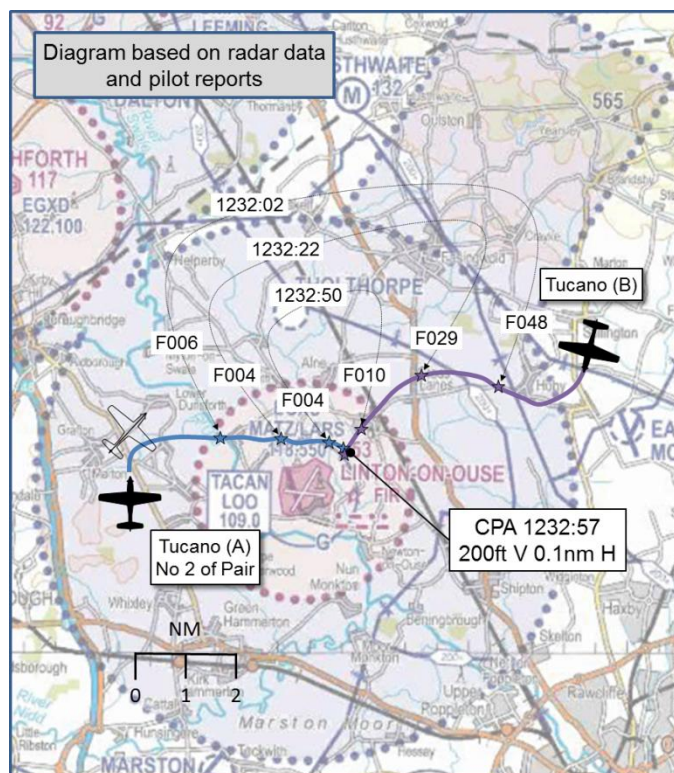


**AIRPROX REPORT No 2014039**Date/Time: 14 Apr 2014 1235ZPosition: 5403N 00114W  
(Linton-on-Ouse Visual Circuit)Airspace: Linton MATZ (Class: G)Aircraft 1                      Aircraft 2Type: Tucano                      TucanoOperator: HQ Air (Trg)              HQ Air (Trg)Alt/FL: 900ft                      1000ft  
QFE (1022hPa)              QFE (1021hPa)Conditions: VMC                      VMCVisibility: 30km                      10kmReported Separation:

100ft V/100m H              50m V/100m H

Recorded Separation:

200ft V/0.1nm H

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

**THE TUCANO (A) PILOT** reports flying a predominantly black aircraft at 140kt with HISLs, navigation and landing lights illuminated and with the transponder squawking Modes A, C and S. He was flying as the lead aircraft of a two-ship formation with a student as the front-seat handling pilot. After a formation take-off, the student in the No2 aircraft was given a simulated landing-gear malfunction. The No2 aircraft was positioned downwind at 1000ft, and its pilot took-over the formation lead as the pilot of Tucano (A) turned behind the new formation leader, in trail at approx 200-300m and 900ft agl, in order to provide a visual undercarriage inspection when necessary. As the formation reported downwind, they were notified by Linton Tower that Tucano (B) was recovering to the airfield with an emergency; the Tucano formation elected to discontinue their practice emergency and the formation turned onto the dead-side to vacate the circuit on runway heading. The formation leader passed their intentions to Linton Tower and commenced his turn. Tucano (A) followed the formation leader, and heard Tucano (B) report at initials that he was visual with the circuit traffic. Believing that the pilot of Tucano (B) was visual with his aircraft, and wishing to fly predictably and in accordance with the formation's broadcast intentions, the pilot of Tucano (A) elected to continue his turn onto the dead-side behind the formation leader. Just before he reached half-way around the turn, the crew of Tucano (A) saw Tucano (B) pass between his aircraft and the formation lead aircraft, left to right across their nose, around 100ft above them and 100-200m in front, at around 250kts; the pilot of Tucano (A) reports that he had not seen Tucano (B) approaching because of their raised wing.

He assessed the risk of collision as 'Medium'.

**THE TUCANO (B) PILOT** reports flying a predominantly black aircraft with HISLs, navigation and landing lights illuminated and with the transponder squawking Modes A and C. After 45min of a training sortie, the 'attention-getter' lights and the 'circuit-breaker' caption illuminated. After analyzing the situation and taking the correct FRC<sup>1</sup> actions, the pilot elected to initiate a visual recovery into Linton from 7000ft and around 8nm to the east. The pilot reports that the visibility was such that he could see the airfield as he initiated the recovery; he informed the Approach controller and changed to the Linton Tower frequency. A visual join was agreed with the Tower controller, who passed Traffic Information on a pair of Tucanos [the formation that included Tucano (A)] departing the circuit. The

<sup>1</sup> Flight Reference Cards

pilot of Tucano (B) recalls that he descended rapidly to 1000ft at more than 250kt and reported at 'initials'. The pilot recalls that he was always clear that he was joining for RW28 but the delay whilst carrying out the FRCs meant they had flown closer to the RW21 initials point than they had intended. Whilst flying from the initials point to the dead-side, the pilot saw the formation lead Tucano to the left of the extended centre-line, on the dead-side, with its gear down, and Tucano (A) ½ - 1nm behind it, to the right of the extended centre-line, in a right-hand turn. Perceiving that there was a 'safe gap' between the other two Tucanos, the pilot of Tucano (B) elected to maintain his flight-path and then looked into the cockpit to check that he had the correct squawk, TCAS scale and runway direction set on the HSI<sup>2</sup>. When he looked out of the cockpit again, he saw that he was going to cross in front of, and higher than, Tucano (A) but, being higher than it, he did not perceive that there was a collision hazard. Tucano (B)'s pilot opined that, if the pilot of Tucano (A) had not seen Tucano (B) then its sudden appearance would have caused him concern. In his open, honest and frank report, the Pilot of Tucano (B) reported that, with hind-sight, there were several things he could have done differently. Firstly, he could have joined at a lower speed because the nature of his emergency did not require the earliest possible landing; he could have left checking the HSI until he had flown clear of the formation; and, finally, he could have altered his joining method, for example by including an orbit, allowing more height separation or flying further to the left on the dead-side, to give the formation more time to vacate the circuit.

He assessed the risk of collision as 'Low'.

**THE INSTRUCTOR TOWER CONTROLLER** reports screening a trainee in the Tower position; RW28RH was in use, and the colour code was BLU<sup>3</sup>. The Tucano formation was in close formation, upwind in the visual circuit, carrying out a practice emergency immediately after departure, when the Ground controller received a call from the Approach controller stating that Tucano (B) was inbound and had declared a PAN emergency with a circuit-breaker caption. The pilot of Tucano (B) contacted Tower requesting visual joining instructions and, after a pause from the trainee controller, requested joining instructions again. The trainee controller passed joining instructions for RW28RH, with the QFE, and informed the pilot that there was a pair in the circuit. Tucano (B)'s pilot read back the details and proceeded to join. At this point, the instructor stepped in on the frequency and warned the Tucano formation pilots that Tucano (B) was inbound with an emergency and, using the Hi-brite<sup>4</sup>, passed Traffic Information that it was 2nm north of the aerodrome. The leader of the formation, which was downwind by this point, elected to terminate their practice emergency and depart VFR to the east from the dead-side. Because Linton was operating SSR only, all departing traffic required a release from Departures, and so the trainee controller opened the land-line to the Departures controller. At around the same time, the pilot of Tucano (B) reported that he could see the formation, but the Tower control team reported that Tucano (B) appeared to be flying through from initials on RW21RH, 'cutting through the downwind leg part' of the RW28RH circuit; the pair of Tucanos were not in tight formation because of their practice emergency, and Tucano (B) appeared to pass between them and in front of Tucano (A). The Supervisor arrived in the Visual Control Room and the Tower controller made sure he was aware of the traffic situation.

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

**THE LINTON SUPERVISOR** reports that he was informed by the approach controller that the pilot of Tucano (B), which was 3nm northeast of Linton, had declared an emergency with an ignition circuit-breaker caption illuminated; the Approach controller had already initiated Emergency State 2<sup>5</sup> action so the Supervisor alerted the Distress & Diversion Cell and went up to the Visual Control Room. When he arrived, the Tower controller made him aware of the traffic situation but the Airprox had already occurred. The pilot of Tucano (A) later called to inform the Supervisor that he would be filing an Airprox.

<sup>2</sup> Horizontal Situation Indicator

<sup>3</sup> Min 2500ft cloud-base and 8km visibility

<sup>4</sup> Display showing radar data. It is not calibrated and is only available to enhance the controller's situational awareness.

<sup>5</sup> The emergency vehicles are manned, and usually pre-positioned to agreed points, to increase their speed of response.

## Factual Background

The weather at Linton-on-Ouse at 1150 was recorded as:

METAR EGXU 141150Z 34013KT 9999 FEW048 13/01 Q1024 BLU NOSIG

## Analysis and Investigation

### Military ATM

The Tower Controller was under training and recalled the emergency aircraft joining the visual circuit. The instructor intervened on frequency to request the intentions of the Tucano formation. The trainee reported that Tucano (B) appeared to be lining-up for RW21 (RW28 RH was the runway in use and no request was made for RW21) and that the line-up for RW21 Initials Point would route the emergency aircraft through the down-wind leg of the RW28RH circuit. Tucano (B) appeared to fly between the pair of Tucanos, who were not in tight formation, but the trainee controller did not perceive a problem because the pilot of Tucano (B) had reported visual with the pair. The instructor recalled intervening when the trainee became hesitant because he wanted to inform the formation pilots that the emergency aircraft was recovering; the Hi-Brite was used to ascertain the position of the emergency Tucano. The workload was assessed as 'medium to low'. The ATC Supervisor assessed the unit and controller workload as 'low'. The Supervisor recalled the Tucano calling a 'PAN' approximately 3nm east of Linton, and he initiated Emergency State 2 action and informed the Distress and & Diversion cell.

At, 1231:49, as per Figure 1, the pilot of Tucano (B) asked to join the visual circuit and the call was repeated at 1231:54. The Tower Controller replied with, "[Tucano callsign] *Linton tower, pan acknowledged, join RW 28RH, QFE 1022, pair in.*" The details were correctly readback by the Tucano at 1232:08.

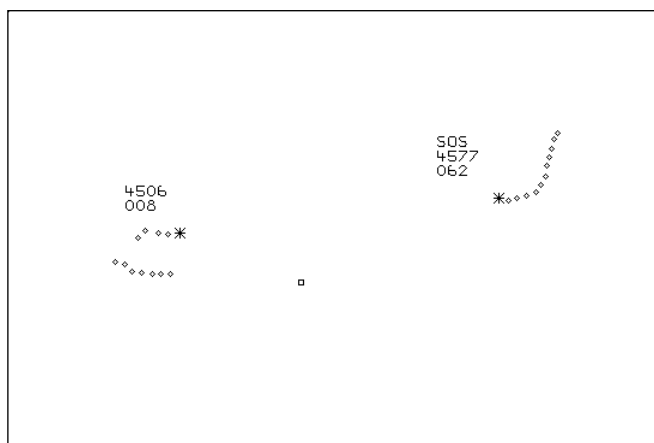


Figure 1: At 1231:49 as emergency Tucano called for visual join (Lead of Tucano pair squawking 4506; Tucano (B) squawking 4577/SOS).

At 1232:17, the pilots of the pair were informed of an emergency aircraft northeast at 2nm. At 1232:25, as per Figure 2, the leader of the pair replied with, "...noted, we will be coming onto dead-side and departing VFR east after extending on runway track."

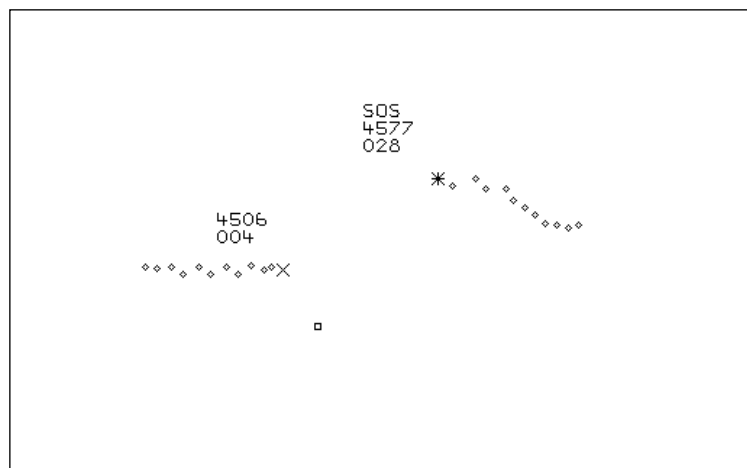


Figure 2: Aircraft geometry at 1232:25.

At 1232:37, as per Figure 3, the pilot of Tucano (B) reported, “[callsign] *is late initials, visual with the other Tucano.*” The controller replied with the surface wind and called the Departures Controller to request a release for the formation departing VFR to the east.

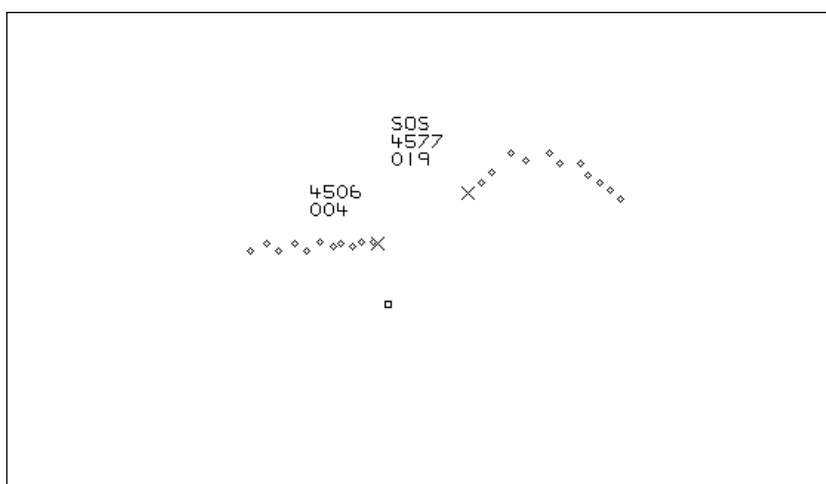


Figure 3: At 1232:37 when the pilot of Tucano (B) reported visual with the formation.

On radar replay the CPA was at 1232:54 with 0.1nm lateral separation and 200ft vertical separation, as per Figure 4. The flight-profile of Tucano (B) would suggest a line-up for RW21.

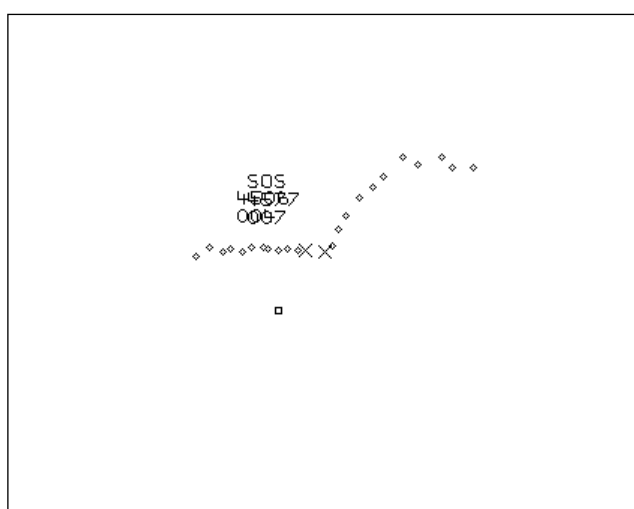


Figure 4: CPA at 1232:54.

The Tower trainee was initially hesitant in dealing with the emergency aircraft but the swift intervention from the instructor meant that Tucano (B) was seen on the Hi-Brite display and the pilots of the pair of Tucanos were made aware, allowing them to vacate the visual circuit. The emergency aircraft reported visual with the pair at initials, alleviating the need for Traffic Information from the controller. The formation crews cancelled their own practice emergency, planned to leave the visual circuit to the emergency aircraft, and attempted to keep their circuit flying standard and predictable. Tucano (A) described seeing the emergency Tucano 100ft above, which would correspond with the emergency aircraft being at 1000ft QFE, as per the standard initials join.

Tucano (B) appears to have been positioned through RW21 initials, which would have put him in conflict with the other aircraft; as a result, the pilots in the pair of Tucanos would have found it difficult to see Tucano (B). The pilot of Tucano (B) perceived that there was a big enough gap between the pair, and that his greater speed would take him through the gap. The pilot of the Tucano (B) was dealing with an engine-related Circuit Breaker caution (designated 'Land as soon as Practicable) during a phase of high-workload flying but, as he was joining the circuit, the onus was on him to see and avoid the other aircraft. The pilot may have perceived the need to land the aircraft as soon as possible, and at some stage he needed to be 'heads in' for cockpit configurations and checks. At that stage of flight, there were numerous demanding cognitive activities required of the pilot, including planning, monitoring, information processing and decision-making. The high-workload and potential stress of dealing with an emergency would have placed even more demands upon mental capacity. For the pilot to have to re-think the approach profile and re-position with other circuit traffic, would have used more valuable cognitive resources and consumed more time; these factors could have easily combined to contribute towards a perceptual error of misjudged distance. Furthermore, the emergency pilot had height separation and visual acquisition; this did not apply to the pilot of Tucano (A), who was surprised and took a different view of the severity of the incident.

The pilot of Tucano (B) was able to reflect on the incident following a safe landing and, in an open and honest report, he identified a number of actions that may have averted the Airprox. The actions included a reduction in speed, choosing a more suitable time to go 'heads in' and building in more horizontal separation with the formation. A Unit investigation recognised the perceived haste of the actions and drew upon the lessons identified.

## **Comments**

### **HQ Air Command**

This open and honest report from all concerned has highlighted the fact that, even in what initially appeared to be a controlled situation where the pilot of the joining aircraft was visual with the formation, circumstances can change rapidly if the cockpit work cycle is not appropriately prioritised. A number of courses of action were available to the pilot of Tucano(B), most of which he identified himself with the benefit of hindsight. This incident prompted an inquiry on the unit concerned to ensure that all the lessons were drawn out, but it should be noted that one pilot was comfortable with the limited separation whilst the other was surprised by the proximity of the other aircraft. The pilot of Tucano(B) could have considered alerting the pilots of the formation, via the radio, of his intention to fly between the 2 aircraft.

## **Summary**

An Airprox was reported between a Tucano, whose pilot was dealing with an emergency and joining the Linton visual circuit, and the rear aircraft of a pair of Tucanos in loose formation, whose pilots were attempting to depart the visual circuit to leave it clear for the Tucano with an emergency. All of the pilots were aware of each other, and the pilot of Tucano (B) was visual with the pair of Tucanos.

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

Information available included 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.

Members were pleased to see such open reporting and frank self-evaluation from those involved, particularly from the pilot of Tucano(B), and commended them all for their candid comments. In discussing the incident, the Board first considered the contribution of ATC to the sequence of events and noted that the Tower was staffed by an instructor and trainee team. Although the trainee had been slightly hesitant in dealing with an unusual situation, as would be expected of a controller with low experience levels, it was clear that the instructor had supported the trainee well by intervening at appropriate times. The Board agreed that ATC could not have done more to prevent this occurrence.

Turning to the actions of the formation, members wondered if there might have been a different way for them to depart the circuit after they had been notified of Tucano(B)'s emergency recovery. The Board noted that the pair of aircraft were being piloted by students, who were themselves handling a practice emergency, and who would likely be working hard to maintain their own situational awareness. The formation were expecting Tucano(B) to recover from the RW28 Initials position and, after some discussion, the Board agreed that their decision to keep their flight profiles predictable and to depart from the dead-side of RW28 was reasonable: had Tucano(B) been recovering from the expected direction, this would have left the circuit clear for the emergency aircraft.

The Board then discussed the actions of the pilot of Tucano(B). The Board was informed that, whilst a circuit-breaker failure required the pilot to land as soon as practicable, it did not warrant the degree of urgency for recovery which he had chosen. In particular, members noted that 250kt is quite a high speed at which to recover a Tucano into the visual circuit, and agreed that by choosing to fly at that speed the pilot had left himself with fewer options when confronted with the pair crossing ahead of his flight-path. Furthermore, by choosing to look into the cockpit as he was approaching the formation, the Board opined that he had not followed the aviation 'golden rule' of 'aviate, navigate, communicate'; at that point he should have focussed all his attention on ensuring that he followed a safe flight-path. All members agreed therefore that the cause of the incident was that the pilot of Tucano(B) had flown into conflict with Tucano(A). Whilst there was much to learn from this Airprox, wherein the CPA was much closer than usually expected in the visual circuit, the Board agreed that the pilot of Tucano(B) had, in the end, maintained vertical separation from, and visual contact with, Tucano(A) and so the risk of collision had been mitigated; it was therefore agreed that the degree of risk was C.

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

Cause: The Tucano(B) pilot flew into conflict with Tucano(A).

Degree of Risk: C

ERC Score<sup>6</sup>: 4

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<sup>6</sup> 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.