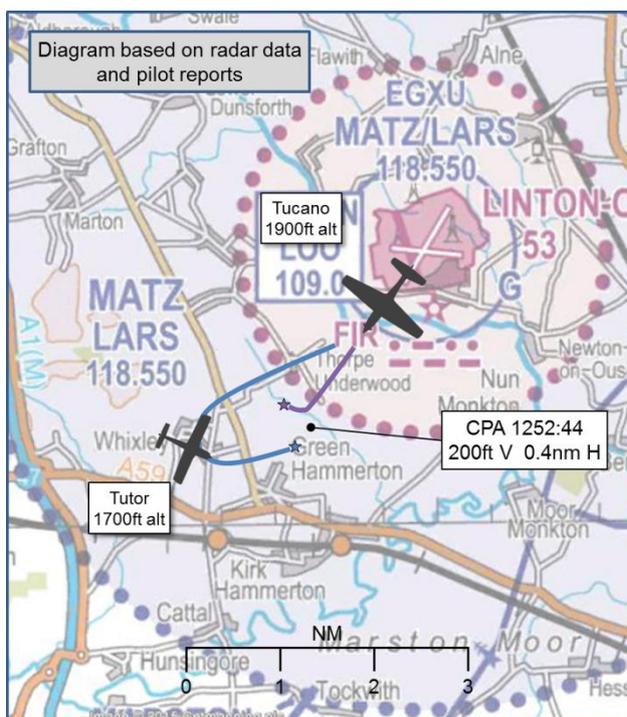


AIRPROX REPORT No 2014219Date/Time: 21 Nov 2014 1252ZPosition: 5400N 00117 W
(Linton-on-Ouse)Airspace: VOY AAIA (Class: G)Aircraft 1 Aircraft 2Type: Tutor TucanoOperator: HQ Air (Trg) HQ Air (Trg)Alt/FL: 1800ft 1900ft
QNH (1016hPa) NK (1019hPa)Conditions: VMC IMCVisibility: 6km 6kmReported Separation:

0ft V/500m H 300ft V/1nm H

Recorded Separation: 200ft V/0.4nm H**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

THE TUTOR PILOT reports flying a predominately white aircraft with navigation, landing lights and strobes illuminated and SSR on with Modes 3A, C and S selected. The aircraft was fitted with a TAS. He was originally intending to transfer tower-to-tower from Linton to Dishforth, but was informed that the Dishforth circuit was unavailable, so he informed the Tower controller that he intended to enter the radar pattern instead. He was given departure instructions to maintain runway heading he recalled [in fact he was cleared to maintain runway track], climb to 2000ft, and contact Director. Once airborne he levelled at 1800ft under instructions from ATC and remained clear of cloud. As he levelled he was given the instruction to turn left heading 090° and, on rolling out, noticed the indication on his TAS of an aircraft in his left 9 o'clock. On looking left he saw a Tucano taking evasive action in a right-hand turn, co-altitude. No RT communication was heard between ATC and the Tucano, and he hadn't received Traffic Information, so he asked the Director the intentions of the Tucano. He was told that it was departing traffic. He reported that he was visual with the Tucano as it turned right but, had it not turned, it would have passed only 300m behind and 200ft above. He believed that the strong headwind meant that he had a relatively slow ground-speed that had allowed the Tucano to catch up with him in the climb.

He assessed the risk of collision as 'Medium'.

THE TUCANO PILOT reports flying a black aircraft with all lights illuminated and SSR on with Modes 3A, C and S selected. The aircraft was fitted with TCAS. He was given clearance to "line-up and wait" by the tower controller in order to build-in radar separation from the aircraft departing ahead. His clearance was to turn left heading 120° and climb to 4000ft. Take-off clearance was obtained and, just after take-off, he was given a change to the departure clearance to maintain runway track. Passing 1200ft, and on runway track, he switched to the departures frequency, called the controller and requested a Deconfliction Service because he was IMC. He was immediately given the instruction "avoiding action, turn right immediately, heading 290°, traffic 1nm, 300ft". Concerned by the proximity of this aircraft he rolled and pulled hard to the right onto the assigned heading. On rolling out he asked the controller to confirm the separation distance from the aircraft and the controller again stated that it was 1nm and 300ft. However, throughout the incident he did not see the other aircraft; he assumed it to be the Tutor that had departed ahead of him. He did not remember hearing a Traffic Alert from his TCAS, although he did recall seeing "a number of tracks" on it.

He assessed the risk of collision as 'Medium'.

THE LINTON GROUND CONTROLLER reports taking over the Ground position at 1230, having previously been the Tower controller for the morning. It was busy with a constant stream of taxiing aircraft. All Tucano departures were IFR and required pre-noting to Departures, in addition there were two Tutors who were departing straight into the radar pattern. It was obvious that the radar positions were going to get very busy. Shortly afterwards, the Airprox Tutor taxied to transit VFR to Dishforth; however, on speaking to Dishforth Tower, he was informed that the circuit was not available as there was a rotary aircraft using it for 40 minutes. The Tutor then elected to join the radar pattern and was pre-noted to Director accordingly. Although the flight log and board didn't get amended, the aircraft's pin was placed in the IFR tray.

He assessed the risk of collision as 'Low'.

THE LINTON DIRECTOR reports controlling a busy radar pattern to RW21RH with 4 aircraft on frequency. When identifying the Tutor on departure he noticed that he was indicating right of the climbout track and so he instructed him to turn left heading 090° on passing 1400ft in order to sequence the pattern. He then focussed his attention on other aircraft in the pattern as the Tutor ahead was unable to maintain VMC at the pattern height of 2000ft. The Airprox Tutor pilot then asked the intentions of the aircraft that had just passed close to him and, at that point, the controller noticed a Departures' SSR squawk to the north of the Tutor, after assessing the relative positions of the two aircraft he decided that no action was required because the conflicting track was now northwest and above, so he informed the pilot that it was departing traffic.

He perceived the severity of the incident as 'High'.

THE LINTON DEPARTURES CONTROLLER reports having a steady stream of VFR and IFR departures, most of whom requested a Deconfliction Service on climbout. The Tutor was on the flight-log as a tower-to-tower Dishforth departure and, although his change of intentions was pre-noted to Director, the Departures controller was not aware of it. However, he saw it get airborne with a Director assigned SSR code and so quickly assimilated that it would be turning left into the radar pattern. The Tucano was pre-noted as requiring a left turn onto 120°, and he knew there would be a 2 minute IFR separation (Linton procedures require 2 mins separation for a Tucano following a Tutor on an IFR departure) but, as an extra precaution, he instructed ADC to impose a 'maintain runway heading' restriction on the Tucano. However, the Tutor was drifting west on departure and his late turn into the radar pattern put him into conflict with the Tucano, who was climbing up through his level. On initial contact the Tucano pilot asked for a Deconfliction Service and so, using SSR, the controller quickly identified him and gave deconfliction advice to turn right onto a heading of 290° to prevent a possible collision. He estimated the aircraft were within 300ft and half a mile at their closest point.

He perceived the severity of the incident as 'High'.

THE LINTON SUPERVISOR reports that he had just taken over the watch, he assessed the unit's workload as high and the controllers' workload as medium-high. The weather was poor; it appeared worse than the METAR suggested, and at 1244z an aircraft had reported the visual circuit was marginal at 1000ft. There was a low cloud base with poor visibility, and integration between the radar circuit and the visual circuit was challenging. The Supervisor was in the VCR, liaising with the Duty Aircrew Officer about the flying state and its effect on the Director, who was busy working prematurely returning aircraft. He could hear in the background that Ground was dealing with the Tutor who had changed his departure details due to the Dishforth circuit not being available. He heard the Tutor being cleared for departure and the Tucano held on the runway for the standard two minutes separation. As the Tucano was cleared for take-off, the Ground Controller put his hand on the shoulder of the ADC and passed the message from Departures that the Tucano should maintain runway heading. The Supervisor then hurried down to the ACR to see what was happening. He could immediately see that the Director was busy, Approach was holding traffic for him, and he was conducting a non-standard radar pattern because the Tutor in the radar pattern couldn't maintain VMC at normal pattern height and needed a height below the radar vector chart. This was acting as a capacity drain, and so the Supervisor was discussing with the SATCO (who had entered the ACR

on another matter), the merits of enforcing a temporary “no radar training circuit” for a short time. This was deemed unnecessary. The Supervisor could see that the wind had blown the Tutor north of the runway track and the turn the Director had given it to position into the radar pattern took him back through the climb-out lane. He then heard the Departures controller issue avoiding action and deemed that there was no need to intervene as appropriate action had been taken to resolve the conflict.

Factual Background

The weather at Linton on Ouse was reported as:

METAR EGXU 211250Z 13008KT 6000 HZ BKN017 OVC024 08/06 Q1018 WHT NOSIG

Analysis and Investigation

Military ATM

The RAF Linton-On-Ouse Flying Order Book (FOB) details Flight Rules and IFR standard separation in para D210, as per below:

7. *Flight Rules.*

b. IFR. All IFR departures will be subject to standard IFR separation. In colour codes BLU or WHT a Traffic Service will automatically be provided unless the pilot requests Deconfliction Service on initial contact. Radar vectors under a Traffic Service will only be provided on climbout when the ac has passed 1500ft and is above the RVC. Therefore, all ac on an IFR departure are to maintain Rwy track until passing 1500ft QFE before turning in accordance with ATC instructions or accepting own navigation.

8. *Separation Standards.* IFR departures will not be released until one of the following occurs:

a A minimum of one minute has elapsed if both ac are of the same type on the same departure track or SID or 2 mins has elapsed for a Tucano ac departing after a Tutor ac.

b. The first ac has reported established on a heading at least 40° divergent from the intended heading of the second ac.

c. The first ac has reported passing a height, altitude or flight level 1000ft above that which can safely (in respect to safety altitudes and other traffic) be applied as a climb-out restriction to the second ac.

Portions of the tape transcript from Ground, Tower, Director and Departures are below:

To	From	Speech	Time
Tutor	Ground	[Tutor c/s], there is a rotary in the circuit at Dishforth for the next 40 mikes.	12:39:48
Ground	Tutor	Roger, can I change my departure please? I would like to go straight to radar pattern.	12:39:55
Tutor	Ground	[Tutor c/s], standby.	12:40:02
Director	Ground	Ground, [Tutor c/s], now taxi's for the RTC.	12:40:15
Ground	Director	[Tutor c/s], standard, squawk 4503.	12:40:19
Director	Ground	4503, stud 5, standard RTC, Ground.	12:40:22
Ground	Tucano	[Tucano c/s], request left turn, correction right turn heading 120 degrees, altitude 4000 feet, [Tucano c/s].	12:43:26
Dep	Ground	Requesting left turn heading 120, climbing 4000 feet, back to Cranwell.	12:44:54
Ground	Dep	Left 210 did you say?	12:45:02
Dep	Ground	Left 120 yeah.	12:45:04
Ground	Dep	[Tucano c/s] left turn heading 120 degrees, climb 4000 feet, squawk 4520, stud 3.	12:45:06
Tutor	Tower	[Tutor c/s] climb on runway track height 2000 feet, squawk 4503, when airborne Stud 5 for Director.	1245:34

Tutor	Tower	[Tutor c/s]	12:48:47
Tucano	Tower	[Tucano c/s] line up and wait, awaiting IFR separation.	12:49:00
Director	Tutor	Director, good afternoon, [Tutor c/s], passing 1500, request Traffic Service.	12:50:34
Tutor	Director	[Tutor c/s], Linton Director, good afternoon, identified, Traffic service. Suggest stop climb 1800 feet to maintain VMC, from 1 ahead, [Tutor c/s].	12:50:40
Director	Tutor	That's copied, 1800 stop from 1 ahead, [Tutor c/s].	12:50:49
Tutor	Director	[Tutor c/s], turn left heading 090 degrees.	12:51:23
Tucano	Tower	[Tucano c/s] cleared for take-off, surface wind 120 8 knots.	12:51:04
Ground	Dep	Deps, can Lima [Tucano callsign] maintain runway track.	12:51:18
Dep	Ground	[Tucano c/s] maintain runway track, just been given clearance to take-off.	12:51:22
Director	Tutor	090, [Tutor c/s].	12:51:26
Tucano	Tower	[Tucano c/s], instructions from downstairs, maintain runway track on departure please.	12:51:38
Tower	Tucano	Maintain runway track on departure, [Tucano c/s].	12:51:42
Tower	Tucano	[Tucano c/s], maintaining runway track, to Departures, 281x82	12:52:00
Tucano	Dep	[Tucano c/s], Linton departures, identified, Deconfliction Service. Avoiding action, turn right immediately heading 290 degrees. Traffic 12 o'clock, 1 mile, crossing right left heading, indicating 300 feet above.	12:52:22
Director	Tutor	[Tutor c/s], just confirm the intentions of the one in my left, 10 o'clock.	12:52:34
Tutor	Director	[Tutor c/s], standby, it looks like its just departing.	12:52:42
Dep	Tucano	Roger and now heading 290. How close did I get to that aircraft? [Tucano c/s].	12:52:42
Tucano	Dep	[Tucano c/s], probably about 1 mile	12:52:49
Dep	Tucano	That's copied	12:52:51
Tucano	Dep	[Tucano c/s], clear of traffic, turn left 180 degrees.	12:52:54
Tutor	Director	[Tutor c/s], appears to be a departure, he's slightly above you now and tracking North West away.	12:52:55
Dep	Tucano	Left 180 degrees.	12:52:57
Director	Tutor	That's copied, [Tutor c/s].	12:53:00
Director	Tutor	Confirm my heading, 090	12:53:12
Tutor	Director	[Tutor c/s], affirm.	12:53:15
Dep	Tucano	Confirm I was within 1 mile and 300 feet, [Tucano c/s].	12:53:18
Tucano	Dep	[Tucano c/s], about that, yes.	12:53:22

At 1250:34 (Figure 1), the Tutor called airborne passing 1500ft and was placed under a Traffic Service by Director; the standard RTC profile at Linton was to climb on runway track to 2000ft QFE.

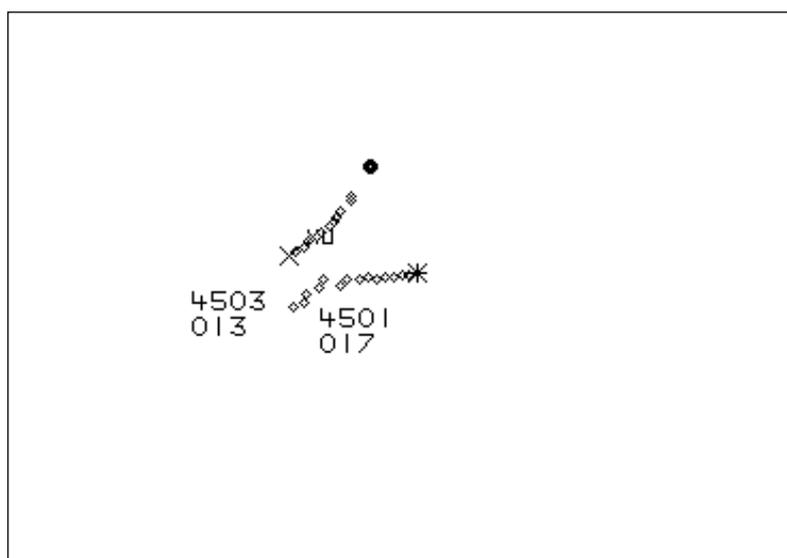


Figure 1: Tutor (squawking 4503) climbed out for a Traffic Service at 1250:35.

The Tucano was cleared for take-off at 1251:04. At 1251:23, the Tutor was instructed to turn left onto 090°. At 1251:38 (Figure 2), the Tucano was informed to remain on runway track.

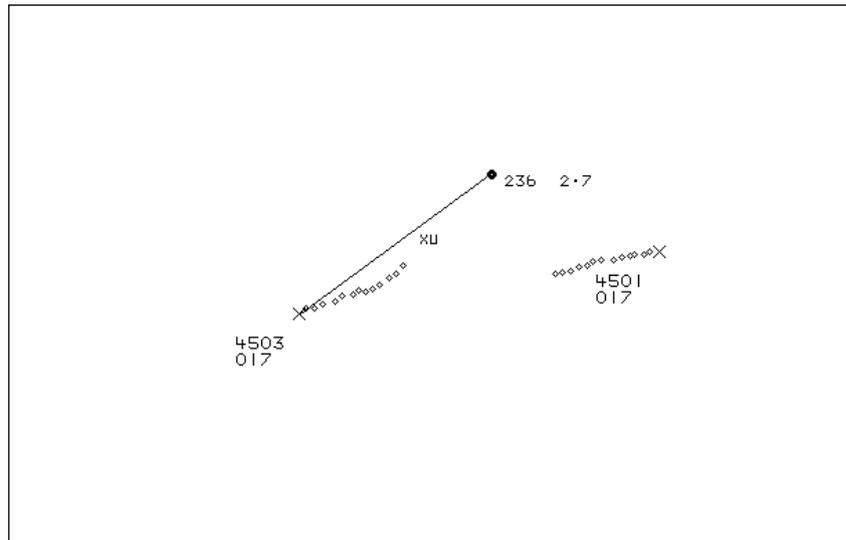


Figure 2: Geometry at 1251:38, Tutor 2.7nms upwind and Tucano airborne instructed to remain on runway track.

At 1252:00 (Figure 3), the Tucano switched to the Departures frequency and the Tutor can be seen in the left hand turn.

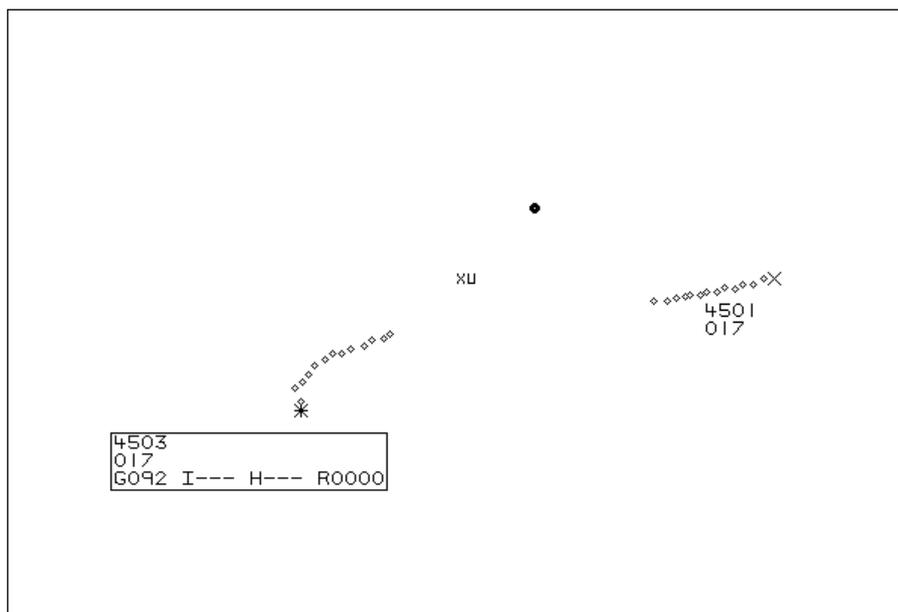


Figure 3: Geometry at 1252:00.

At 1252:22 (Figure 4), the Departures controller identified the Tucano pilot, placed him under a Deconfliction Service and provided an immediate avoiding action onto heading 290°. Traffic Information was called as 12 o'clock, 1nm, crossing right to left, 300ft above.

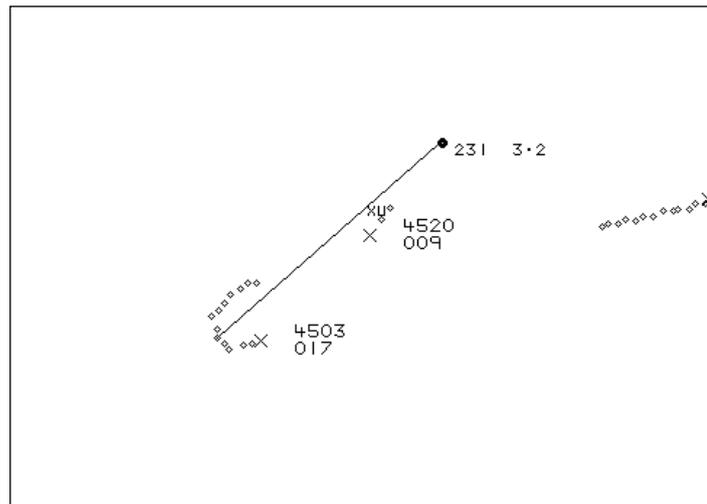


Figure 4: Identification and avoiding action given to Tucano at 1252:22.

At 1252:34 (Figure 5), the Tutor requested the intentions of the aircraft in the 10 o'clock position.

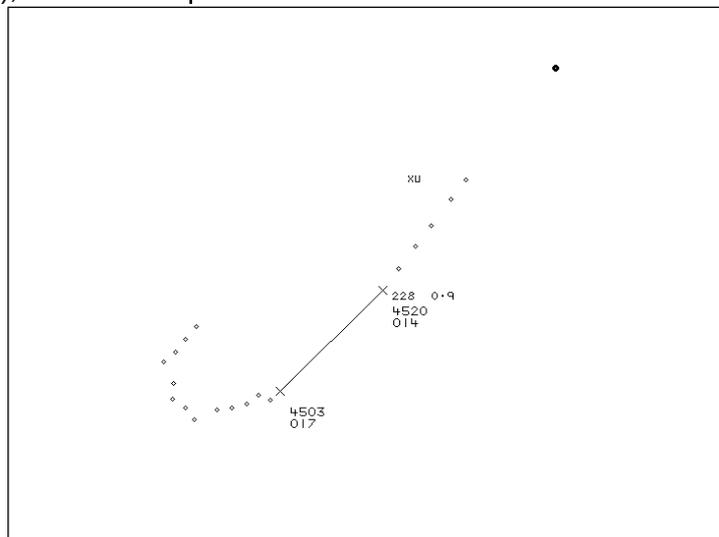


Figure 5: Tutor request for information on Tucano at 1252:34.

The CPA was at 1252:42 (Figure 6), with 0.4nms and 200ft separation.

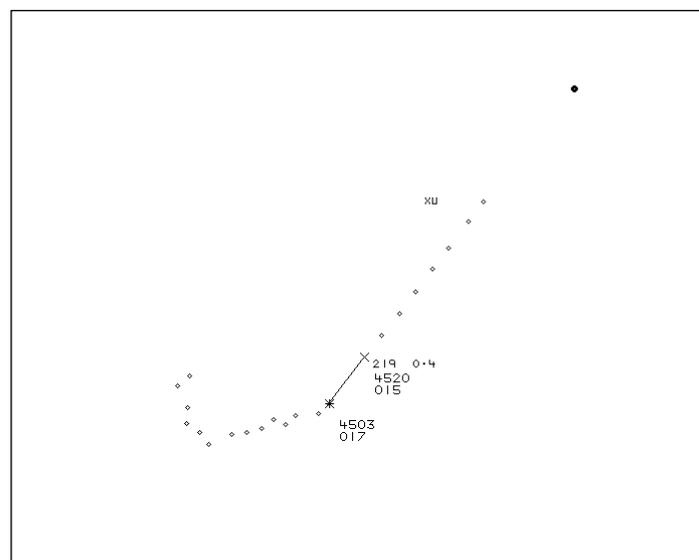


Figure 6: CPA at 1252:42.

At 1252:56 (Figure 7), the effects of the hard Tucano right hand turn are evident, as both tracks are informed they are clear of traffic.

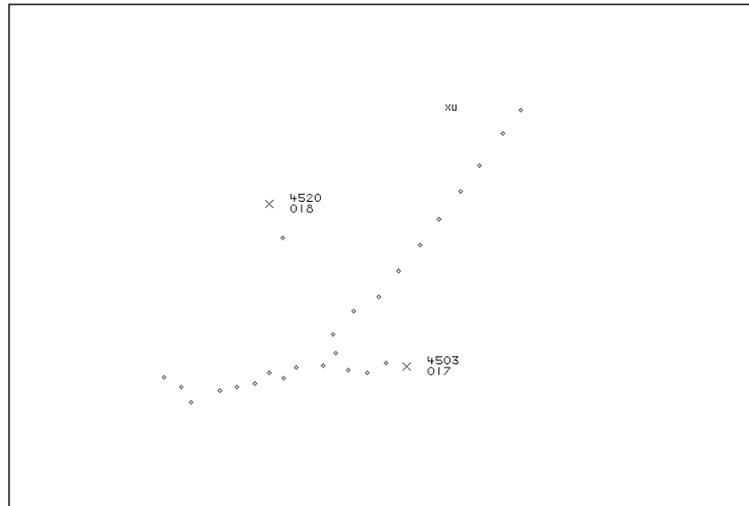


Figure 7: Geometry at 1252:56.

The Ground controller was informed of the Tutor change of intentions and the Director was prenoted. The Tower controller gave a take-off instruction to the Tutor at 1248:33 (re-stated at 1248:47) and to the Tucano at 1251:04. As per the FOB, the Tower controller had separated the aircraft by 2 minutes. The Tutor clearance was for the standard RTC, climbing on runway track to 2000ft QFE. The Tucano was initially placed on a left turn 120°, climbing to 4000ft clearance; this was later amended to remain on runway track at 1251:38, as per Figure 2 with the Tutor 2.7nm upwind.

Director had identified the Tutor, stopped the climb at 1800ft QFE, for weather, and issued a left turn onto 090°. The controller was then in contact with two other aircraft in the RTC to put one aircraft into cockpit checks and to descend another that required to operate below the cloudbase. The next transmission from the Airprox Tutor was to confirm the intentions of the Tucano; there was a delay in replying as the controller assimilated the information and no Traffic Information was issued prior to the Tucano taking the avoiding action and ensuring separation.

Departures had been fairly busy with departure aircraft requesting a Deconfliction Service. Once the Tutor had got airborne, Departures had correctly assimilated that the Tutor would remain in the RTC. Departures knew that there would be at least a 2-minute separation with the Tucano, which should have achieved IFR separation, as per the FOB. As an extra precaution, the controller imposed a climbout on runway track for the Tucano, which also deconflicted against a primary only track showing on radar. It was noticed that the Tutor had drifted west, to the right of the climbout lane, as opposed to a left hand turn. The Departures controller quickly identified the Tucano and gave an avoiding action turn. The Departures controller had reacted to the Tutor getting airborne and drifting west by amending the Tucano departure details; procedurally, Departures and Tower had provided the separation as promulgated in the FOB but this was not enough to assure adequate separation for this incident.

The Tucano pilot was complying with the ATC climbout instructions and following avoiding action, he pulled hard right to ensure separation with the Tutor. The Tucano was never visual with the Tutor, due to being IMC. The Tutor pilot reported receiving instructions to maintain runway heading but the actual instruction was for a 'climb on runway track' at 1245:34. The Tutor pilot levelled at 1800ft and took the left turn heading 090°. TAS had worked well to give a warning and this enabled the pilot to get visual. The track at Figure 2 demonstrates a Tutor drift to the right and that was commented upon in the controller reports. The Tutor pilot commented upon the low ground speed that allowed the Tucano to catch up (ground speeds reported as 140 kts vs 80 kts). By the time the Tutor pilot had turned, it was 3.2nm from the runway, on the evidence of the radar replay, and the relatively tight turn had placed it crossing the climbout path of the Tucano. ATC

would expect runway track to mean adjusting for wind as opposed to flying on runway heading and getting manoeuvred away by the wind.

The normal barriers to an Airprox of this nature would be ATC information and separation, ACAS, 'see-and-avoid' and safe procedures. Lookout was less of a barrier due to the weather limitations; TAS worked well for the Tutor pilot to alert him of the traffic and TCAS appears to have functioned for the Tucano pilot; the pilot could not recall if TCAS had alarmed but tracks were evident on the display. Departures did provide information and an avoiding action turn; Director was momentarily dealing with other traffic and the Tucano would have just painted on radar as the Departures was providing avoiding action. The Tutor pilot questioned the position of the Tucano 12 seconds after it was identified by Departures. The procedure for allowing Tucano movements behind a Tutor was enforced with 2-minutes between clearances for take-off. However, the Tutor drifted slightly right, which placed it in the climbout lane for a longer period than anticipated. When this was spotted by the Departures controller, it was too late to cancel the Tucano take-off but the instruction to maintain runway track was supplied to aid separation. The Tutor turned fairly tight and this meant that, following the drift to the right and speed differences, it came into conflict with the Tucano departing on runway track.

The procedure at Linton has since been amended and the new Flying Order Book entry reads:

Separation Standards. *IFR separation will be achieved by one of the following:*

- a. The ADC will not permit ac to depart until standard separation is assured if one or both elements are pre-notified as IFR.*
- b. The first ac has reported established on a heading at least 40° divergent from the intended heading of the second ac.*
- c. The first ac has reported passing a height, altitude or flight level 1000 ft above that which can safely (in respect to safety altitudes and other traffic) be applied as a climb-out restriction to the second ac.*

In an attempt to prevent re-occurrence, the unit introduced a procedural change to rectify the issue. The 2-minute time separation has been removed and replaced with procedures to maintain lateral and/or vertical IFR separation.

UKAB Secretariat

Both pilots shared an equal responsibility for collision avoidance and for not flying into such proximity as to create a danger of collision¹. If the geometry is considered to be head-on then both pilots are required to alter course to the right.²

Comments

HQ Air Command

This incident hinges on the ATC procedures that were in place at the time and the pilots' application of instructions to maintain runway track or runway heading. The reported wind at the time of the incident was 130/08kt – all across the runway from left to right. The Tutor pilot reports being instructed to maintain runway heading though the transcript shows that it was, in fact, to maintain runway track (which was neither read back by the Tutor pilot nor challenged by the Tower controller). With no allowance being made for drift it was inevitable that the Tutor would end up to the north of the climbout lane and then have to cross it to enter the radar pattern. The Linton Flying Order Book entry that stipulates 2 minutes separation between a Tutor departure and a Tucano departure (in that order) under IFR would not take account of drift errors or

¹ Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions).

² Ibid., Rule 10 (Approaching head-on).

dissimilar tracks on climbout and has since been removed. Rapid identification of the confliction and issuance of avoiding action to the Tucano by the Departures controller prevented the conflict from worsening. The lesson is to listen to exactly what the clearance is, read it back in full and then fly the clearance.

Summary

An Airprox was reported on 21st November 2014 at approximately 1252, between a Tutor and an Tucano. The Tutor was VMC and receiving a Traffic Service from Linton Director in the radar pattern. The Tucano was IMC, once airborne he contacted the Linton Departures controller, was identified under a Deconfliction Service, and given immediate avoiding action.

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 actions of the Tutor pilot, his departure clearance, once it had been changed to reflect his change of intentions, was to maintain runway track. The Board noted that he did not read the clearance back to the controller, and was not challenged to do so. Once airborne, he maintained runway heading instead of track as per the clearance, and was then blown north of the departure lane by the easterly wind. This meant that he had to cross back over the departure lane to join the radar pattern, putting him in confliction with anything departing the circuit. Turning to the Tucano pilot, the Board agreed that he had done all that he could in the circumstances, wasn't aware of the proximity of the Tutor, and had followed his departure clearance as stipulated. In the event, the Tucano pilot took swift and immediate avoiding action when advised to, thus maximising the separation; however, the Board cautioned that care needed to be exercised when adopting extreme manoeuvres in IMC lest pilots place themselves in a worse situation caused by an unusual flight attitude.

In discussing the actions of ATC, the Board wondered whether the Director, having seen the position of the Tutor, should have modified the radar pattern to account for its departure from the norm. However they accepted that the controller was extremely busy and probably wasn't aware of the Tucano departing behind the Tutor. The Board noted that the Departures controller could see the situation unfolding and had changed the Tucano's clearance to runway track; some Board members wondered whether at that stage he should have asked the Tower controller to hold the Tucano or, failing that, given a more westerly initial heading. This led them to discuss the procedures at Linton that required the Tower controller to hold the Tucano for 2 minutes before allowing it to get airborne behind the Tutor. It was put forward that the 2 minutes was intended to be a minimum and not a target, and that the controller should have been looking on the High-Brite monitor to check the track distance before allowing the Tucano to depart. The Board also noted that the Departures controller had the power to impose a "call for release" instruction that may also have averted the incident. Other members thought that the 2 minutes separation was sufficient if everyone had followed the same ground track; they opined that it was because the Tutor pilot had flown runway heading that the separation had been eroded. It was noted by the Board that Linton has since amended the Flying Order book to ensure that the situation doesn't arise again.

In identifying the cause, the Board agreed that the Linton procedures had allowed the Tower controller to release the Tucano into conflict with the Tutor. There were also two contributory factors in that the Tutor pilot did not maintain runway track, and the Linton Departures controller's situational awareness had not been brought to bear on the release decision. The risk was the subject of much debate but, in the end, it was agreed that it was Category B; avoiding action was taken, but safety margins had been much reduced below the normal.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Linton procedures allowed the Tower Controller to release the Tucano into conflict with the Tutor.

Contributory Factor(s): 1. The Tutor pilot did not maintain runway track.
2. The Linton Departures controller's situational awareness was not brought to bear on the release decision.

Degree of Risk: B.

ERC Score³: 2.

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.