not be fully compatible in that they could not always be independently flown procedurally without ATCO intervention (with limited options), as demonstrated in the circumstances of this Airprox.

The Board then moved on to the actions of the ATCO. They noted that he had expected the performance of the aircraft to be similar and was surprised that the aircraft going around had caught up so quickly with the departing aircraft ahead. Civil pilot members commented that the RJ85 pilot had in fact effectively conducted a discontinued approach rather than a missed approach *per se* and, because this was initiated earlier in the approach sequence, this accounted for the fact that the RJ85 would be considerably faster than if a missed approach had been conducted at decision height. The outcome had been that the time available for the ATCO to act had been much reduced, compounded by the late call from the RJ85 pilot due to the radio frequency being busy. The Board had much sympathy for the ATCO who had been placed in an unenviable situation with few options with which to resolve a conflict that he could see unfolding in front of him. Nevertheless, they considered it a contributory factor that the requirement for avoiding action had not been immediately evident to him. The Terminal ATC member reiterated that it was not viable for the ATCO to stop the climb of the departing aircraft to below 2000ft due to obstacle clearance and airspace restrictions. Equally, climbing the missed approach aircraft to above 2000ft in that location was fraught with difficulty due to Heathrow traffic in the airspace above. The Board thought that the best option would have been to turn the missed approach aircraft rather than the departing aircraft, but they noted that the ATSU procedures at the time guided controllers to turn the latter in preference because there were fears that asking the pilot of a 'going around' aircraft to turn might overload the pilot concerned. Civil pilot members commented that although this was a laudable aim, being already at 2000ft and stable, and having suggested a turn themselves, the RJ85 pilots would have likely had no issue with receiving an

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



avoiding action turn at that point. Finally with respect to ATC issues, the Board noted that the RJ85 pilot had not been able to make the relevant calls to ATC at the appropriate time because of R/T loading due to the frequencies being band-boxed; this had then contributed to the ATCO not having as early SA as he might have, and therefore losing precious seconds in recognising the requirement for avoiding action.

The Board then turned to the actions of the RJ85 pilot and the reasons for the discontinuing his approach. Although the turn onto the ILS seemed somewhat tight, it was pointed out that this was not unusual and that it seemed that in-cockpit distractions had been more prevalent in the resulting late configuration of the aircraft. Civil pilots are taught not to continue with unstable approaches, particularly given the steep glide path at London City Airport. Civil pilot members commented that, notwithstanding the imperative to go around as a result, it may have been wiser for the RJ85 pilot to have continued the approach to the missed approach point anyway before then going around. They opined that there was no need to go around immediately that the unstable approach was recognised but, instead, a call could have been made to ATC that they shortly intended to go around at the missed approach point, thus allowing ATC a measure of time to make appropriate arrangements for deconfliction. Also, by doing so, the go-around would be conducted at a slower starting speed and thus there would be less overtake on departing aircraft ahead. ATC members were very keen to understand the point at which a pilot will determine if the aircraft is going to carry out a missed approach procedure or perform a discontinued approach. The Civil pilot members said that the normal height for this is 1000ft; above this then a discontinued approach will be at greater speed than below 1000ft, when a missed approach would be conducted from a slower approach speed. The Board felt that the RJ85 pilot's decision to discontinue the approach where he had done so was a contributory factor in that it had resulted in his aircraft being at a higher speed, and hence catching up the RJ1H faster than expected.

Turning to the cause and risk of the incident, the Board's discussion weighed heavily on the fact that the 2 aircrafts' pilots had each followed their required procedures but that they had still come into conflict, in IMC, with few options for ATC to materially influence the outcome. In this respect, they recognised the ATCO had had little time to recognise and deal with the situation, and had done his best within local requirements to introduce at least some element of lateral separation once he had determined that the RJ85 was rapidly catching up with the RJ1H. With this in mind, the Board determined that the cause of the Airprox had been a procedural conflict in controlled airspace due in great part to the contributory factor that the MAP and SID did not appear to be compatible in these circumstances. Moving to the risk, the Board determined that although action had been taken to turn the RJ1H to avoid the RJ85, safety margins had still been much reduced below the norm; they assessed the incident as a Category B risk of collision.

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

Cause: A procedural conflict in controlled airspace.

Contributory Factor(s):

1. The Missed Approach Procedure (MAP) and the Standard Instrument Departure (SID) were not compatible in these circumstances.
2. The RJ85 pilot discontinued his approach rather than continuing to the Missed Approach Point to go-around, which resulted in him catching up with the RJ1H.
3. The requirement for avoiding action was not immediately evident to the ATCO.

Degree of Risk: B.