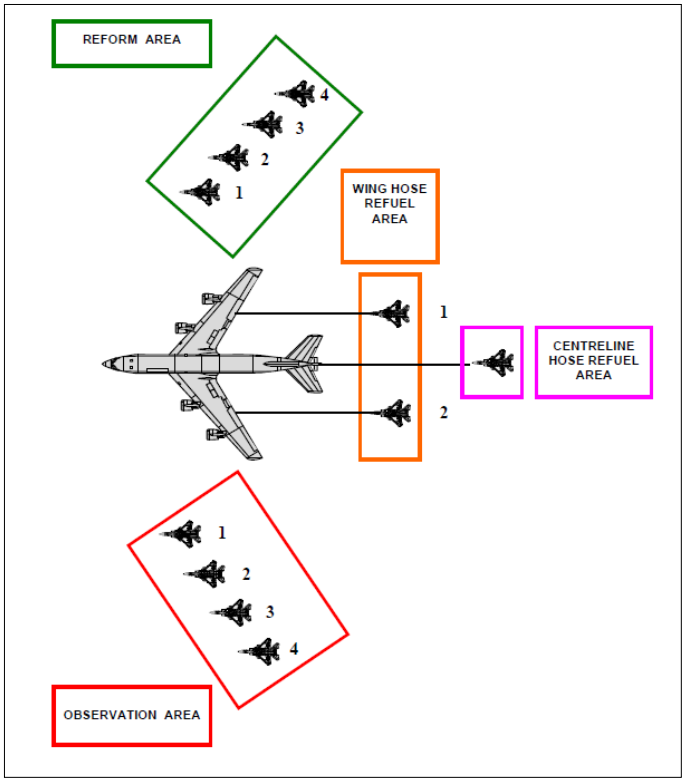
AIRPROX REPORT No 2012009

Date/Time:	25 Jan 2012 1814Z	(Night)
Position:	5558N 00103E	
Airspace:	(AARA 5)	(*Class: G*)
	Reporting Ac	*Reported Ac*
Type:	Tornado GR4	Typhoon FGR4
Operator:	HQ Air (Ops)	HQ Air (Ops)
Alt/FL:	FL200	FL200
Weather:	VMC CAVOK	VMC NK
Visibility:	50km	NK
Reported Separation:	30ft V/30ft H	NK
Recorded Separation:	NR	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

UKAB Note (1): The above is a diagram taken from ATP56 (B), the NATO manual of AAR.

THE TORNADO GR4 PILOT reports conducting night AAR in AARA 5. He was visual with the VC10 tanker heading 265° at 280kt. The VC10 had 2 Typhoons in tow and he was cleared to join in the 'observation left' position on it. Typhoons 1 and 2 were in contact right and left respectively. When he was about three ac lengths back from the observation position and 50ft low, Typhoon 1 disconnected normally, was cleared to the 'reform right' position and was seen to begin moving.

As the Tornado crew continued forward towards observation left, they began the 'before contact checks' and Typhoon 2 was cleared to disconnect. They interrupted their checks while the pilot raised his NVGs and they heard Typhoon 2 cleared to the 'reform right' position. They stabilised just aft of the VC10 wing line then completed the checks.

The Tornado pilot then saw Typhoon 2 in plan form turning towards him and initiated an immediate pull up. The navigator who was still wearing NVGs also saw Typhoon 2 roll L towards them before passing below the Tornado. Typhoon (2)'s nose passed underneath the Tornado, mid fuselage, and the Tornado crew felt a moderate burble as the ac went below. The Tornado continued the climb to FL210 before discontinuing AAR and commencing RTB.

THE TYPHOON (2) FGR4 PILOT reports flying as No2 of a pair of Typhoons conducting night AAR training in AARA 5 with a VC10. Following a successful refuelling on the left hose, he disconnected and moved to a position about 30ft astern of the hose. Having satisfied himself using external visual cues that the ac was stable and in a safe position, he briefly looked down to locate the refuelling probe switch but was unable to locate it immediately due to the dim cockpit lighting. Within 2sec he looked back up to be presented with a picture of his ac climbing towards the trailing edge of the VC10 wing with what appeared to be significant closure rate. He executed a breakaway manoeuvre by rolling left to 95° AOB and applying full back stick.

Having stabilised the ac he informed the tanker and stowed the probe and at that point the Tornado called to say that they had experienced an Airprox with them. He did not see the GR4 until after the incident, and so he cannot comment on the separation.

HUD video analysis indicated the following:

a. Four minutes prior to the incident, the Tornado called visual with the tanker and was cleared to join.

b. At the time of the incident the GR4 had not reported 'Observation Left'.

c. At the point the breakaway manoeuvre was initiated the Typhoon was positioned aft of the hose basket with a flightpath of just less than 1° above the horizon and 7kts closure.

d. Displacement achieved from the tanker during the breakaway manoeuvre was 300ft low, swept in the 7 to 8 o'clock position at approx 0.2nm slant range.

THE VC10 PILOT reports that two Typhoons and a Tornado were the second and third serial respectively of a night AAR sortie in AARA5. The Tornado GR4 joined the VC10 in a safe and controlled manner and settled into a steady position and, he thought, called 'Observation Left'. The join and position were witnessed and confirmed visually by the tanker captain.

Typhoon (1) completed a second dry contact, before being moved to the reform position [right echelon] then Typhoon (2) was given the order to disconnect, which the pilot acknowledged.

Once out of contact and astern the hose, Typhoon (2) was given the order to 'Go Reform right'; the pilot acknowledged and the [VC10] engineer saw on the CCTV Typhoon (2) begin to move. The engineer then lost sight of Typhoon (2), the captain looked left and saw Typhoon (2) about 0.5nm astern and low and in the 7 o'clock position.

After the incident the Tornado initiated a climb to FL210 as he elected not to refuel, but to RTB and was released by the tanker to contact Scottish Mill.

Typhoon (2) then regained leader and the Typhoon flight departed the tanker iaw published procedures. The VC10 crew continued its sortie without further incident.

UKAB Note (1): Since the incident was not reported on the frequency in use, ScATCC were informed of the incident after the event; however, they provided a comprehensive report. Following discussion with HQ Air BM SM it was agreed that there were no ATC aspects to this incident and for brevity the ScATCC report has not been included.

UKAB Note (2): HQ 2 GP (the VC10 operating authority) conducted a Non-Statutory Inquiry (NSI) into this incident. The Inquiry is 10 pages in length (plus additional Annexes) and is classified 'Restricted - Limited Distribution'; for brevity and to comply with the security caveats only the salient points are outlined below (disidentified).

REPORT INTO AIR SAFETY OCCURRENCE ON 25 JAN 12 – TYPHOON FGR4 REG XXX AND TORNADO GR4 REG YYY - *[abbreviated and disidentified]*

Description of Events.

The Typhoon flight, a 2 ship of Typhoons, was tasked to fly a night CT sortie from RAF Coningsby comprising a transit to AARA 5 for non-EO AAR with a VC10, followed by 1v1 intercepts. The sortie had originally been programmed as a 3-ship, but very early in the planning process this was reduced to a 2-ship.

The Tornado flight, a 2 ship of Tornado GR4s, was tasked to fly a night EO Close Air Support (CAS) sortie from RAF Lossiemouth as part of a Sqn pre-deployment trg package for an operation. During the planning process it became evident that the VC10 would be available for night AAR, and the plan was amended to allow the Tornado leader to conduct EO AAR at the start of their sortie while the No 2 conducted CAS in the Dufftown area. After takeoff, the Typhoon flight and the Tornado leader both routed direct to AARA 5 to RV with the VC10 at FL200 and 280kts. The Typhoon flight was the first of the 2 elements to join the VC10, although not the VC10's first receiver; Lossie XX (a single GR4) had already completed AAR and departed from AARA 5. The Typhoons' transit and join were uneventful and as the aircraft approached the observation left position (but before they were able to make their "observation left" R/T call) the VC10 cleared Typhoon 1 astern the right hose and Typhoon 2 astern the left hose. Typhoon 1 continued as directed but at this stage Typhoon 2 had indications of a minor fuel imbalance and maintained observation left for a further minute until the problem was rectified. Typhoon 2 then proceeded astern the left hose. Both Typhoons manoeuvred normally around the VC10 and had successful contacts. During this passage of flight the Tornado leader was cleared to join the VC10 and checked in on the boom frequency aware of the two Typhoons in contact.

Once fully refuelled Typhoon 1 requested disconnect and reconnect for a dry AAR contact and was cleared to do so. Upon completion of the dry contact Typhoon 1 was cleared to disconnect and subsequently cleared to the reform right position, and Typhoon 2 was cleared to disconnect. At this stage the Tornado was approaching the observation left position and with both crew on NVGs the VC10's external lighting began to interfere with the Tornado pilot's NVGs. He briefly halted his approach short of the observation left position to raise his NVGs; the WSO's NVGs remained down. At the same time that the Tornado pilot raised his NVGs and was about to drive forward to the observation left position, the pilot of Typhoon 2 disconnected and, once he assessed he was stabilised astern, looked inside the cockpit to identify the fuel probe switch. The VC10 crew cleared Typhoon 2 to the reform right position. Unable to immediately identify the probe switch, the pilot of Typhoon 2 looked up after approximately ½ second to be faced with a perception of an upwards closing vector towards the VC10 wing-tip. Instinctively he took evasive action by rolling to ~95º AOB and applying full back stick. The Tornado crew was able to glimpse this manoeuvre occurring, and the pilot pulled aft on the stick in an attempt to gain separation. The Tornado pilot does not believe this action took place quickly enough to have reduced the collision risk.

Typhoon 2 is assessed to have passed underneath the Tornado with a miss-distance estimated by the crew of the Tornado as 20 to 30ft (the proximity was such that the crew felt disturbed airflow as Typhoon 2 passed below them). Once the collision vector with the VC10 was broken, and unaware of having passed close underneath the Tornado, the pilot of Typhoon 2 rolled back on to the tanker's heading and stabilised 500ft low. The Tornado pilot continued climbing to FL210 and informed ATC of his change of altitude. Typhoon 2 pilot acknowledged his clearance to reform right and reported that he had "had to breakaway" and then, once stabilised, continued with his clearance to join Typhoon 1 in the reform right position.

From the reform right position Typhoon 1 had seen Typhoon 2 disconnect and stabilise astern the left hose, but had not perceived any drift from that position before he saw Typhoon 2 execute the evasive manoeuvre. Typhoon 1 did not see the Tornado until it began to climb away from him.

Based on the witness statements and the HUD footage, the Panel does not consider that the collision risk with the VC10 was as high as was perceived by the pilot of Typhoon 2. Nonetheless, given the perceived level of collision risk, the pilot of Typhoon 2 reacted instinctively and in an understandable manner.

The Tornado crew briefly discussed the incident in-cockpit and elected to terminate their sortie and RTB, passing their intentions to the VC10 (a full transcript of intercom and R/T calls is at Annex A [not published]). The R/T calls at this point made it difficult for any of the aircrew to gain a full understanding of what had taken place, although each crew had a picture of what they believed to have occurred which shaped how they continued with their sorties.

a) Tornado. The Tornado crew felt that they had almost collided with Typhoon 2 and were sufficiently shaken to discontinue all tactical aspects of their sortie and return to RAF Lossiemouth. Airborne submission of an Airprox report was discussed but discounted, as the Tornado pilot wished to fully confirm his understanding of events before raising a report.

b) Typhoon. The Typhoons were now both fully fuelled and needed to reduce weight before landing, either by continuing with the intercepts or in some other manner. Having confirmed that Typhoon 2 was content to continue the sortie, Typhoon 1 judged that continuing with the briefed serial was the most appropriate course of action, and the Typhoon flight departed AARA 5 and completed an uneventful 1v1 Intercept profile. Typhoon 2 did not consider airborne submission of an Airprox report as he was not fully aware of the proximity between the two aircraft. Once all aircraft had recovered to their departure bases the crews conducted telephone debriefs to ascertain the facts of the incident. The Tornado crew and Typhoon 2 pilot agreed to submit ASORs via ASIMS and the captain of the VC10 made a full note of the events prior to discussing his requirement for Airprox reporting with the Sqn leadership.

c) VC10. The VC10 crew understood that there must have been a collision risk between Typhoon 2 and the Tornado and that they had not contributed to the incident in any way. The captain elected to continue with the sortie as planned and had no intention of submitting an Airprox report whilst airborne as he did not believe they had been directly involved.

Determine the Cause of the Occurrence and Examine Contributory Factors.

a. Cause. The Pilot of Typhoon 2 became disorientated astern the left hose of the VC10 whilst attempting to stow the probe.

b. Contributory Factor. The pilot of Typhoon 2 assessed that avoiding action was necessary to prevent a collision with the VC10.

c. Other Factor. The momentary pause in the Tornado's progress towards the observation left position put him in the flight path of Typhoon 2 during the latter's avoidance manoeuvre.

The Board reviewed the relevant Tornado and Typhoon publications and instructions and as a result made the following recommendations:

Recommendations:

(1) Advice on disconnecting from the tanker in the TGRF HB and the TUG [respective ac type handbooks] should be amended to specify that: "when safely established in the reform position pilots should then commence the After Refuelling Checks". This wording is specifically intended to prevent pilots from attempting to stow the probe whilst in the astern position.

(2) Advice on conducting pre-AAR checks in the TGRF HB and TUG are aligned to utilize the TGRF HB wording, which does not prohibit initiation of the checks before reaching the observation position.

(3) Chapter 9 of the TGRF HB should be amended to include specific advice on mixed NVG and non-NVG AAR, with an emphasis on when to lift NVGs during a join so as to not interfere with a smooth join to the observation position.

(4) Typhoon, Tornado GR4 and Brize Norton StanEval teams convene a meeting to discuss the NSI Panel's report and agree relevant amendments to the TGRF HB and TUG, to include agreement on use of the ATP-56(B) definitions for all AAR positions, and depiction of same in the TGRF HB and TUG.

(5) Typhoon StanEval should include advice on night AAR in the TUG, based on the advice in the TGRF HB and that in the Typhoon StanEval AAR Brief.

Initial Response to the Incident.

A full transcript of R/T calls during and immediately after the incident between the VC10, the Typhoon formation and the Tornado, along with cockpit intercom from the Tornado was provided. The Panel considered two aspects of the initial response to the incident to be worthy of comment.

a. Communications. A previous Aircraft Accident Report highlighted the compelling need to fully communicate any incident around tanker aircraft that is not immediately apparent to the formation leader, and the Panel believed that a few short calls to establish what had happened would have allowed all aircraft to make a fully informed approach to the conduct of the remaining sortie time. The Panel considered that the lack of precise terminology during the immediate aftermath of the incident was not conducive to building an accurate picture of events amongst the VC10, the Typhoons and the Tornado. Typhoon 2 used the term "breakaway" to describe the avoiding action he took to remove his perceived collision risk with the VC10. This is a specific term used during the conduct of AAR defined in ATP 56. Rather than conducting a breakaway, the Typhoon was taking avoiding action to stop a potential collision risk.

b. Airprox Reporting. As soon as possible after being involved in an Airprox, the pilot of a British Military aircraft is to make an initial report to ATC (MAA Regulatory Publication-Gen-RA1410(1) Para 45-49.). In the case of the incident under investigation, none of the pilots made an airborne filing of an Airprox report, and it was not until after subsequent discussion on the ground that initial reports were made. The Tornado and VC10 pilots both submitted ASORs linked to an Airprox, whilst Typhoon 2 submitted an ASOR not linked to an Airprox. The Panel detected a widely held belief that the current Airprox investigation system is regarded by aircrew as taking too long.

Recommendations.

(1) The relevant sections of Air Staff Orders (ASO) for "Aircraft Accidents And Incidents" (ASO 425) be amended to incorporate a requirement to debrief, whilst airborne, all incidents considered likely to lead to submission of an ASOR and specifically all incidents occurring during AAR.

(2) ASO 425 be added to 2GASOs in a similar format to 1GASOs and AWCASOs, incorporating the debrief requirement at sub-para (1) above.

(3) Group Flight Safety Staff ensure that crews are refreshed on the requirements of MAA Regulatory Publication-Gen-RA1410(1) regarding Airprox reporting.

(4) Group Flight Safety Staff investigate the utility and speed of the current Airprox investigation system.

HQ AIR (OPS) comments that units are required by MAA Regulation to investigate their own Airprox, although this is only possible in practice for the most serious incidents. UKAB assessment of risk and cause normally waits for the outcome of such investigation so that they may be considered, and to avoid duplication of investigative effort. Most are left for the UKAB, with Air BM SM support, to investigate, which HQ Air recognises takes time. Furthermore, HQ Air recognises the efforts of the UKAB to reduce this time lag as much as possible, and also distributes the outcomes immediately and performs some limited analysis of the results to assist the units involved.

The Recommendations should prevent recurrence as long as the revised procedures are followed rigorously. This incident highlights that AAR, like many military aviation activities, requires high levels of attention and that things can go wrong very quickly. The dangers of self-induced distraction in

close proximity to other aircraft, day or night, must always be considered; periods of 'heads-in' time in such scenarios must be minimised and much more time may be needed for any in-cockpit activity. Furthermore, the only safe breakout direction behind a tanker is directly backwards. Once the situation developed where a lateral movement was required, or was triggered instinctively, a conflict with joining traffic was always a possibility. The information that traffic was joining on the left was available in the Typhoon cockpit but was not able to be factored in at the time.

This incident serves as a salutary reminder that procedures need to be robust and rigorously applied when conducting such potentially hazardous activities.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of all 3 ac, transcripts of the relevant RT frequencies, radar recordings, reports from the air traffic controllers involved, a copy of the HQ 2 Gp NSI and reports from the appropriate ATC and operating authorities.

The Board was briefed that, following discussion with the UKAB Secretariat, HQ Air had recommended that an independent NSI be conducted since the UKAB Secretariat lacked the in-depth knowledge of current night AAR procedures.

The Board agreed that the NSI instructed by HQ 2 Gp and provided in full to the UKAB was comprehensive, had identified the cause and relevant factors and had made appropriate recommendations. The Board therefore accepted the report and the HQ Air comment without reservation or further remark; that being the case it was agreed that it would form the basis of the UKAB investigation. Subsequent Board discussion of this most serious incident was therefore confined to assessing the degree of Risk; Members agreed unanimously that there had been a serious risk of collision. Members observed and welcomed that most of the follow-up actions had already been initiated.

The UKAB agreed that there was a perception, identified in the NSI, that many pilots (not only military) believe that Airprox investigations take too long; this has already been identified and addressed both by the UKAB internally and partner organisations. This has resulted in a significant shortening of the process, from about 6 months to just over 3 months, with no reduction of investigation depth or quality.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Attempting to stow the probe while astern the VC10's left hose, Typhoon 2 pilot became disorientated and broke away into conflict with the joining Tornado, which he did not see.

Degree of Risk: A.