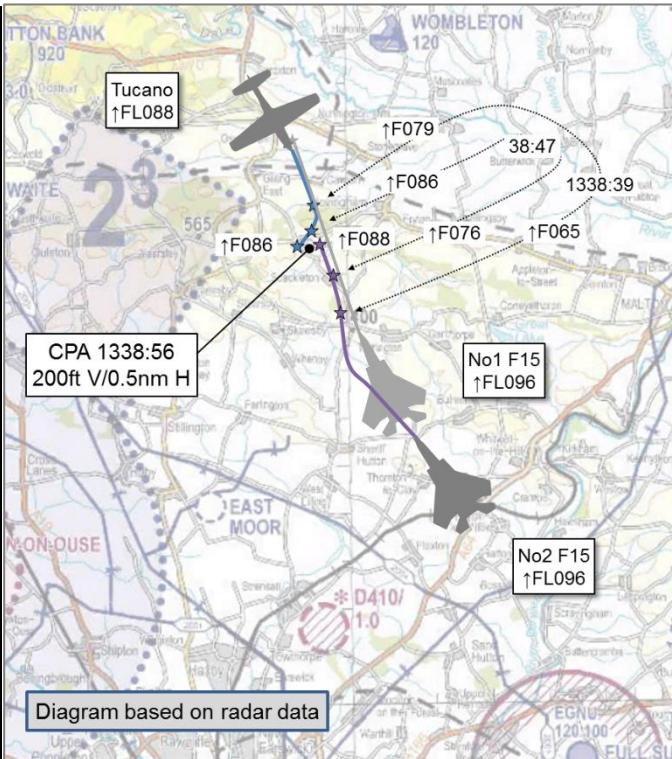


## AIRPROX REPORT No 2017278

Date: 14 Dec 2017 Time: 1340Z Position: 5409N 00103W Location: 10nm NE Linton

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	Tucano	F15
Operator	HQ Air (Trg)	Foreign Mil
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	None
Provider	Linton	Swanwick
Altitude/FL	FL086	FL096 + FL088
Transponder	A, C, S	A, C, S
Reported		
Colours	Black	Grey
Lighting	NK	Anti-cols, Position lights
Conditions	VMC	VMC
Visibility	8km	8km
Altitude/FL	8000ft	8000ft
Altimeter	RPS (977hPa)	RPS
Heading	180°	340°
Speed	180kt	400kt
ACAS/TAS	TCAS II	Not fitted
Alert	Unknown	N/A
Separation		
Reported	500ft V/0m H	0ft V/0.5nm H
Recorded	200ft V/0.5nm H	



**THE TUCANO PILOT** reports that he had exited from low-level and climbed to 8000ft. He called Linton App and obtained a Traffic Service. At 10nm NE Linton, and 30 seconds after being identified by ATC, he saw a fast-jet on a reciprocal heading pass approximately 500ft directly overhead. He immediately turned right heading 220° to clear the airspace and check for a possible second aircraft. He informed ATC about the turn, and the Airprox, and continued with the recovery to Linton.

He assessed the risk of collision as 'Medium'.

**THE F15 PILOT** reports he was part of a two-ship formation low-flying in Area 11 at 500ft. The weather was worsening, so the No2 radar-locked onto the lead and the pair aborted from low-level in accordance with standard procedures, with the No2 in trail. Whilst in the climb, the lead made an information call to Swanwick Mil. The lead aircraft exited the weather at about 8000ft and did not gain visual or radar contact with the Tucano. The No2, in 2nm trail, also exited at 8000ft and immediately saw the Tucano, 0.5nm in the left 9 o'clock, co-altitude. The other aircraft appeared to be maintaining adequate separation and 'deconfliction' was maintained.

He assessed the risk of collision as 'Low'.

**THE LINTON CONTROLLER** reports that a first Tucano called for recovery and, although it was below the radar vector chart altitude, some low-level contacts indicating 1000ft were called to him. Just a few secs later, the Airprox Tucano, to the NE of Linton, called for an instrument recovery; a squawk was given and he was told to standby. The first Tucano was identified and, having ascertained that it was now above 2000ft, was vectored for the RTC. He then returned to the Airprox Tucano and asked for his heading and height, at this point the pilot reported that he had just turned onto a heading of 220° because a Tornado (he reported) had just passed 500ft above him.

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

**THE LINTON SUPERVISOR** reports that he had recently taken over the position of Supervisor and, although he was in the ACR at the time of the incident, he did not witness it. The controller informed him shortly afterwards.

## Factual Background

The weather at Linton was recorded as follows:

```
METAR EGXU 141250Z 23011KT 9999 FEW024 BKN040 BKN180 05/02 Q0983 BLU TEMPO 6000 SHRA SCT020
WHT=
SPECI EGXU 141314Z 22016KT 9999 7000SW -SHRA SCT022 BKN038 05/02 Q0983 WHT TEMPO 9999 NSW
SCT025 BLU=
```

## Analysis and Investigation

### Military ATM

The images below are taken from radar replays of NATS radar feeds, which are not representative of the picture available to the Linton controller.

At 13:37:07 (Figure 1), the Linton Approach controller passed Traffic Information (TI) on the F15s to the first Tucano as "south east, 5nm, tracking north west, fast moving, two contacts, indicating slightly below", which indicates that they were visible on radar at that time. At 13:37:39 (Figure 2), the Airprox Tucano first called the Linton Approach Controller for recovery (seen with transponder code 4576), climbing to 8000ft QFE. The controller issued a squawk and requested that the pilot standby. He then returned his attention to the other Tucano aircraft.



Figure 1: Geometry at 13:37:07

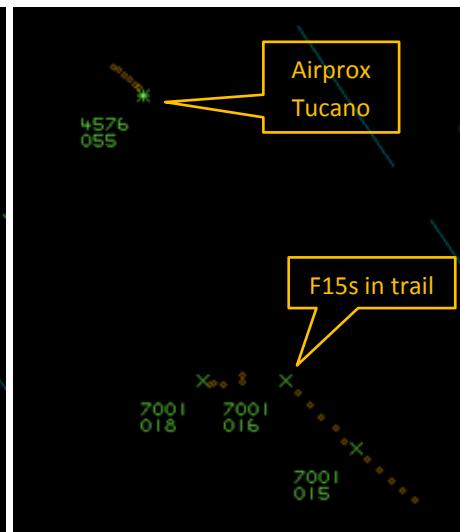


Figure 2: Geometry at 13:37:39

At 13:38:09 (Figure 3), the Linton Approach Controller identified the Tucano, agreed a Traffic Service and asked the pilot to pass his details. At 13:38:20 (Figure 4), while the Tucano pilot was passing his recovery details, the Mode C of each F15 disappeared on radar replay, which can indicate a rapid climb. The last indication displayed was that both were at 018.

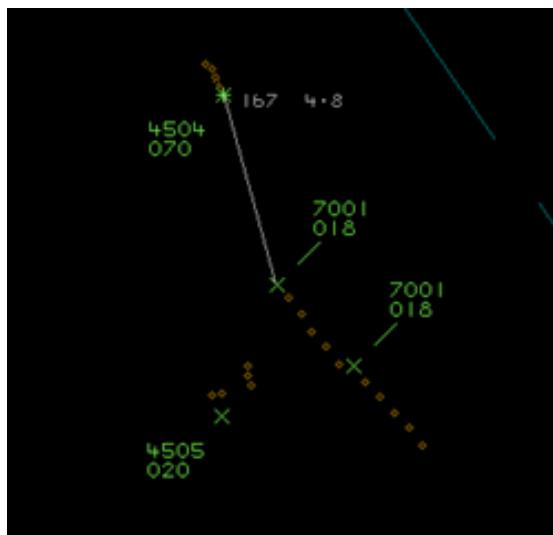


Figure 3: Geometry at 13:38:09

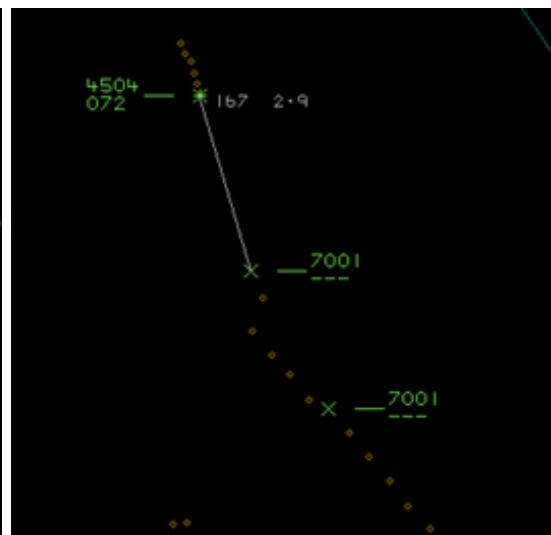


Figure 4: Geometry at 13:38:20

At 13:38:24 (Figure 5), the same time the Tucano pilot finished passing his details, the F15s' Mode C reappeared on radar replay indicating 072 (lead aircraft) and 043 (second aircraft). The controller acknowledged the pilot and turned his attention to the other recovering aircraft. No TI was passed at the time, and it is not known whether or not the F15s' Mode C was visible on the controller's radar screen. At 13:38:36 (Figure 6), the Linton Approach Controller was vectoring another aircraft for instrument recovery while the lead F15 passed above the Tucano with approximately 1400ft and 0.3nm separation.

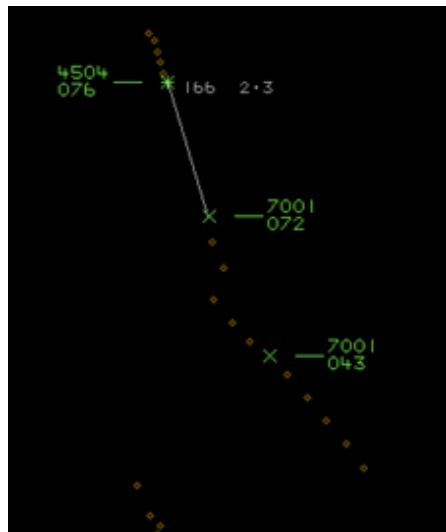


Figure 5: Geometry at 13:38:24

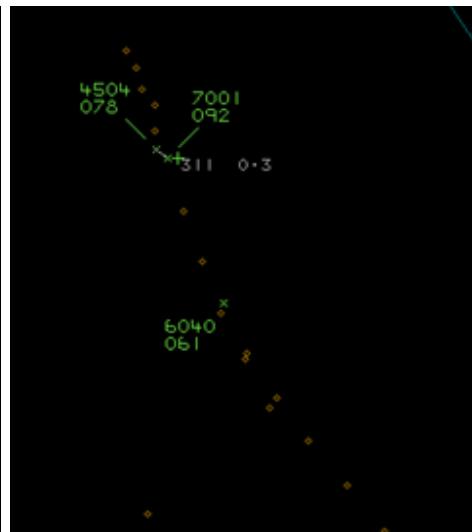


Figure 6: Geometry at 13:38:35

At 13:38:47 (Figure 7), as the controller asked the Tucano pilot to confirm his heading and height and he reported that he was coming right due to an aircraft passing 500ft above. Replays showed the Tucano between the F15s, 1000ft below the lead and 1000ft above the second aircraft. Figure 8, (13:38:56) shows the second F15 as it passed the Tucano with approximately 0.7nm and 400ft separation.

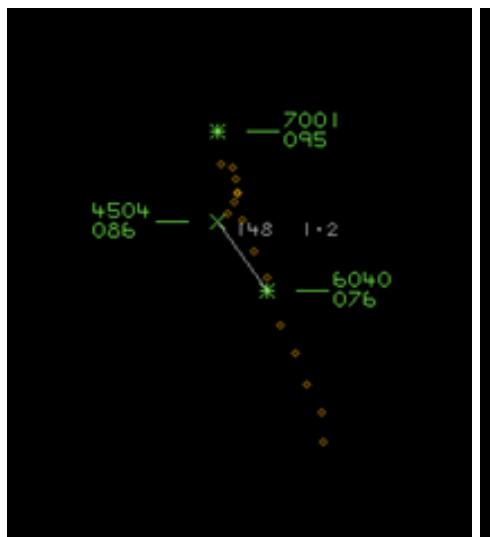


Figure 7: Geometry at 13:38:47

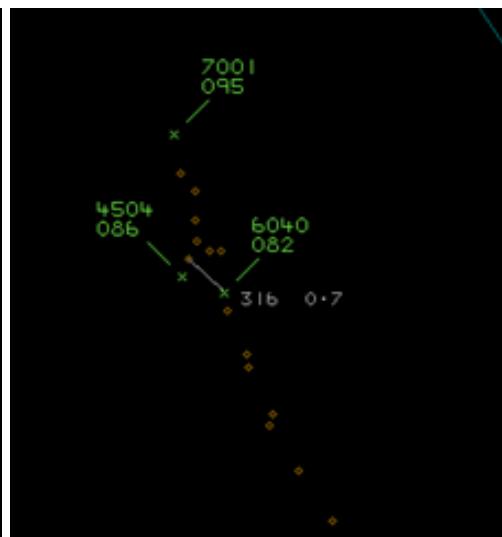


Figure 8: Geometry at 13:38:56

When the controller agreed a Traffic Service with the Airprox Tucano pilot, the Mode C of the F15s was indicating 018, therefore not posing any conflict. Although the F15s' Mode C then dropped out for a period, when the Tucano pilot finished passing his recovery details, the Mode C of the F15s was once again visible on radar replay and there was 2.3nm separation between the Tucano and lead F15. Whether the controller's radar screen displayed the F15 Mode C or not, it would have been reasonable to pass TI to the Tucano pilot because there was a definite or possible conflict, depending on the displayed picture. Instead, the controller prioritised checking that his other aircraft had levelled off above terrain safe level, which would enable vectoring to begin.

Although handling multiple recoveries does require a controller to divide their attention between aircraft, Traffic Service can be provided below terrain safe level, the first Tucano's pilot had been reminded of his responsibility for terrain separation, and the other aircraft was not in conflict with him; therefore, the controller's priority should have been with passing TI to the Airprox Tucano pilot in this case.

## UKAB Secretariat

The Tucano and F15 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>. If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right<sup>2</sup>.

## Comments

### HQ Air Command

The Tucano pilot had planned and executed his mission in accordance with all extant procedures, including entering the low-level element of his sortie on CADS. However, he was in the recovery phase and, equally, the F15s had not planned to climb at the point they did, thus CADS as a barrier to MAC was not viable in this instance. Furthermore, from the accounts of both pilots, it also appears that the weather precluded a timely visual acquisition of the other aircraft for both the pilots concerned.

Both aircraft in this encounter were transponder equipped and so visible (for the most part) to the Linton controller. However, the rapid climb that the F15s necessarily undertook as they aborted from low-level compromised the controller's ability to see and judge the rate of reduction of vertical separation. It is also possible that this rapid climb defeated the TCAS on the Tucano as the pilot

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

<sup>2</sup> SERA.3210 Right-of-way (c)(1) Approaching head-on.

does not recollect receiving any kind of warning (audio or visual) of the presence of the F-15s. As highlighted in the Military ATM report, the controller could have prioritised their attention towards the possible confliction of the F15s and the Airprox Tucano over the other recovering Tucano that they had already called the traffic to. Therefore, none of the available barriers to MAC was fully effective.

The circumstances of this Airprox once again demonstrate the importance of employing a layered defence to MAC but equally show that even with multiple barriers available there are inherent weaknesses in all of them and safe separation between aircraft can still be eroded.

## **USAFE**

USAFE-UK commented that the F15s carried out a standard abort from low-flying due to weather conditions. Given that the Linton controller passed Traffic Information on the F15s, then indicating 1500ft, to another aircraft it seems possible that he thought they were no threat to the Airprox Tucano despite the implications of the F15s' Mode C dropping out.

## **Summary**

An Airprox was reported when a Tucano and an F15 flew into proximity at 1340hrs on Thursday 14<sup>th</sup> December 2017. Both pilots were operating under VFR in VMC, the Tucano pilot in the process of obtaining a Traffic Service from Linton for a radar recovery, and the F15 pilot not in receipt of an ATS as they aborted from low-level.

## **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 looked at the actions of the Tucano pilot, and reasoned that there was very little more that he could have done under the circumstances. He didn't receive any Traffic Information from the Linton controller, and his TCAS didn't alert him, probably because the F15s were climbing above the rate of 10,000fpm. However, he did see the first F15 appear out of the cloud in front of him, and took avoiding action, which meant that he had probably increased lateral separation to a certain extent when the No2 also came out of cloud shortly afterwards.

For their part, the F15s were operating at low-level when they encountered bad weather and needed to conduct a low-level abort. Noting that this was a busy area of airspace, members with fast-jet military experience wondered whether it would have been obvious that there was deteriorating weather ahead, and, if so, the F15 pilots would have been better advised to have made an earlier decision to pull out of low-level in a more controlled manner, giving Linton LARS some warning. It seemed from the F15 pilot's account of getting the No2 to lock-on his radar in trail that they may have left the decision to abort too late and were thus left with no option other than to climb through the likely radar pattern at Linton without calling them first. The Board acknowledged that they were probably following SOPs to call Swanwick (Mil) on their ICF as they climbed; unfortunately, by the time contact had been established and they were identified by Swanwick, they were likely to have flown IMC through a busy piece of airspace. The key lesson being that an early weather decision was required when flying below busy airspace so that any IMC climb could be conducted in a more controlled manner. There was then some debate as to the rate at which the F15s were climbing. Whilst accepting that until they reached minimum safe sector altitude they needed to climb rapidly, members commented that once they were above this altitude the priority changed from avoiding the ground to avoiding other aircraft. As such, the F15 pilots would have been better served by ensuring their rate of climb was reduced to below 8,000fpm so that their SSR returns would register both on ATC displays and with other aircraft TAS/TCAS equipment. By maintaining above 10,000fpm rate of climb above safety altitude, the Tucano TCAS didn't alert and Linton's radar did not show the Mode C, thereby denying the Tucano pilot two barriers that may have been able to give him information on the F15s. With regard to CWS,

the Board noted that the F15s did not have TAS/TCAS equipment and, although they had a radar, the Board were told that it was unlikely to be configured to scan for other traffic given the nature of their task at the time. Given also that they had become VMC above the cloud before receiving any ATS or information on the Tucano, the Board felt that there was a degree of providence that the first F15 was above the Tucano as it exited the cloud.

Turning to the Linton controller, the Board heard that he wasn't particularly busy, with just the two Tucanos on frequency (although both had called him for a service at a similar time). Whilst it was not known whether the controller could see the Mode C on the F15s on his radar screen or not, controller members thought that he should have known that a dropout of Mode C would indicate that the low-level traffic was climbing rapidly. As such, they opined that he should have prioritised calling that traffic to the Tucano rather than focus on the other, recovering Tucano. That said, they acknowledged that events had unfolded at a fast pace, and in turning his attention to the first aircraft that called him, it had been unfortunate that that opportunity had been missed.

In determining the cause and risk of the Airprox, the Board quickly agreed that this had been a conflict in Class G because neither pilot had any information on the other before the event. Notwithstanding, members agreed that a contributory factor was that the F15s had exceeded the 10,000fpm climb once above safety altitude thereby denying the opportunity for ATC or other aircraft to detect their presence with altitude. The assessment of the risk was much debated, with some members believing that there had been sufficient separation between the aircraft as they passed such that separation had not been at the bare minimum (i.e. although safety had been much degraded below the norm, this was not a Category A event). However, others argued that providence had played a major part because the F15s had no knowledge that the Tucano was there, and that any separation achieved during their highly dynamic climb was purely through good fortune. In the end, the latter view prevailed and the risk was assessed as Category A. Noting the contributory factor, the Board then resolved to make a recommendation to USAFE-UK that they review the procedures for climb rate once above the safety altitude after a low-level abort.

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

Cause: A conflict in Class G.

Contributory Factor: The F15s exceeded 10,000fpm rate of climb once above safety altitude, thereby denying the Tucano TCAS barrier.

Degree of Risk: A.

Recommendation: USAFE-UK review the rate of climb once above safety altitude after a low level abort.

### **Safety Barrier Assessment<sup>3</sup>**

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

#### **ANSP:**

**Regulations, Processes, Procedures and Compliance** were assessed as **ineffective** because Traffic Information had not been passed to the Tucano despite the F15s being displayed ahead.

**Situational Awareness and Action** were assessed as **ineffective** because the Approach controller had not assimilated that the F15s would conflict with the Tucano.

---

<sup>3</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

**Flight Crew:**

**Tactical Planning** was assessed as **partially effective** because the F15 pilots had made a late decision to abort from low-level and had not called Swanwick Mil prior to commencing their climb.

**Situational Awareness and Action** were assessed as **ineffective** because neither pilot knew about the other prior to CPA.

**Warning System Operation and Compliance** were assessed as **ineffective** because the Tucano pilot had not received any information from his TCAS on the F15s, probably due to their high rate of climb.

**See and Avoid** were assessed as **partially effective** because the Tucano pilot saw the first F15 late as it broke cloud and had only been able to take emergency avoiding action.

