

AIRPROX REPORT No 2014222

Date/Time: 26 Nov 2014 1505Z

Position: 5742N 00320W
(Lossiemouth)

Airspace: Lossiemouth ATZ (Class: G)

Aircraft 1 Aircraft 2

Type: Tornado Tornado

Operator: HQ Air (Ops) HQ Air (Ops)

Alt/FL: below 700ft 700ft
QFE (1012hPa) QFE (1012hPa)

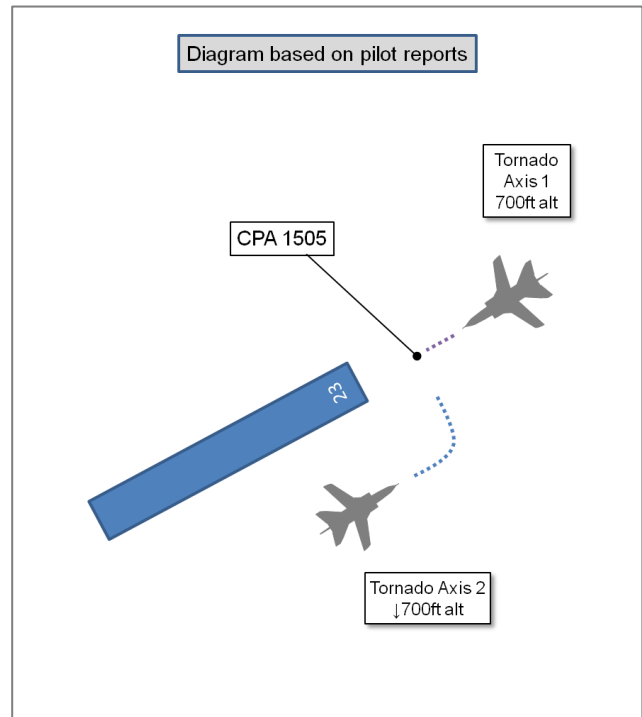
Conditions: VMC VMC

Visibility: >30km 30km

Reported Separation:

100ft V/0ft H 350ft V/0ft H

Recorded Separation: NK



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO (1) (AXIS 2) PILOT reports flying a grey aircraft with anti-collision and navigation lights illuminated, his transponder was selected with Modes A, C and S. The aircraft was not fitted with ACAS. It was the end of an uneventful sortie and the pilot elected to conduct visual circuits for student currency. The first circuit resulted in a go-around due to an aircraft on the runway; on positioning downwind, the pilot was told by ATC that there was radar traffic at 8nm but that he was number one. After completing checks he turned finals, called "finals, gear down" and was cleared to touch-and-go. ATC called the radar traffic at 4 miles; continuing. About a third of the way round the finals turn the pilot was visual with the radar traffic and identified it as a collision risk. At this point the captain rolled the wings level and bunted sharply downwards towards the sea, passing approximately 100ft beneath the conflicting traffic. The pilot of the other aircraft reported the Airprox to ATC and Tornado (1) pilot elected to curtail the training and land from the next approach.

He assessed the risk of collision as 'Medium'.

THE TORNADO (2) (AXIS 1) PILOT reports flying a grey aircraft with navigation lights and HISLs illuminated and SSR transponder with Modes A and C selected. The aircraft was not fitted with ACAS. He was on a PAR approach and, at approximately 4nm, was told "final clearance delayed, continue approach" by ATC. This was acknowledged. Another Tornado was then seen to commence a visual finals turn; after approximately 90° of turn, the Tornado on finals was seen to roll out and bunt beneath him, simultaneously he pulled up to increase the separation and broke off the approach.

He assessed the risk of collision as 'High'.

THE LOSSIEMOUTH ADC reports that RW23 was in use; Axis 2 was in the visual circuit and had just gone around due to one ahead. He received an 8 mile call from the Talkdown controller and made the relevant broadcast on the frequency, Axis 2 then called downwind. The controller acknowledged this, then paused to assess whether Axis 2 could get in his touch and go before the radar traffic landed. He elected to make Axis 2 number 1 and told him so over the RT. Axis 2 called finals and was given clearance to touch and go and then the radar traffic was instructed to continue, this was also broadcast on the frequency. He heard the pilot of Axis 2 ask something on the frequency, but couldn't be sure what was said, so asked him to repeat; he then realised that the pilot was reporting avoiding the radar traffic, he saw one Tornado go underneath the other, which was pulling up. He looked on the hi-brite and saw that both aircraft were in the same location, one

heading towards the airfield, the other towards the deadside. He believed that as Axis 2 called finals the radar traffic was at 6 miles, and noted that throughout he had believed that Axis 2 would get his approach in before the radar traffic. His intention had been to give the delayed clearance and then the instruction "if visual continue with tower" to the radar traffic.

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

THE LOSSIEMOUTH PAR CONTROLLER reports receiving Axis1 on PAR at 11 miles from touchdown, his intentions were to land. He was given normal instructions to descend at 6.5nms and at 4 miles the clearance was delayed and he was told to continue his approach. When Axis 1 was at 3/3.5nms a confliction appeared on both elements of the radar screen at 2nm. The unknown aircraft joined from the left of the screen towards the centreline, showing a similar height in elevation, the controller waited a few seconds to assess the situation and was just about to call the traffic when he saw the conflicting aircraft drop several hundred feet in elevation. He assessed there was now no risk of collision between the two aircraft so went through to ADC for the 2.5nm clearance, at the same time the pilot said he was breaking off the approach and changing to the tower frequency because of an "airmiss". The PAR controller acknowledged and informed the supervisor.

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

THE LOSSIEMOUTH SUPERVISOR reports that at the time of the incident he was conducting a handover to the on-coming supervisor. The PAR controller interrupted the handover to inform him of the incident. The VCR was fully manned with low traffic levels at the time. The Supervisor then arranged for the RT and radar recordings to be impounded.

Factual Background

The weather at Lossiemouth was reported as:

EGQS 261450Z 15001KT CAVOK 06/02 Q1013 BLU NOSIG

Analysis and Investigation

Military ATM

Due to the heights and geography involved, a radar replay could not be traced; however, the unit involved produced a reconstruction of the incident as per Figure 1.

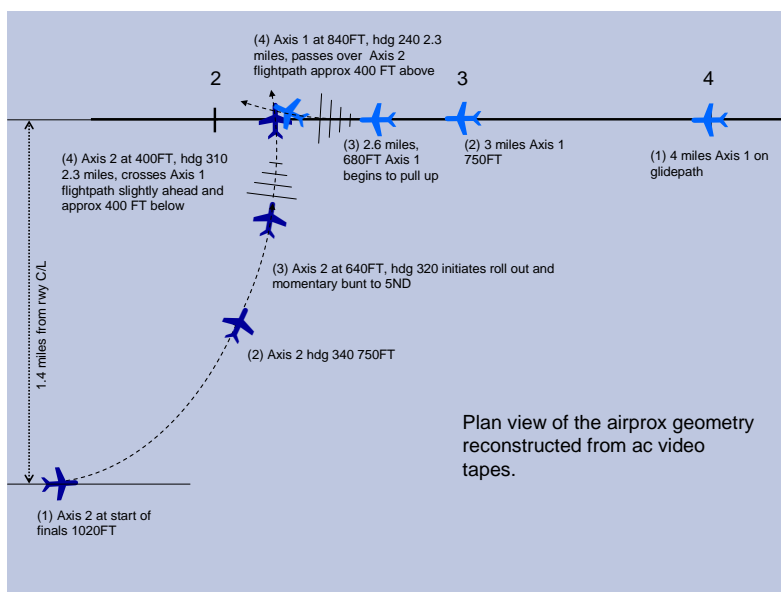


Figure 1: Unit reconstruction of the incident.

A tape transcript from the unit is below, which includes RT and Cockpit Voice Recorder:

To	From	Speech Transcription	Time
Talkdown	Axis 1	Talkdown Axis 1 on handover	15:04:42
Axis 1	Talkdown	Axis 1 Lossie talkdown identified, readback QFE	15:04:43
Axis 1	Talkdown	Eight miles	15:05:45
All	Twr	Tornado eight miles land	15:05:49
Aircrew D Axis 2	Aircrew C	We're going to get, right....about the same time aren't we	15:06:12
Aircrew C Axis 2	Aircrew D	Yes, you may have to extend downwind to fit in behind the radar traffic	15:06:17
Twr	Axis 2	Axis 2 downwind touch and go	15:06:26
Axis 2	Twr	Axis 2	15:06:27
Axis 2	Twr	Wind calm	15:06:30
Axis 2	Twr	You are number one	15:06:33
Twr	Typhoon	[Typhoon c/s] extending upwind	15:06:41
Aircrew D Axis 2	Aircrew C	Unintelligible cockpit checks	15:06:56
Twr	Axis 2	Axis 2 finals gear down	15:07:04
Axis 1	Talkdown	Axis 1, final clearance delayed, continue approach	15:07:06
Axis 2	Twr	Axis 2 cleared touch and go	15:07:07
Talkdown	Axis 1	Continue approach, Axis 1	15:07:08
Twr	Axis 2	Cleared touch and go Axis 2	15:07:09
Aircrew B Axis 1	Aircrew A	One guy just started to tip in to finals	15:07:10
All	Twr	Tornado four miles continuing	15:07:11
Axis 1	Talkdown	Three and a half miles	15:07:12
Twr	Axis 2	Axis 2 confliction on that instrument traffic	15:07:15
Axis 2	Twr	Axis 2 say again	15:07:17
Aircrew B Axis 1	Aircrew A	Well this will be interesting...I'm visual with traffic left ten	15:07:18
Aircrew D Axis 2	Aircrew C	I'm not happy with that...I'm going to duck under, he's way too close	15:07:18
Axis 1	Talkdown	Three miles	15:07:23
Aircrew D Axis 2	Aircrew C	Right, travel gear	15:07:24
Aircrew B Axis 1	Aircrew A	Happy	15:07:26
Aircrew A Axis 1	Aircrew B	Yeah	15:07:27
Aircrew D Axis 2	Aircrew C	That would of put us ahead of him, sorry about that I wasn't happy with that at all	15:07:27
Aircrew C Axis 2	Aircrew D	No agreed	15:07:28
Aircrew B Axis 1	Aircrew A	I'm gonna go up over that	15:07:29
Axis 1	Talkdown	Two and a half miles	15:07:32
Talkdown	Axis 1	Axis 1 switching to tower for an air miss	15:07:34
Twr	Axis 2	Axis 2 going below the instrument traffic	15:07:34
Axis 2	Twr	Axis 2 roger	15:07:38
Twr	Axis 1	Axis 1 join broken off the approach for an air miss	15:07:45
Axis 1	Twr	Axis 1 Lossie Tower join runway two three clutch QFE 1021 correction 1012, 1 deadside, 1 upwind extending	15:07:48

Axis 1 was on PAR RW23 and, from the transcript evidence, was on centreline and on glidepath at 5nm. The conditions were VMC but the crew were flying an IFR approach and had near constant RT from the Talkdown controller. Five seconds after the 3.5nm call, the crew commented, *"Well this will be interesting...I'm visual with traffic left ten."* At the same time, one of the crew members in Axis 2 commented that, *"I'm not happy with that...I'm going to duck under, he's way too close."* From the crew comments, it is evident that they were aware of the looming

confliction and had been maintaining an effective lookout, as well as conducting their respective approaches. Both crews and Talkdown were uncomfortable with the geometry and, ultimately, avoiding action from Axis 2 provided approximately 400ft height separation (Figure 1).

The Talkdown controller conducted the precision approach including the essential safety checks. The controller became alerted when the confliction appeared in elevation and azimuth and there was a delay in delivering Traffic Information as the controller assessed the confliction. The Talkdown controller was relatively inexperienced (first endorsed in PAR on 15 Aug 14) and there may have been a delay in processing and delivering the information; however, the aircrew were visual and reported the 'air miss' on frequency before switching to Tower for a visual circuit join.

The Tower controller, who had been at Lossiemouth for three months, had a medium workload with two aircraft on frequency and one on an IF approach. As per MAA RA 3018(1) (replaced by RA3261), one of the responsibilities of an Aerodrome Controller is to, "*sequence the mixed arrival and departure of visual and instrument traffic.*" The Tower controller had to make a decision over priorities and sequencing between Axis 1 and 2. The reply to the Axis 2 downwind call was in three transmissions and this reflects the occurrence report that the controller thought about the confliction, issued a priority and formulated a plan to get both aircraft their respective approaches. The controller had attempted to produce a flexible outcome, as outlined in local orders, to have Axis 2 conduct a touch-and-go and to issue an 'if visual to Tower' instruction to Axis 1, prior to Axis 1 reaching 2nm. 'If visual to Tower' would have led to the PAR controller asking Axis 1 if he was visual with the Aerodrome. A negative reply would result in a go-around and an affirmative reply would result in Axis 1 calling Tower in order to obtain a clearance to land following Axis 2 establishing safely airborne, after the touch-and-go. Other options available in the circumstances include sequencing the IFR traffic first and extending the visual traffic downwind or sending the visual circuit traffic around at circuit height. Alternatively, the Tower controller had the option of breaking-off the radar traffic. In terms of priorities, the RAF Lossiemouth Flying Order Book (FOB) states:

'VFR/IFR Priorities. Under normal circumstances the Aerodrome Controller is to apply the following order of priorities when integrating IFR and VFR traffic:

- h. Instrument approaches.
- i. Visual circuit traffic – {OCU}
- j. Visual circuit traffic.'

In the planning and decision making phase, the controller may have misjudged the aircraft projection, possibly based on past procedures and experiences at a different fast-jet base. The controller had just taken over the console and judged that Axis 2 would be touching down with Axis 1 at around 500ft; however, the aircraft were converging for the 2.25nm finals area. The Tower controller had recently arrived from another fast-jet base, where a tighter visual circuit was flown. To add further context, various aircraft operate out of Lossiemouth, including Tornados, Typhoons and Sea Kings; certain Tornado configurations can also affect aircraft speed (swept wing or flapless approaches) and sequencing considerations. Runway selection affects the size of the visual circuit as certain local avoid areas extend the width and length of the visual circuit patterns i.e. RW23 circuit extends past a local town. Most of the Tower controller's training had occurred on RW05, and in similar scenarios on RW23, visual circuit traffic had commented that they could get ahead of PAR traffic.

The normal barriers to a confliction would be sound integration procedures, lookout, Traffic Information and a form of ACAS. The Tornados were not fitted with ACAS but both crews demonstrated their lookout and collision avoidance responsibilities, as per the cockpit recordings. The crew lookout and avoiding actions prevented the prospect of a collision. The Tower controller had passed information on the PAR traffic, at 4nm continuing the approach, immediately after clearing Axis 2 for a touch and go. The Talkdown controller would have passed circuit information with a positive clearance or a break-off instruction, which would have been passed prior to Axis 1 reaching 2nm finals. Talkdown was assessing the confliction and about to pass information when the crew took action. The normal procedure for VFR/IFR integration would be for Tower to

sequence traffic, allocate use of the runway and provide information to allow crews to separate themselves accordingly. The sequencing relies upon planning ahead and decision making, which are open to human perceptions and past experiences. The mixed IFR/VFR circuits at Lossiemouth can be complex due to the different variables and this tests the judgement of all involved. The ATC unit have provided more guidance in their training manuals for controllers assessing sequencing of aircraft; the unit are coordinating with aircrew to review the 'if visual to tower' call. A thorough unit Occurrence Safety Investigation was conducted and produced a number of recommendations.

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. The Lossiemouth Flying Order Book states that IFR traffic has priority over VFR circuit traffic; therefore Axis 2 was required to give way to Axis 1.

Comments

HQ Air Command

This incident highlights the requirement for crews to maintain a high level of situational awareness and a robust lookout when joining or operating within a busy operational aerodrome and, if required, question the direction given by ATC. Despite the best intentions of the Aerodrome Controller to provide flexible management of the visual circuit, limited experience of controlling this aircraft type and at this location led to the visual traffic being sequenced ahead of the instrument traffic and into conflict on finals.

The crew of the Axis 2 had discussed the likelihood of being required to position behind the arriving instrument traffic. The allocation of priority in the visual circuit was unexpected and caused the crew to alter their plan. Despite not fully understanding the intentions of the arriving traffic, an opportunity remained to continue with their original plan, thereby removing the potential for conflict. The crew of Axis 1 arriving via an instrument approach were visual with the circuit traffic and had situational awareness regarding the potential conflict for some time prior to the incident. Whilst remaining visual with the conflicting traffic, the crew of Axis 1 elected to continue their approach to the point where they felt concerned about the proximity of the other aircraft.

Both crews had the responsibility for collision avoidance and for not flying into such proximity as to create a danger of collision. Thankfully, the crews of both aircraft maintained visual contact throughout this incident and elected to take suitable avoiding action, albeit at a late stage. Local Air Traffic training and procedures have been amended following a thorough investigation into this incident.

Summary

An Airprox was reported on Wednesday 26th November 2014 at 1505 between two Tornados at RAF Lossiemouth. Axis 2 was in the visual circuit, turning finals and Axis 1 was conducting a PAR approach to land. Both pilots took avoiding action; because the incident was below the NATS area radar coverage the exact radar separation is not known.

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, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

¹ Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions) as reflected in Military Flying Regulations.

The Board first considered the actions of Axis 1, the Board noted that despite not being given Traffic Information by ATC, he was visual with the circuit traffic and some members opined that he could have broken off the approach much earlier than he did if he had perceived there to be a confliction. However, they also acknowledged that being an instrument approach, and in accordance with the Lossiemouth flying order book, as IFR traffic he could reasonably have expected that he had priority.

Turning to Axis 2, again the Board noted that the crew had internally discussed the potential need to extend downwind to go behind the radar traffic. This indicated that they recognised the possibility of a confliction on finals. The Board surmised that once the Aerodrome controller had given them landing priority downwind they were then seduced into following along with his plan, perhaps against their better judgement. The Board discussed at great length whether the crew should have been expected to clear their path before turning finals, or at the very least questioned the controller before turning in. Some members opined that responsibility for collision avoidance ultimately remained with the pilots and so, knowing that IFR traffic had priority in accordance with the flying order book, irrespective of what the controller had told them they should have gone around from the end of the downwind leg if there was any uncertainty. The counter argument proposed by other members was that, not knowing the intentions of the radar traffic, they could reasonably have expected ATC, with full situational awareness, to have allocated the priorities appropriately, and so were justified in commencing the final turn and descent in expectation that the PAR traffic might be overshooting. This led the Board onto lengthy discussions regarding the ATC role in the Airprox, and the dangers of trying to second-guess what other aircraft might be doing, or be capable of doing, when faced with a confliction.

Acknowledging that the PAR controller was relatively inexperienced, the Board was disappointed that he had not given Traffic Information to Axis 1 on first spotting the potential conflict on his radar. However, they were heartened to hear that new simulator scenarios to include the need to give Traffic Information were being included in PAR training packages, and that these were to be used RAF-wide. Turning to the actions of the Aerodrome controller, the Board heard that he was relatively new to Lossiemouth, had spent most of his training there using RW05, and so had limited experience integrating radar and visual circuit traffic on this runway. His previous unit had apparently not had the same visual circuit operating limitations or complexities as Lossiemouth, and he was therefore not attuned to anticipating a wider visual circuit on RW23 to avoid the local town (which then put the two aircraft in proximity with each other due to the extended track of the aircraft in the visual circuit). Again, members were pleased to hear that Lossiemouth were planning to address this training shortfall in the future. The Board also noted that, in this case, whilst well-intentioned, the controller's plan to get both aircraft in from their approaches was based upon the flawed use of the "if visual call tower" procedure for the PAR aircraft. This procedure was not intended for use in this scenario, but instead for ones where use of the runway by radar traffic was assured. Furthermore, its use in this scenario relied upon the radar traffic becoming visual with the circuit traffic at a relatively late stage in the approach which, with traffic turning finals in the visual circuit, had the potential to be dangerous. Moreover, without a positive clearance being passed to the radar traffic, visual circuit information would also not have been passed. Fortunately, in this situation the radar traffic, Axis 1, was visual with the circuit traffic and elected to break off the approach at the same time as the visual circuit traffic 'bunted' below.

Non-RAF members of the Board recalled that the Board had recently made a recommendation to the MAA about the provision of Aerodrome Control Services at military airfields (Airprox 2014121), which had been deemed unnecessary by the MAA. Ironically, in this instance, it had been an attempt by the Aerodrome controller to positively sequence the aircraft that had led to the crew of Axis 2 changing their plan. Nevertheless, they opined that the situation seemed to indicate a lack of certainty about who was responsible for what in military airfield visual circuits; if Aerodrome Control Services were not to be formally adopted, for which they recognised that there were rational reasons, then military pilots needed to be much more positive in ensuring their own separation and sequencing in the visual circuit.

Moving on to determine the cause of the Airprox, the Board agreed that it had been a misjudgement of sequencing by the Lossiemouth Tower Controller that was at the root of the incident. However,

they then discussed, at great length, whether the aircrew, and in particular Axis 2, had contributed to the event by allowing the situation to develop to a point where the aircraft were so close that drastic action had been required. After a vote the Board decided by the narrowest of margins that there were no contributory factors. Turning to the risk, it was agreed that although both pilots had been visual with each other, that the situation developed to the point where one aircraft needed to bunt below the other made this Risk Category B, safety margins were much reduced.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A misjudgement of sequencing by the Lossiemouth Tower Controller.

Degree of Risk: B.