AIRPROX REPORT No 2014188

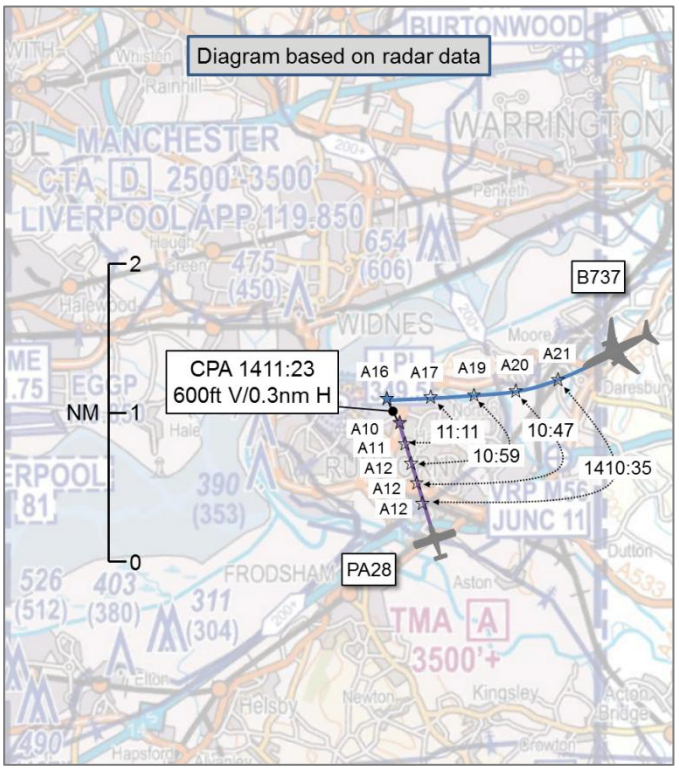
Date/Time: 21 Sep 2014 1411Z (Sunday)

Position: 5320N 00242W (5.3NM E Liverpool Airport - elevation 81ft)

Airspace: Liverpool CTR (*Class*: D)

Reporter: Liverpool Radar Controller

	Aircraft 1	*Aircraft 2*
Type:	B737	PA28
Operator:	CAT	Civ Trg
Alt/FL:	1600ft QNH (1026hPa)	1200ft QNH (1026hPa)
Conditions:	VMC	VMC
Visibility:	10km	NK
Reported Separation:	400ft V/>1nm H	NK V/2nm H
Recorded Separation:	600ft V/0.3nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE LIVERPOOL (LPL) APPROACH RADAR CONTROLLER reports having been on duty for one hour in a busy and complicated session. At 1358, the PA28 pilot called for a transit routing Whitegate (WHI) - LPL NDB - Kirkby (KBY). He was advised that it might not be possible to give him the requested crossing clearance due to inbound traffic; however, it might be possible to accommodate an overhead crossing. He was issued with a Control Zone (CTR) entry clearance at Oulton Park at 1500ft, VFR; however, the controller did not ask the pilot to report entering Controlled Airspace (CAS). The controller commented that a few complicated scenarios and calls then distracted him from watching the Oulton Park area closely. At approximately 1411, just after the B737 pilot was instructed to turn onto final approach to RW27, a 4360 squawk was noticed 1nm south of final approach at 1100ft tracking north; because 80% of his workload was occurring in the northwest portion of CAS, the controller had previously believed the traffic to be one of the inbound VFR aircraft passed to Aerodrome Control earlier (the 4360 squawk had not been positively identified because the pilot had not reported entering CAS). Traffic Information was called to the B737 pilot regarding the 4360 squawk, and he was issued with a heading of 330°. At this point the two aircraft were 1nm horizontally and 800ft vertically apart. Because the B737 pilot was already established on the ILS and descending, the controller's instinctive decision at the time was to turn the aircraft away from the unknown traffic; with hindsight, because Traffic Information had been passed and the aircraft were under IFR/VFR respectively, he thought that it might have been better to have let the situation continue. As it happened, the B737 pilot did not take the turn instruction and instead executed a missed approach climb straight ahead to 2000ft. Throughout the incident there were multiple 'climb-throughs' with aircraft to the northwest, a departure from Hawarden, multiple RTF and telephone calls, as well as the ATC Assistant asking if Hawarden could have a specific clearance via Wallasey for their departure, which was declined. The Radar Controller asked the Aerodrome Controller if the unknown aircraft was with him and if it could be seen; it was not observed. The PA28 pilot then reported at the LPL NDB. The controller advised him that he had not been cleared to the LPL NDB, and to route southbound clear of the final approach track to RW27. The PA28 pilot was subsequently instructed to take up an easterly track and then proceed north in the Manchester Low Level Corridor. The B737 pilot was asked if he had received a TCAS alert on the traffic. He reported sighting it on TCAS but had not received an RA. During a later telephone discussion, the B737 pilot reported that

he had in fact received a TCAS RA with a vertical resolution. With hindsight the controller realised that the PA28 pilot should have been requested to report entering CAS and possibly given a discrete SSR code. The controller commented that it had been 'extremely' busy when this event happened.

THE B737 PILOT reports that he was inbound to LPL under IFR in VMC. 'Standard' lighting was illuminated; SSR Modes C and S were selected; TCAS was carried. He was established on final approach for the ILS RW27. At approximately 5nm, ATC advised the crew of a light aircraft in their 9 o'clock position, which they said had entered CAS without permission he recalled. They received a TCAS TA, and the safety pilot was able to identify the aircraft which appeared to be tracking towards the LPL NDB in their 9 o'clock position. They then received further information from the Tower Controller (he recollected), and a 'Monitor Vertical Speed' TCAS RA activated. He elected to 'go-around' and the aircraft was flown to the missed approach altitude of 2000ft. They reviewed the situation and advised ATC that they had gone around due to the light aircraft, although they did not report a TCAS RA. The second approach was flown without incident. He spoke to Liverpool ATC regarding the lateral and vertical separation. They estimated that it was less than 1nm and about 400ft, although full confirmation of the actual distances were not available at the time. They advised him that they would file a full report regarding the incident. He advised them that he had in fact received a 'Monitor Vertical Speed' TCAS RA.

THE PA28 PILOT reports that he was on a cross-country VFR training flight transiting the LPL CTR and in contact with LPL Radar. A red anti-collision light on the tail was illuminated; SSR Modes C and S (elementary) were selected; a TAS was not fitted. He initially contacted LPL Radar south of Chester VRP. He passed all his details and requested a Zone transit routing Whitegate (WHI) NDB - LPL NDB - Kirkby VRP not above 1500ft, as he had done many times in the last twelve years operating in the area. After clarifying his registration, the controller issued him with a clearance to enter the CTR via Oulton Park VRP not above 1500ft QNH. The controller stated that it was not certain a clearance would be issued to clear him on his exact intended routing, but he would 'see how it went'. He read back his clearance to enter the LPL CTR via Oulton Park and stated that any route through the Zone to his destination would be acceptable. His student was the handling pilot and, on reaching Oulton Park, verified their position, tuned in and identified the LPL NDB before turning towards it on a heading of approximately 350°. Shortly before his second intended way-point (LPL NDB), he told his student that it looked like LPL ATC had forgotten them and that they would orbit whilst they obtained clarification on what to do next. Just prior to entering a right-hand orbit they both gained visual contact with the other aircraft on approach to LPL RW27. His student continued the right-hand orbit and Traffic Information about them was passed to the other pilot, who reported 'going around'. After a short conversation with the Radar controller it was apparent that they had been forgotten and he was given two headings to exit the CTR towards the Manchester Low Level Corridor.

He assessed the risk of collision as 'None'.

Factual Background

The LPL weather was:

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211350 01007KT 9999 SCT045 17/08 Q1026
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Analysis and Investigation

CAA ATSI

ATSI had access to Liverpool RTF and radar together with area radar recording, the controller's report and the PA28 pilot's written report. The Airprox occurred at 1411:20, 5.3nm east of LPL on final approach to RW27 within the Class D controlled airspace of the LPL CTR, between a B737 and a PA28. The B737 pilot was operating an IFR flight inbound to LPL and was in receipt of a Radar Control Service from LPL Radar. The PA28 pilot was operating VFR on a flight to Blackpool and was in receipt of a Radar Control Service, also from LPL Radar.

The LPL Radar controller's workload and RTF loading was assessed as high, although traffic loading was assessed as medium. The controller was operating with an assistant. There were three IFR inbound flights, one IFR outbound, a number of VFR movements, a survey aircraft operating within the CTR, and an expected Hawarden IFR departure. There were no reported unserviceabilities. Training was taking place in the Aerodrome position and Ground Movement Control (GMC) was being operated.

At 1358:10, the PA28 pilot contacted LPL radar and was instructed to 'say again' due to background noise. The pilot was then instructed to squawk 4360 (LPL conspicuity code). At interview the controller explained that visitors in the operational room had been talking. This, combined with carrying out coordination, had been distracting at the time. The PA28 pilot reported en route to Blackpool, 8nm south of Chester at 2000ft, requesting a routeing via WHI - LPL (NDB)[1] - Kirkby. The controller cleared the PA28 pilot to enter CAS via Oulton Park[2], not above altitude 1500ft VFR on QNH 1026hPa, which was acknowledged correctly. The controller added *"and* [PA28 C/S] *I may not be able to get you a LPL crossing but we'll be able to cross you possibly over the head er the airfield but will keep you advised on that due inbound traffic".* The PA28 pilot advised that he was happy with any crossing route.

At interview the controller recognised that no specific clearance limit or routeing had been given to the PA28 pilot, the intention had been to instruct him to report at the zone boundary prior to giving a routeing update, subject to the inbounds. As workload increased the controller then became involved in a number of tasks; VFR aircraft leaving or entering CAS; Aerodrome Control passing a departure time, and the assistant notifying Hawarden's request for a Wallasey departure route which was in conflict with the survey aircraft. Aerodrome Control then requested a release on an IFR departure; the controller issued a departure clearance but advised *"not yet released"*.

At 1401:40, the B737 pilot contacted LPL radar and was advised to expect an ILS approach for RW27 right-hand pattern, number one with no ATC speed restriction. A second IFR inbound contacted LPL radar and was sequenced number two. The B737 pilot was descended to 4000ft and, at 1402:20, was given a left turn 090° to position downwind right-hand. The PA28 was 15nm southeast of LPL. The controller contacted Aerodrome control and released the outbound IFR departure and then contacted Scottish Control (WAL) sector to coordinate its climb to FL080 against a third inbound descending to FL090.

At 1404:43, the PA28 pilot entered CAS at 1400ft and shortly afterwards the B737 pilot was descended to 2500ft downwind right-hand. (Figure 1.)

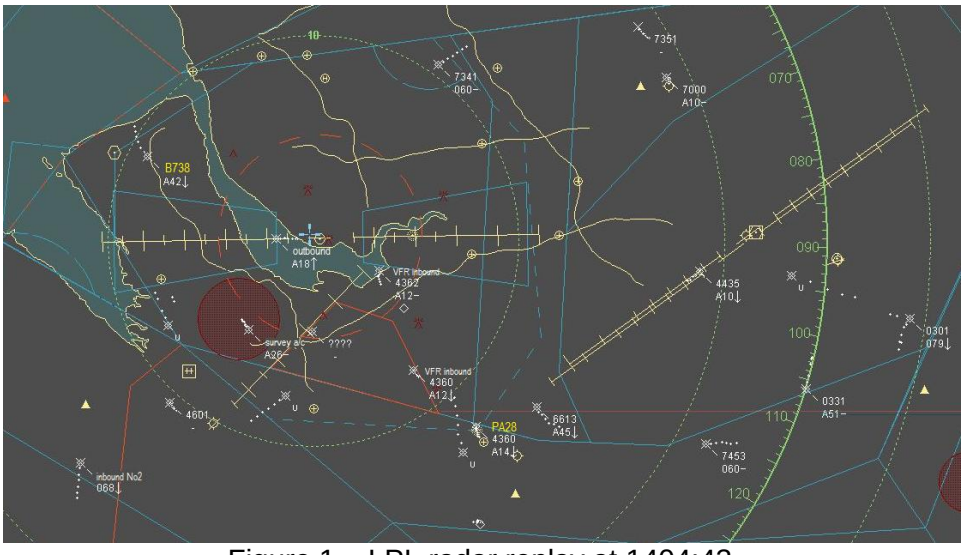

Figure 1 – LPL radar replay at 1404:43

[1] Approximately 4nm east of airport.
[2] Motor racing track, approximately 13nm southeast of LPL, 1nm south of WHI.

At 1408:10, the controller answered a telephone call from Hawarden ATC and initially commented about the increased workload before confirming a release which had been requested earlier by Hawarden ATC. A discussion occurred regarding the survey aircraft in conflict with the Hawarden departure and, during the conversation, at 1408:40, the controller transmitted *"*[B737 C/S] *turn right heading one eight zero degrees base leg, descend to altitude two thousand feet."* The controller ended the conversation with Hawarden ATC as the B737 pilot acknowledged the turn and descent instruction.

The controller then gave heading and level instructions to the No 2 aircraft in the sequence. Meanwhile a Hunter and Canberra formation at 6000ft called LPL radar looking for a cloud break. The controller did not respond to the call and, at interview, explained that workload was such that he had initially attended to calls of a higher priority. At 1409:40 he gave the B737 pilot a right turn onto a closing heading of 240° and a clearance for the ILS approach. (Figure 2.)

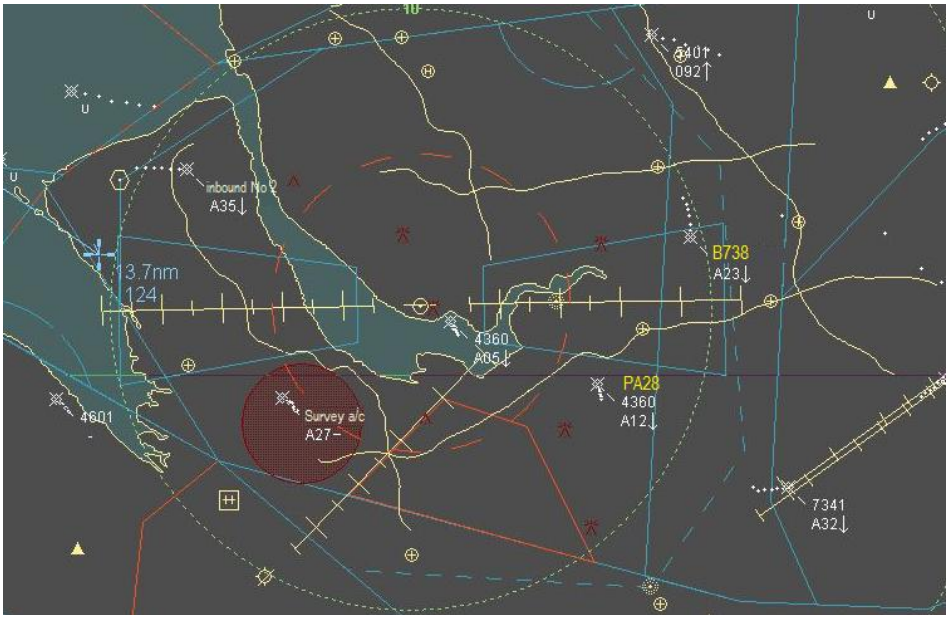

Figure 2 – LPL radar replay at 1409:41

The survey aircraft then called LPL radar requesting a routing further west to hold outside CAS for 10min prior to returning to LPL. This was approved by the controller and, at 1410:26, Hawarden ATC called to advise that their departure was holding on the runway for 2min, which was approved and Hawarden ATC were advised about the survey aircraft's intentions. (Figure 3.)

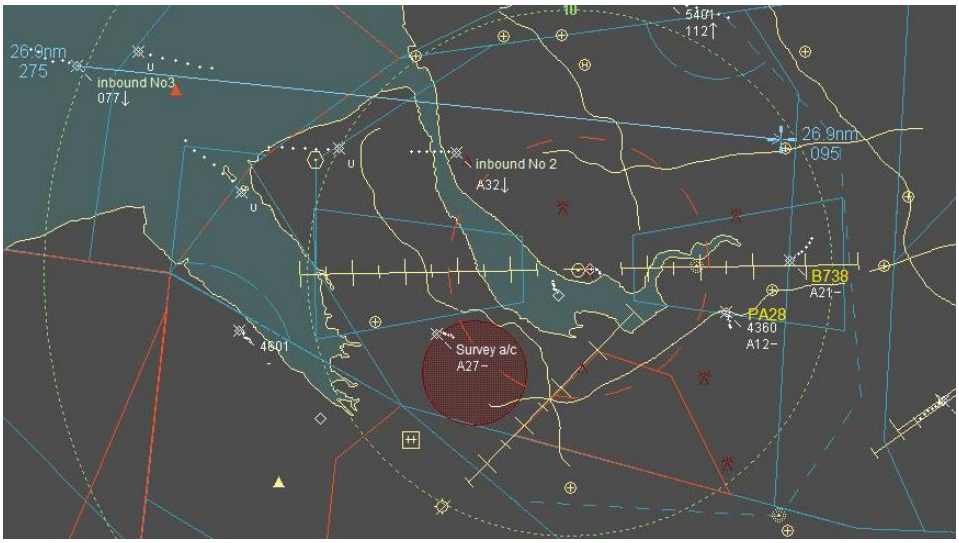

Figure 3 – LPL radar replay at 1410:26

The formation called again and the controller transferred the IFR outbound to Scottish Control. At 1410:50, the B737 pilot reported established. The controller responded *"*[B737 C/S] *Liverpool radar er roger and er traffic just observed just to the er south of a five mile final er indicating altitude one thousand one hundred feet at the moment tracking northbound eh turn right heading of er three three zero degrees* [1411:20]*".* This call was not acknowledged by the B737 pilot. The aircraft labels had merged and at the end of the transmission, the two aircraft had passed abeam (CPA) at a horizontal distance of 0.45nm and a vertical distance of 600ft. (Figure 4.)

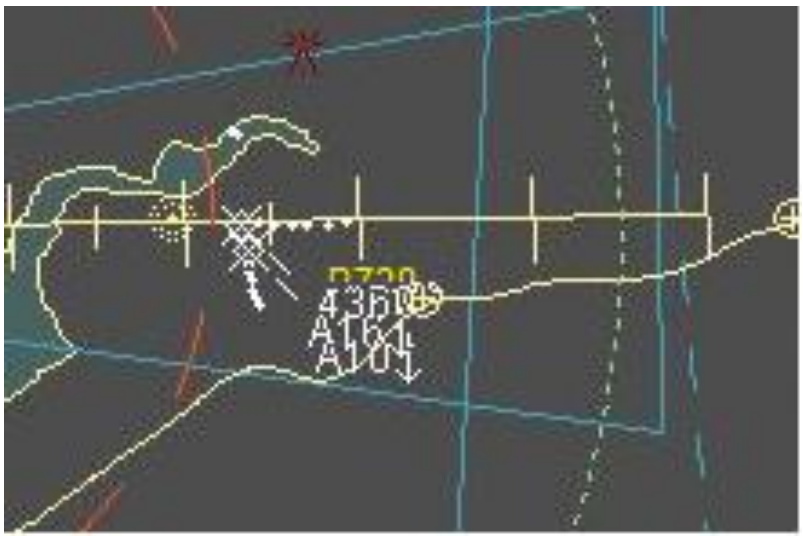

Figure 4 – LPL radar replay at 1411:20

At interview the controller recalled that when the B737 pilot had reported established his attention was drawn to the 4360 squawk and the controller, initially considering this to be one of a number of VFR inbounds, then contacted the Aerodrome controller *"Who's that on the bottom of that* [B737 C/S]*".* The Aerodrome controller responded *"I have no idea"*. The Radar controller then asked the Aerodrome controller if anything could be seen from the Visual Control Room (VCR).

In discussion during the interview the Radar controller was asked why 'avoiding action' had not been used. The controller indicated being surprised at the time and the controller's immediate response had been to turn the B737 pilot right, away from the confliction. However, in the same instant the controller had re-assessed the traffic situation and determined that: a right turn would have required the use of 500ft separation with the following inbound; a left turn was towards the PA28 and survey aircraft; and he judged that as the two aircraft had almost passed abeam, straight ahead was in fact the best option. The Radar controller was therefore not concerned when the B737 pilot did not acknowledge the turn instruction and continued straight ahead.

Meanwhile the PA28 pilot transmitted "[PA28 C/S] *that's us just approaching the Lima Papa Lima are we cleared all the way"*. The controller instructed the PA28 pilot to route southbound to remain south of the final approach track and advised him that he had not been cleared to the LPL. The PA28 pilot responded *"Oh copy that er we were cleared into controlled airspace"*. The Radar controller replied *"Affirm you were but not to the Lima Papa Lima"*. The B737 pilot started to climb and, at 1412:14, reported going around. The B737 pilot was instructed to continue straight ahead to 2000ft.

At interview the controller was very concerned and disappointed at the error and reasoned that having given a clearance to enter the CTR but having been uncertain about the routeing, the PA28 pilot should have been given a clearance limit or asked to report at the boundary for onward clearance. The controller recalled becoming very busy and momentarily forgot about the PA28 and, because of the generic conspicuity squawk, considered it to be one of a number of VFR inbounds in communication with the Tower. The controller also considered it unfortunate that the PA28 pilot had not reported entering the zone or asked for confirmation of his routeing. The

controller also explained that the flight progress strip had been placed in the pending bay prior to the PA28 entering the zone and therefore was not prominent.

The Liverpool ATSU made the following observations:

The Radar controller did not exercise positive control with regard to the transit aircraft. The impact of this was that the aircraft was not given a positive route clearance to help deconflict from arriving traffic inside controlled airspace, no reports were asked for nor where there any safety nets added e.g. clearance limit of the M56.

Although the opportunity to split the position was not really viable due to the sudden increase in workload, the management of the position could have been better handled and perhaps allowed the controller more time to focus on the traffic situation.

The use of the LPL conspicuity code did not assist the controller with positive identification of the transit, this is indicated by the confusion associated with the track.

It would appear that it has become 'custom and practice' for VFR flights to request routing in relation to IFR facilities, in this case WHI NDB to LPL NDB. In turn ATC are clearing VFR aircraft along such routes. This is not deemed appropriate and does not support the philosophy of VFR flight with regard to terrain avoidance and navigation.

In consultation with CAA SARG the Liverpool ATSU has issued:

MATS Part 2 Supplementary Instruction 11/2014 to ensure that controllers:

Allocate a discreet code to VFR and IFR CTR/CTA transit aircraft.

Do not issue give VFR flights a routeing that relates to navigational aids i.e. LPL, WHI and or WAL irrespective of the pilot's request.

Additionally, the following Safety Reminders were published:

Safety Reminder 001/2014 to remind operational staff about existing procedures regarding 'strategies for managing distractions'.

Safety Reminder 002/2014 to remind operational staff about existing procedures regarding 'the management of traffic overload situations'.

CAA ATSI are content with the actions already taken by the Liverpool ATSU.

UKAB Secretariat

CAP 493 (Manual of Air Traffic Services (MATS) Part 1, Section 1, Chapter 2 and Section 1, Chapter 6, Paragraph 1B.2 state:

'The minimum services to be provided by ATC in Class D airspace are:

(a) Separate IFR flights from other IFR flights;

(b) Pass traffic information to IFR flights on VFR flights and give traffic avoidance advice if requested;

(c) Pass traffic information to VFR flights on IFR flights and other VFR flights.

[3]Separation standards are not prescribed for application by ATC between VFR flights or between VFR and IFR flights in Class D airspace. However, ATC has a responsibility to prevent collisions between known

[3] Section 1, Chapter 5, Control of VFR flight.

flights and to maintain a safe, orderly and expeditious flow of traffic. This objective is met by passing sufficient traffic information and instructions to assist pilots to 'see and avoid' each other.

Instructions issued to VFR flights in Class D airspace are mandatory. These may comprise routeing instructions, visual holding instructions, level restrictions, and information on collision hazards, in order to establish a safe, orderly and expeditious flow of traffic and to provide for the effective management of overall ATC workload.

Routeing instructions may be issued which will reduce or eliminate points of conflict with other flights, such as final approach tracks and circuit areas, with a consequent reduction in the workload associated with passing extensive traffic information. VRPs may be established to assist in the definition of frequently utilised routes and the avoidance of instrument approach and departure tracks. Where controllers require VFR aircraft to hold at a specific point pending further clearance, this is to be explicitly stated to the pilot.'

'Pilots must be advised if a service commences, terminates or changes when:

outside controlled airspace;

entering controlled airspace.'

Both pilots shared an equal responsibility to avoid collision and not to fly into such proximity as to create a danger of collision[4]. Because the two aircraft were on converging flight paths, the PA28 pilot was required to give way to the B737[5].

Summary

The Airprox occurred in Class D airspace of the LPL CTR between a B737 under IFR and a PA28 under VFR; both pilots were being provided with a Radar Control Service. In Class D airspace, ATC are not required to ensure standard separation is achieved between VFR and IFR flights. The LPL Radar controller issued the PA28 pilot a clearance to join the CTR without specifying a route or a clearance limit. This non-specific instruction allowed the PA28 pilot to enter CAS and come it into conflict with the B737 which was being positioned for an ILS approach to RW27. The controller's workload increased rapidly and resulted in him forgetting to update the PA28 pilot's routeing. The B737 pilot was issued with Traffic Information about the unknown aircraft (the PA28) and was given a right turn away from the aircraft. The B737 pilot received a TCAS RA to monitor vertical speed and decided to carry out a missed approach. The minimum separation was recorded as 0.3nm horizontally and 600ft vertically.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board first discussed the actions of the B737 pilot and noted that during the incident he had received a TCAS RA 'Monitor Vertical Speed'. A Civil Airline Pilot commented that although 'Monitor Vertical Speed' RAs always require the pilot to avoid the displayed prohibited vertical speeds, typically, they do not require a change in vertical speed. However, on this occasion the conflicting traffic was below the B737 on the ILS approach and so the RA would likely have precluded descent which would have resulted in deviation above the Glide Path. Consequently, the pilot could have been placed in a position where his approach would have been 'unstable' and so it was considered appropriate for the pilot to carry out a missed approach at that time. Board members wondered why the pilot had not reacted to the ATC instruction to turn. The Civil Airline Pilot member explained that, once established, discontinuing an ILS approach and then turning leads to a high workload with a relatively unmanoeuverable aircraft after the Auto-pilot has been de-selected; the safer option was to go around straight ahead.

[4] Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions).
[5] Ibid., Rule 9 (Converging).

The Board then considered the actions of the Liverpool Radar controller. The Board noted that the controller was undoubtedly busy at the time. Additionally, in the period leading up to the Airprox, there had been visitors in the VCR and the associated high noise levels were reported by the controller as being a distraction. Nevertheless, Civil ATC members were surprised that the controller had not taken more positive action to control the entry of the PA28 into the CTR. They opined that the controller should have issued a specific route to the PA28 pilot, an appropriate Clearance Limit, and a discrete SSR code (rather than the unit conspicuity code) in order to allow the controller to identify the aircraft and subsequently follow its progress. The Board believed that the controller's intention was to return to the PA28's flight to give its pilot instructions but workload and distractions had prevented this action; had he instructed its pilot to report at the CTR boundary, this would have reminded him of the aircraft's presence and appropriate action could then have been taken. Finally, the Board noted that, within Class D airspace, Traffic Information should be passed to the pilots of IFR and VFR flights to facilitate deconfliction. Because the PA28 had not been identified it had not been possible to issue Traffic Information to its pilot about the B737; this also resulted in delayed Traffic Information being passed to the B737 pilot about the PA28.

The Board then discussed the actions of the PA28 pilot and, although some thought he had left it a little late to take action as he approached the runway approach path, they commended him for realising that the presence of his aircraft had probably been overlooked by the controller and, rather than continue his flight through the RW27 approach path, instructing his student to orbit and obtain further clarification of his route. Notwithstanding, they noted that, even in Class D airspace, in the converging circumstances that pertained it was for the PA28 pilot to maintain a good lookout and to give way to the B737, which he did, albeit quite late.

The Board then discussed the cause of the Airprox. It was apparent that the Liverpool Radar controller did not sufficiently control the PA28's entry into the CTR and that this had allowed the PA28 pilot to fly into conflict with the B737; this was considered to be the cause the Airprox. The Board decided that the controller's high workload and control room distraction due to the visitors had affected his decision making and was, therefore, a contributory factor. This all resulted in the Liverpool Radar controller not issuing positive routeing or a clearance limit to the PA28 pilot, not maintaining positive track identification on the PA28, and not passing Traffic Information. These were all considered to be additional contributory factors to the Airprox.

In considering the risk, the Board noted that both pilots had taken action to avoid a collision, and that at the closest point of approach the two aircraft were separated by 600ft and 0.3nm. Several members considered that the pilots' actions and the minimum vertical distance between the two aircraft indicated that there was no risk of a collision, which meant that the Airprox might be categorised as Risk C. However, a majority of members opined that the situation, within CAS, was not under control. Neither pilot had been issued with timely Traffic Information and both would, quite reasonably, have not been expecting conflicting traffic within CAS that had not been advised. It was considered that it had been fortuitous that the PA28 pilot had sighted the B737 when he did, and that the B737 pilot had been given just enough time to assimilate the Traffic Information and react quickly. Consequently, it was considered that safety margins had been much reduced below the normal and that the Airprox should be categorised as risk Category B.

The Board were pleased to note that Liverpool ATSU have taken appropriate action following the Airprox to assist in preventing a similar incident occurring in future.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Liverpool Radar controller allowed the PA28 to fly into conflict with the B737.

Contributory Factors: 1. The Liverpool Radar controller's high workload and control room distraction.

2. The Liverpool Radar controller did not issue positive routeing or clearance limit to the PA28 pilot.

3. The Liverpool Radar controller did not maintain positive track identification on the PA28 or pass Traffic Information.

Degree of Risk: B.

ERC Score[6]: 50.

[6] 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.