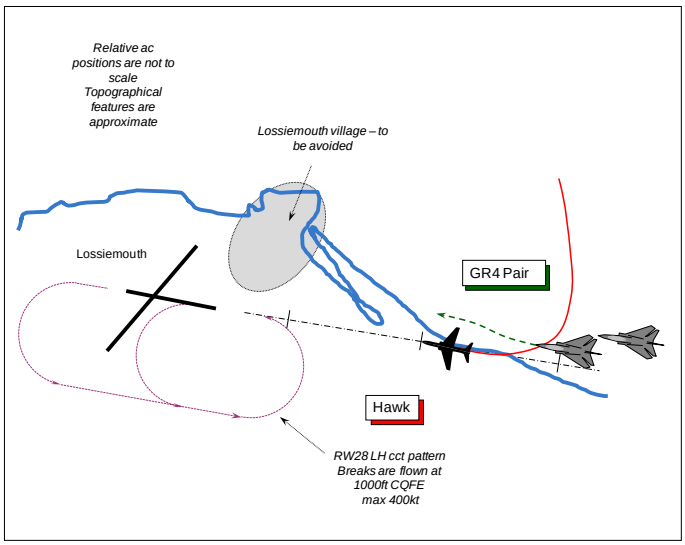
AIRPROX REPORT No 2011136

Date/Time: 6 Oct 2011 1628Z

Position: 5742N 00315W (Initials to RW28 at Lossiemouth – TDZE: 36ft)

Airspace: Lossiemouth CMATZ (*Class: G*)

	Reporting Ac	*Reported Ac*
Type:	Tornado GR4 pr	Hawk T Mk1
Operator:	HQ Air (Ops)	HQ Navy
Alt/FL:	1000ft CQFE (991mb)	900ft↓ CQFE (991mb)
Weather:	VMC CLBC	VMC CLBC
Visibility:	10km	9km
Reported Separation:	Nil V/250m H	Nil V/250m H
Recorded Separation:	Not recorded	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE TORNADO GR4 PILOT reports he was leading a pair of GR4s on a visual recovery at Lossiemouth at the completion of an evasion sortie. They were informed that RW28 was in use and, realising there was a large number of ac recovering to the aerodrome, remained with APP to gain SA on the other ac. Flying an arc from NW of the aerodrome out to the E at about 16nm prior to running in to the aerodrome on a heading of 280º, APP cleared them to continue their visual approach and at about 10nm they switched to TOWER. Under a BS from TOWER they positioned themselves on the Deadside and gained visual contact with the 3 other ac in the cct. He was just about to call Initial when the pilot of a Hawk ac was heard on the frequency calling to join for a visual straight-in from 2nm Final to land. A few seconds later, inside Initial heading 280° at 1000ft Clutch QFE (CQFE) (991mb), he caught sight of a Hawk directly in front of them 0·3nm away and 200ft above crossing from R – L in a descending RH turn. The black Hawk with lights on and undercarriage down was slightly above their height initially, but it continued to descend, belly-up to his GR4 pair and passed very close in front of them. To avoid the Hawk he made a slight gentle right-hand turn (in close formation) as the Hawk passed 250m away at the closest point down the port side with a 'medium' Risk of collision. He immediately called Initial and advised TOWER that they had gained sight of the Hawk joining the cct. On the subsequent break into the cct he was sufficiently distracted by the Airprox that he lowered the gear instead of the flaps at 265kt. The Airprox was subsequently reported to the ATC Supervisor after landing by telephone.

The ac has a drab grey camouflage scheme; the white strobes were on. SSR was selected off.

THE HAWK T MK1 PILOT reports he was on a radar to visual recovery to Lossiemouth from the W. About 5nm NW of Lossiemouth at 1500ft CQFE (991mb), ATC requested that he maintain E as there was radar traffic at 10nm. He was then told that the radar traffic was at 8nm but this was then amended to ac joining visually. Given the deteriorating weather and four further ac recovering behind him, he was keen to help by landing as promptly as possible. Visual with a clear gap in the cct and radar traffic on finals, believing the traffic joining [the GR4 pair] to be at a range of 8nm from the A/D, he requested to join straight to a RH Final from his position 3nm N of the A/D. ATC said 'roger contact TOWER' which he did. Switching to TOWER, he called his position at 'RH Final' and then at 'straight-in 2nm' and was cleared to Land. Descending wings level, passing 900ft, at 150kt a

pair of Tornados were first seen at 3 o'clock - 250m away - as they passed down his starboard side at a range of 250m overtaking at the same height with a 'medium' Risk of collision.

He cited deteriorating weather visible to the SW of the A/D and 9 ac inbound via visual and radar ccts as significant factors. The ac has a Black colour-scheme; the white strobes were on. SSR was selected on.

THE LOSSIEMOUTH AERODROME CONTROLLER (ADC) reports that during a busy recovery wave of mixed ac in deteriorating weather, the Tornado GR4s were joining as a pair through Initial. Shortly afterwards a call was received from the Hawk pilot to join straight-in on Final. At this point he was not visual with the Hawk, so he queried the pilot on his position. The Hawk pilot stated 2nm, visual with the one ahead. He instructed the Hawk pilot to join at Initial, stating that there was a pair joining at Initial. The Hawk pilot again reported final visual with the one ahead, which was the first point that he was visual with the Hawk; upon receipt of a gear check the Hawk pilot was given a clearance to land, the Tornado pair then broke into the cct. An Airprox was not mentioned on frequency at any point.

THE LOSSIEMOUTH ATC SUPERVISOR (SUP) reports that at the time of the Airprox Lossiemouth was on RW28 with multiple ac recovering either visually or radar to visual. At this stage both the radar and visual cct were busy, so with the amount of traffic recovering he asked someone else to supervise the ADC as an extra pair of eyes and ears. The GR4 pair was on a visual recovery and the leader called visual with the A/D about 15-16nm to the E of the A/D. At about 10-12nm the GR4 pair switched to TOWER for their visual join. The Hawk pilot was recovering from the NW for a radar-to-visual approach and flew to the S of Tain Range, before being vectored to the E and descended. About 4nm NE of Lossiemouth the Hawk pilot called visual with the A/D; at this point he was informed of radar traffic – another pair at 3nm - and the subject GR4 pair joining visually at 8nm. The Hawk pilot called visual with the radar traffic at 3nm and the SUP instructed the APP controller to send the Hawk to TOWER thinking that the Hawk was joining through Initials and would be well ahead of the GR4 pair joining visually from 8nm. The APP controller was never informed that the Hawk pilot was doing anything other than a normal join through Initials, he thought.

BM SAFETY MANAGEMENT reports that this Airprox occurred between a Hawk T1 on a radar-to-visual and a pair of GR4s in the latter stages of a visual recovery to RW28 at Lossiemouth, during an Exercise JOINT WARRIOR recovery wave. The Hawk was operating from Lossiemouth as part of the Exercise and was considered to be Station-based having been briefed on A/D procedures.

Due to the distance of Lossiemouth from NATS' radar heads, the Airprox was not visible on radar; consequently, the radar replay was only used to confirm the position of the Hawk in the early stages of the Airprox sequence.

The incident sequence can be considered to have commenced at 1625:20. At this point, a stream of fast-jet ac was recovering for radar to visual and visual recoveries, including the subject ac. The SUP describes the ADC's and the unit's workload as 'high to medium'; the ADC has described his workload as 'high', albeit of 'low' task complexity.

The Hawk pilot and GR4 crews describe the weather conditions at the time of the incident as VMC, with good visibility in nil weather and BKN cloud between 1800 and 2000 ft – CC was BLUE.

Given the often high intensity operations at Lossiemouth, no landline liaison is conducted between the ACR and VCR to 'warn-in' ac joining visually. The APP Assistant annotates the ac's remarks column on the Electronic Tote system with an asterisk for those ac recovering visually, which is then seen by the ADC, GROUND or the Tower Assistant. The standard visual join is the 'Run-in and Break' through the IP, other forms of visual join would warrant a liaison call on landline between the ACR and VCR.

Having held off to the N and E of Lossiemouth to sequence against ac ahead, at 1625:20 the leader of the GR4 pair advised APP that they were, "*15 miles to the east, are you happy for us to turn inbound for visual recovery?*" APP replied, "*Roger, visual recovery approved, radar traffic is at 6 miles finals*" which was acknowledged by the leader. At this point, both ac can be seen on the radar replay; the GR4 pair is 16.5nm ENE of Lossiemouth tracking S'ly, whilst the Hawk is 8nm WNW, tracking E'ly.

APP was then continuously engaged with other recovering ac from 1625:35 until 16:26:16 when the controller asked the GR4 leader (the lead ac's SSR contact faded from the radar recording at 1625:41) whether they were, "*visual with the aerodrome*?" The GR4 leader replied, "*we're now visual with the field, happy, to TOWER*." APP re-stated that the, "*radar traffic is about 3 miles*" and the GR4 leader replied at 1626:24, "*that's copied, we're visual with that traffic,* [C/S GR4 pair] *to TOWER...*[C/S GR4 pair] *stud 2 main go*."

Figure 2 depicts the Hawk's approximate ground track, based upon the radar replay; the grey shaded area is Lossiemouth village which is a noise-abatement avoid. At 1626:29, at a position 3.1nm NNW of Lossiemouth, the Hawk pilot informed APP that he had the, "..*field in sight.*" APP replied, "[Hawk C/S] *maintain please and maintain eastbound, got radar traffic 2 miles and visual joiners about 10 miles*" which was acknowledged by the Hawk pilot. During this transmission, at 1626:37, the Hawk pilot turned to track 105°. APP then informed the Hawk pilot that it, "*won't be much of an extension*" to which the Hawk pilot replied, "*Okay, I can't go far...shall I remain this or go to TOWER now*?" At 1626:52, APP asked the Hawk pilot to, "*confirm you're visual with the ones* [the GR4 pair] *at 8 miles*?" The Hawk replied, "*..negative this time*." APP then stated, "*radar traffic at 8 miles, correction, visual joiners at 8 miles*" that was the GR4 pair. The Hawk was 2.9nm NE of Lossiemouth tracking 105° when the pilot stated at 1627:00 that he was, "*visual with the one at 3* [radar traffic] *but I can fit in behind him if I join downwind and turn finals now*." APP replied at 1627:06, "[Hawk C/S] *roger, continue inbound, call TOWER, good-day*" which was acknowledged by the Hawk pilot at 1627:08 stating, "*To TOWER, squawking standby*."

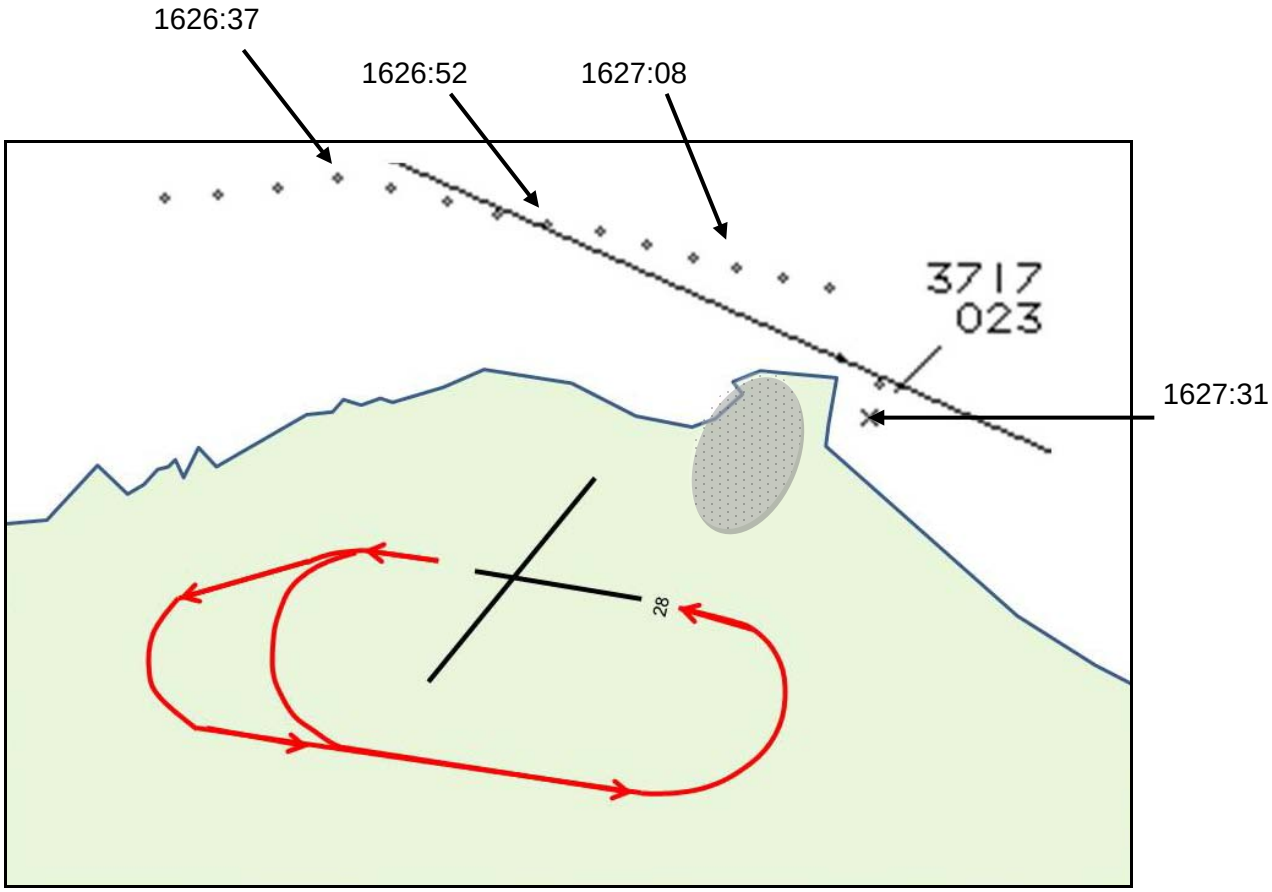


Fig 2: Approximate ground track of Hawk

[UKAB Note (1): Fig 2 Indicated Hawk Mode C of 2300ft is based on 1013mb and equates to a height of about 1640ft Clutch QFE (991mb).]

The SUP reported that having heard the Hawk's transmission at 1627:00, he instructed APP to send the ac to TOWER, thinking that the Hawk would join through Initials and would be well ahead of the GR4 pair joining visually at 8 miles. Although the Hawk pilot mentioned that "*I can fit in behind..if I join downwind and turn finals now*" it is clear that the SUP and APP believed that the Hawk would join though Initials. No landline liaison was conducted between the ACR and VCR to pass on any amendment to the Hawk's joining details.

The Hawk pilot has stated that the deteriorating weather to the SW of Lossiemouth, coupled with the high volume of traffic in the radar and visual circuits, were factors in his decision to land 'as promptly as possible'.

At 1627:00, the GR4 leader called TOWER and requested to join, which was approved; the A/D details were passed with the cct state – 3 in. The GR4 leader reported that having 'positioned on the Deadside he gained visual contact with the 3 other ac ahead in the circuit.' This accurately reflected the cct state at that moment as passed by the ADC and did not include the Hawk.

Shortly after 1627:16, at a position 057° the A/D 3·5nm, the Hawk commenced a R turn to track S'ly to the E of Lossiemouth village. At 1627:31, about 079° the A/D 3.3nm, indicating 2300ft Mode C - about 1640ft CQFE (991mb) - the Hawk pilot called TOWER *"..join for straight-in turning finals*." TWR responded "[Hawk C/S] *Lossie TOWER join runway 2-8 clutch Q-F-E 9-9-1 4 5 in* [5in was the correct cct state including the GR4 pair] *confirm position"*, as the ADC was not visual with the Hawk. The Hawk pilot replied at 1627:42, "*2 miles finals now, coming down through 1 thousand feet*." [At this point, the Hawk was slightly N of the extended RW28 centre-line on a R base leg 3·3nm E of the A/D, maintaining about 1640ft CQFE, moments before the contact fades on recorded radar.] The GR4 leader reported that he became visual with the Hawk prior to calling Initial 'directly in front of them in a descending R turn' and stated on the frequency at 1627:54, that they were, "*visual with that traffic and Initials*." In reply to the Hawk pilot's transmission at 1627:42, the ADC instructed the Hawk to, "*join at Initials 1 thousand feet pair joining*"- GR4 pair. However, the Hawk replied, "*finals 2 miles visual with the 1 ahead*." Having confirmed with the Hawk pilot that the gear was down, the ADC cleared the Hawk to land at 1628:17. It is likely that the CPA occurred shortly after this as the GR4 pair passed down the starboard side of the Hawk, with both pilots assessing that nil vertical and 250m of lateral separation existed. The GR4 leader was able to take some avoiding action albeit a 'slight gentle R turn' as they were in 'close formation.'

The GR4 pair did well to maintain their situational awareness, visually acquiring both the known traffic within the visual cct and the unexpected Hawk. Given their close-formation and likely speed, it is unlikely that they could have done more to sight the Hawk earlier, or to increase separation further.

From the ADC's perspective, when the Hawk pilot called at 1627:31 he would have expected it to be executing a 'run-in and break' as no additional landline liaison had been effected. To the ADC's credit, he immediately requested the Hawk's position. Moreover, the term 'straight-in' has a specific meaning that suggests a position on the extended centre-line; in reality, the Hawk was conducting a right-base join through the deadside. With little time to assimilate the Hawk pilot's intentions to route through dead-side and cognisant of the GR4 pair approaching Initial who had reported visual with the Hawk at 1627:54, the ADC's instruction to the Hawk pilot to join through Initials was the ADC's only option to attempt to sequence the singleton Hawk with the GR4 pair. When the Hawk pilot then re-stated "*finals 2 miles, visual with the 1 ahead",* after receiving a positive gear check, the ADC correctly issued a clearance to land. BM SM contends that the ADC acted appropriately in dealing with a complex event.

In terms of the SUP's instruction to APP to authorise the Hawk's approach at 1627:06, the two controller's perception of the Hawk pilot's intentions is critical. Although the Hawk pilot clearly stated

that he would join "*downwind and turn finals*," the SUP believed that the Hawk would continue to join normally through Initial. This could be from mis-hearing the Hawk pilot's transmission, or only hearing the first part of the transmission where the Hawk pilot stated that they could "*fit in behind*" the radar traffic. Such a 'failure to hear' would have been coupled with confirmation bias of the Hawk's intention to route through Initial, exacerbated by the high taskload. Alternatively and most likely, the SUP may have interpreted the Hawk pilot's transmission as a statement of what the Hawk pilot would do having conducted a 'run-in and break'. This is given weight by the SUP's report that states that the Hawk's 'join through Initials would be well ahead of the [GR4] pair joining visually at 8 miles', which would have provided a more expeditious recovery for the Hawk without delaying the GR4 pair. Unfortunately, it has not been possible to contact the SUP concerned to confirm one or other of these hypotheses. What is clear, is that at the point when the Hawk left the APP frequency the Hawk was 2.9nm NE of the A/D tracking 105°.

From the Hawk pilot's perspective, due to the deteriorating weather to the SW of Lossiemouth and the high volume of traffic in the radar and visual circuits, his desire to recover expeditiously is understandable. However, the Hawk pilot's decision to recover from what was effectively a right-base join suggests that his level of situational awareness was low. Routeing through the deadside would inevitably place the Hawk in conflict with other ac recovering through Initials and by entering the finals turn without being visual with the approaching GR4 pair it is clear that the Hawk pilot had not assimilated the relative speed of his ac and the GR4 pair. Finally, taken literally, the Hawk pilot's statement at 1627:00 that he would join "*downwind and turn finals*", might also indicate that he believed the visual cct was right-hand on RW28.

Whilst it has not been possible to confirm the ATC SUP's understanding of the Hawk's intentions, the main causal factor in this Airprox was the Hawk pilot's decision to join from R base, through the dead side, without being visual with the joining GR4 pair.

HQ AIR (OPS) comments that the Hawk assumed that the GR4 pair was further from his intended recovery track than was actually the case. When joining a *visual* circuit it is the responsibility of the joining traffic to *visually* de-conflict with all circuit, and other joining, traffic. Visual deconfliction *cannot* be based upon assumption. The Hawk pilot should not have joined the visual circuit as he did, he should have joined through Initial as he was told to by the ADC.

HQ NAVY comments that during what appears to have been a particularly busy recovery period at Lossiemouth, in deteriorating weather conditions, the pilot of the Hawk made a decision, based on the information provided to him, to recover as expeditiously as possible. He was told that ac were at 8nm and he informed ATC of his intention to join and land immediately rather than route through Initial. It is for the very reasons described in this Airprox that RN Control Towers are manned with both a Radar Supervisor and a DATCO to supervise the VCR, thereby allowing the 2-way flow of information at the supervisory level.

THE HAWK PILOT'S COMPANY comments that the Hawk pilot was fully aware of the recovery procedures at Lossiemouth. He elected to carry out a radar-to-visual recovery from the west to route to the initial point (IP) via the north of the aerodrome. The weather was deteriorating with a high rate of radar to visual and visual recoveries. As the Hawk pilot reported *"field in sight"* APP instructed the Hawk pilot to maintain an easterly heading and passed TI on radar traffic at 2nm and the GR4 formation at about 10nm. APP later passed further TI on the GR4 formation and requested if the Hawk pilot was visual, who replied *"Negative this time"*. APP immediately passed further TI on the GR4 formation as *"radar traffic at 8 miles, correction, visual joiners at 8 miles".* The Hawk pilot replied he was *"visual with the one at 3 but I can fit in behind him if I join downwind and turn finals now".* The Hawk pilot judged that by converting from a standard visual recovery through initial to a right base join would reduce impact on the already busy circuit and allow for an expeditious recovery as he was getting low on fuel. The Hawk pilot erroneously reported downwind when in fact he was downwind right hand. The reply the Hawk pilot received from APP was *"..roger, continue inbound, call TOWER..".* This was taken, understandably, as approval to turn finals. The Hawk pilot initiated his turn inbound and flew into conflict with the GR4 formation. The Hawk was painting on radar until after the transfer to TOWER.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from air traffic controllers involved and reports from the appropriate ATC and operating authorities.

It was explained that this Exercise produced an extremely busy period for ATC at Lossiemouth and the importance of following standard procedures had been emphasised to the Hawk pilot's detachment during Station briefings on local procedures. The lead pilot of the Lossiemouth-based GR4 pair was conducting a conventional run-in-and-break visual approach from the E. It was stressed that APP was not required to sequence the GR4 pair recovering visually against the singleton Hawk and no TI had been provided to the GR4 leader about it. A civil controller Member opined that in busy periods it is often simpler to take charge and sequence all traffic by issuing radar vectors. Nevertheless, other Members countered that visual formation recoveries were the speediest and most efficient method of recovering large volumes of fast-jet traffic.

The GR4 leader had switched from APP to TOWER before the Hawk pilot transmitted his proposal to APP to join visually from R base direct onto final. Therefore the GR4 leader had no prior knowledge of the Hawk before he heard its pilot call on the TOWER frequency and confirm his position in response to the ADC's query. The lead GR4 pilot was responsible for fitting in with visual traffic and it was clear the ADC had provided the correct cct state originally as he knew it; the GR4 leader had identified all the cct and radar traffic before he joined through the IP. Quite understandably, therefore, the lead GR4 pilot would have been surprised by the sudden appearance of the Hawk, belly-up gear down, joining from a R base leg as they ran in through the IP.

The Hawk pilot's company had commented that the Hawk was getting low on fuel, but the Navy Member contended that this was not a significant factor that contributed to the Airprox. Nevertheless, Members were keen to point out that pilots with concerns over their fuel-state should notify ATC at the earliest opportunity for a 'fuel-priority' recovery. It was evident here that the Hawk pilot had endeavoured to assist ATC during this busy recovery by converting his standard radar-to-visual approach through the IP for a run-in-and-break into the cct, into a non-standard visual recovery via a R base join to RW28 – which has a LH cct - to land. Whilst he had transmitted this proposal to APP, the phraseology he used "*..join downwind and turn finals now"* was evidently not clear enough and thus open to interpretation because he actually meant a R base-leg join direct to final. The lesson here was keep RT standard whenever possible, however, Members recognised that the controller's subsequent reply, *"..roger, continue inbound, call TOWER.."* had to all intents and purposes acceded to the Hawk pilot's proposal. Furthermore, the SUP's misunderstanding of the Hawk pilot's intentions was also key to this Airprox. The BM SM report postulated that the SUP believed that the Hawk pilot would execute a normal join through the IP prior to breaking into the cct, but this was evidently contrary to what the pilot had told APP. From this point APP ceased issuing vectors to the Hawk pilot for his radar-to-visual recovery; without ensuring he was visual with the GR4s and under a misunderstanding as to how the Hawk would approach the aerodrome, the SUP instructed APP to allow the Hawk pilot to continue inbound as the latter had proposed, which seemed like an abrogation of the controllers' responsibilities rather than sequencing the radar-to-visual recovery. The Board agreed this was part of the Cause, insofar as ATC did not prevent the join through right base, which resulted in the subsequent conflict with the GR4 pair as the Hawk descended through their level onto final ahead of them.

Nonetheless, even if the SUP thought the Hawk pilot would keep the speed on and fly through Initial a conflict could still have ensued and it was plain that no attempt had been made to forewarn the ADC of what was happening. A civil controller Member questioned the SUP's instructions to APP and was surprised that the SUP had the authority to intercede. The BM SM Advisor explained the SUP's executive role here in directing the watch, that he had full cognisance of the traffic situation from monitoring the RT and should, therefore, have been aware of what the Hawk pilot was telling APP. Pilot Members agreed that a breakdown in communication was fundamental to the Cause but were critical of the Hawk pilot for acting as he did. Whilst the Hawk pilot might not have realised how close the GR4 pair was as he turned onto final ahead of them, he had been told about the visual

recovery by APP and should have been looking out for them. The Board agreed that the Hawk pilot's proposal to join in a non-standard manner through R base was the other part of the Cause of the conflict. Combining all these causal factors the Board agreed that this Airprox had resulted because the Hawk pilot requested, and ATC did not prevent, a join through right base, which resulted in a conflict with the GR4 pair.

Controller Members contended that as APP had acceded to his proposed cct join, the Hawk pilot might reasonably have expected APP to have co-ordinated this with the ADC. Despite co-ordination not being stipulated by the unit for radar-to-visual and visual recoveries, controller Members perceived an absence of critical teamwork within ATC. Without co-ordination the ADC was left to sort it out himself unaware of the Hawk turning and slowing down onto finals from R base as the GR4s ran-in at speed. Controller Members were, therefore, critical of the lack of co-ordination here with the Hawk pilot having been switched to TOWER whilst in conflict with the GR4 pair. Members understood the ADC's immediate reaction to the Hawk pilot's call, instructing the pilot to join through the IP, because the controller had not spotted the ac at that stage and was unaware of the Hawk pilot's intentions to turn direct onto final. Moreover it was evident that the Hawk pilot was unaware of the relative proximity of the GR4s until he first saw the pair overtaking him. Other pilot Members recognised how much the GR4 lead pilot had been affected by the close quarters encounter when he mixed-up the gear and flap selections downwind. All this led some Members to conclude that safety had not been assured. However, the leader of the GR4 pair had spotted the Hawk in time to manoeuvre further into the deadside by making a slight RH turn, leaving the Hawk 250m away to port, the latter subsequently descending having been cleared to land. Weighing all these factors carefully, by a majority of the Members, the Board concluded that no Risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hawk pilot requested, and ATC did not prevent, a join though right base, which resulted in a conflict with the GR4 pair.

Degree of Risk: C.