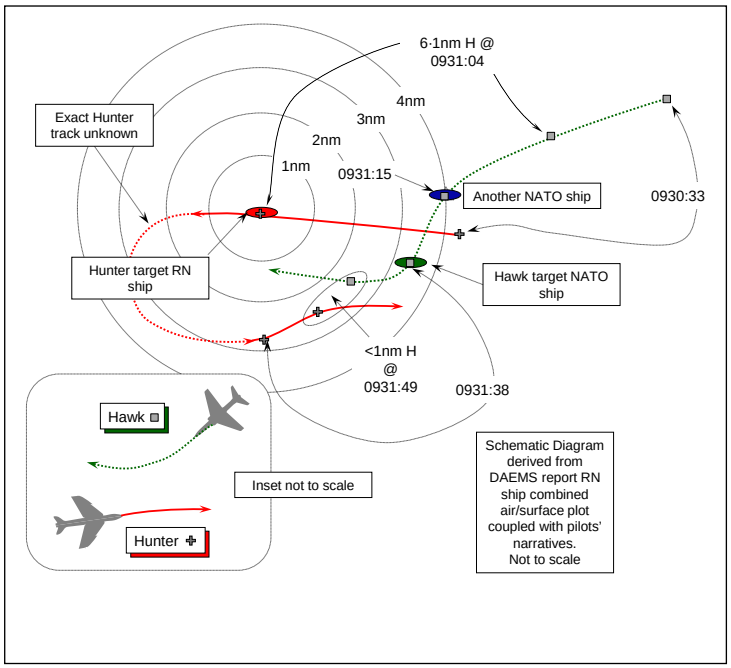
AIRPROX REPORT No 2012047

Date/Time: 22 Mar 2012 0931Z

Position: 5000N 00400W (19nm SW of Start Point S Coast Exercise Areas)

Airspace: EGD 008 (*Class:* -)

	Reporting Ac	*Reported Ac*
Type:	Hawk T Mk1	Hunter Mk58
Operator:	HQ Navy	Civ Comm
Alt/FL:	250ft QNH (1024mb)	100ft RAD ALT
Weather:	VMC Haze	VMC Haze
Visibility:	9km	9km
Reported Separation:	200ft V/50m H	NR
Recorded Separation:	Reported as ¼nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE HAWK T Mk1 PILOT reports he was the front seat PIC, flying dual, as the No2 in a mixed formation led by a Hawker Hunter. The rear seat was occupied by another pilot who was the PF at the time of the Airprox. The formation was conducting an Operational Sea Training (OST) 'Thursday War' exercise, flying visual attacks on a surface fleet and then re-positioning to conduct a pairs missile attack profile.

A face-to-face briefing had been conducted with the lead Hunter pilot before the flight, during which a sound deconfliction plan comprising both geographical and vertical separation had been briefed by the formation leader. It had been highlighted during the brief that, after the pair's attack profile, the Hunter would remain in the S Coast Exercise Areas (SC EXAs) to re-join with a Falcon DA20 in preparation for another attack, whilst the Hawk would RTB at Yeovilton. The Hunter pilot briefed that on completion of his missile profile he would track to the S until the Hawk had cleared the area to the NE. The Mission Commander in the Falcon DA20 had issued a Time over Target (TOT) of 0931 for both the Hawk and the Hunter, but allocated separate target ships to the two ac – a NATO warship to the Hawk and a RN warship to the Hunter. The weather in the SC EXAs was marginal for a 'VMC War', but assessed as within limits by both himself and his rear-seat pilot.

During the early part of the sortie, both he and his rear-seat pilot advised the Hunter pilot that the latter's VHF transmissions were unreadable [UHF Air Safety was used thereafter]. The Hunter and the Hawk joined with the Falcon DA20 to the E of the targets, which is SOP. Shortly afterwards [At 0925:30] the DA20 'launched' the Hunter and the Hawk on the missile profile. The Hunter and the Hawk climbed to medium altitude [15000ft QNH], remaining visual with each other throughout. Plymouth MIL passed updated positions for both targets, at which time it became apparent that the Hunter's target ship was about 4nm further W than the Hawk's target. Consequently, the Hunter accelerated and separated from the Hawk to the W. At a suitable range [8nm] from their target's last-known position, his rear-seat pilot commenced a high dive attack in accordance with the standard missile profile. As they broke cloud at 8000ft, the ship closest to the last reported position for their target was overflown, at which point it became apparent that it was not the correct NATO target ship, albeit it was from the same NATO state, of a sister class and of a very similar design and dimensions. He noticed that their target ship was about 1nm to the SW so the rear-seat PF adjusted his profile to overfly this ship. Flying in VMC, 6000ft below cloud with an in-flight visibility of 9km in

haze out of sun, just after overflying their NATO target ship, whilst recovering wings level at 250ft QNH (1024hPa), heading 220° at 420kt, he noticed a dark object 'blooming' in the front canopy. He immediately gave the order to the PF to 'pull-up' whilst simultaneously taking control as he saw the camouflaged grey/green Hunter pass 200ft below them in a level R turn through an E'ly heading about 50m to port with a 'very high' Risk of collision. He executed a climbing R turn to avoid the Hunter and recovered to Yeovilton without further incident, during which it was noted that the ac had sustained 7.8g.

The Mission Commander had not declared an 'IMC War', which would have resulted in each ac taking up a pre-assigned IMC sanctuary level and might have avoided this Airprox.

His Hawk has a black colour-scheme and the nav lights, nose light and HISLs were on.

THE HAWKER HUNTER Mk58 PILOT reports he was the element leader, of a pair of ac [Hunter and Hawk] tasked to conduct practice attacks against a surface Task Group (TG), which included one RN warship, two NATO warships and an RFA, as part of a routine operational pre-deployment training 'Thursday War' Air Defence Exercise (ADEX) in the SC EXAs. The brief was detailed and complex. The second event of the serial was a missile attack against the TG, from an eastern gate, which involved both ac 'launching' from the wing of a DA20 Falcon ac, climbing to medium altitude [15000ft QNH] and then diving steeply onto the target at the final stage of the attack to emulate the missile profile. During the element briefing it became clear to him that the crew of the No2 Hawk ac had not conducted a missile profile before, [he thought]. Consequently he went through the profile in detail, focusing particularly on the final dive and off target de-confliction procedure. Normally, when two Hawks are simulating such missile profiles, the ac conduct a 30sec staggered 'launch' from the DA20 in order to achieve lateral and time de-confliction over the target area. A height de-confliction is also briefed, with sanctuaries to be honoured until the pilots of the two ac are visual with each other. On this occasion, however, he briefed the No2 Hawk pilot that they would launch together and that he would accelerate ahead of the Hawk to achieve the necessary spacing prior to the final dive. He calculated that he would achieve a 30sec lead as the dive commenced at a range of 7nm from the targets. For the off-target de-confliction he briefed that he would turn L, onto approximately S, and descend to low-level. Off-target, the No2 Hawk was to turn R onto a NE'ly heading and continue to climb to medium level to return to base at Yeovilton, which catered for the height de-confliction. He did not specifically brief height sanctuaries as the ac were to turn away from each other off-target; he in the Hunter descending to low level and the No2 Hawk climbing to medium altitude.

The sortie proceeded normally, except that comms on the VHF frequency were poor, so all intra-formation RT comms were conducted on the UHF Air Safety control frequency. The missile profile started by joining the DA20 at the E Gate, over 40nm [some 65nm] from the target, at low altitude [250ft asl at 0920] for a TOT of 0931. During the transit from the E Gate the target positions were passed by PLYMOUTH MIL - who provide a BS. Flying the lead Hunter, his target was the RN warship about 4nm, bearing 250° from the No2 Hawk pilot's target that was one of the NATO warships. He was aware from the previous event with the ships, which had concluded at 0905, that there was also Another NATO warship in the vicinity. The W - E split of the targets of about 4nm worked well for their planned 30sec split; both ac would commence the dive at approximately the same range from their respective targets at the same time and achieve a simultaneous TOT. From the 'launch' point to the level off at medium altitude [15000ft] he could see the No2 Hawk in his mirror. Once level, he accelerated to 540kt GS and watched the Hawk recede behind him. At the dive point he assessed that he had achieved the required 30sec spacing and also that the No2 Hawk was displaced to the N of his own line of attack (LOA), which he expected, given the target disposition.

At the subsequent element debrief, the No2 Hawk pilot confirmed that his Hunter was positioned in the No2 Hawk's 11 o'clock at a range of about 4nm at the dive point. He called 'diving' at a suitable range [7nm] from the target and assumed that the No2 Hawk was also commencing the dive at that point. As he came out of cloud at about 4000ft amsl in a 45°dive, he saw three targets: his own was easily recognizable as the RN warship, the furthest to the W of the three and, as expected, one NATO ship was about 4nm away on a bearing of about 070°, in the position corresponding with No2

Hawk's target. The other NATO warship was approximately midway between the two targets, a mile or so S of a line joining the targets and therefore on a bearing of approximately 110° from his own target. He called 'on top' a few secs after 0931 and turned S, letting down to below 250ft asl. He waited for about 5sec, but hearing no 'on top' call from his No2 Hawk he transmitted on the UHF frequency 'Hawk, say posit' and started a turn to the E at 360kt. As he had not heard an 'on top' call from the No2 Hawk (which may have been simultaneous with his own), and hearing nothing in response to his second call, he concluded that the No2 Hawk was off-target and had followed the brief by turning R onto a NE'ly heading and commencing a climb. As he turned L through a SE'ly heading, however, he saw the No2 Hawk coming off Another NATO warship, in a R turn at low-level. He remained very low - between 100-250ft asl - to de-conflict from the Hawk, but it was obvious that No2 Hawk pilot saw him late as the ac pitched up noticeably as it passed down his port side. He took no evasive action as he was comfortable that there was no collision risk, although very uncomfortable that the No2 Hawk was in that position.

At the debrief the No2 Hawk PIC explained that he had identified the first target by reading the ships pennant number, recognized that it was the wrong target and, on seeing the second NATO warship to the SW continued in that direction in a shallow dive to overfly the ship at low-level. The Hawk crew acknowledged that their post target actions had eroded the briefed de-confliction. However, as formation leader he was ultimately responsible and with hindsight, given the experience of the No2 Hawk crew, he should have been more explicit about the height de-confliction and he should have remained on a S'ly heading until he had positive confirmation on the RT that the No2 Hawk had exited the target area. These points were debriefed in a constructive way.

The Airprox occurred whilst flying in VMC some 4000ft clear below cloud with an in-flight visibility of 9km in Haze; the surface wind was 070/15kt.

RN FLIGHT SAFETY CENTRE (RNFSC) INVESTIGATION

Elements of the 65-page RNFSC Investigation Report, which included some 36 Recommendations have been summarised below.

As part of a modified ADEX serial the Hunter and Hawk crews were tasked to conduct a pairs Fighter Bomber Attack (FBA) profile followed by a missile attack against surface units conducting Operational Sea Training serials in the SC EXAs. The Hawk was programmed to target a NATO warship and the Hunter was programmed to target an RN warship. On completion of their respective attack profiles the briefed separation criterion for safe flight was not maintained and as a consequence a Defence Air Safety Occurrence Report (DASOR) and associated Airprox were filed by the Hawk PIC. The Hawk Delivery Duty Holder (DDH) subsequently convened an Occurrence Investigation into the Airprox and a very thorough report was provided. A replay of events using the RN Ship's Command Management System (CMS) and the walk-through of events by the Ship's Fighter Controller coupled with the surface and air picture from the RN warship proved invaluable to the investigative team and enabled them a clearer understanding of the sequence of events.

The Hawk and the trial Hunter ac were scheduled to operate together in the provision of Air Support during a Joint Tasking and Readiness Capability Fast Jet Target Replacement Trial.

[UKAB Note 1. The Trial was intended to assess the suitability and utility of Hunter ac in exercises to train RN warship crews]

During the trial, the Hunter was to operate within the confines of the regulatory environment set by the MAA for Military Registered Civilian Owned Aircraft (MRCOA) Operators through the Manual of Flying Orders for Contractors (MFOC). The MAA had explicitly approved the conduct of this trial; HQ Navy Cmd had approved the conduct of this trial and specifically approved mixed ac type formations.

The full deconfliction requirements should have been detailed within the Trial Instruction (TI). It appears that the Hawk Unit and the Hunter Operator were applying different deconfliction parameters, none of which can be sighted in any official document.

At the briefing the Hawk PIC was asked by the Hunter pilot if he was happy to launch as a pair with the Hunter; he declined because he was unaware that the TI included authorisation by NCHQ for mixed ac formations. The TI had been delivered to the Hawk pilot's unit, but it had not been briefed at Unit level. A line in the TI states, 'All pilots are known to each other and these serials, with the attendant briefing requirements, are familiar to all Hawk aircrew. The deconfliction requirements are identical, whether the ADEX ac are Hawk or Hunter ac'.

The TI summary states 'The trial ac [Hunter] will be flown in routine ADEX serials alongside Hawk ac from 'another' MRCOA RN unit and Falcon DA20 ac - it does not specifically mention the Hawk pilot's unit and therefore this serial was flown in contravention of the approved TI.

There is a discrepancy within the statements of the Hawk PIC and the Hunter pilot as to the level of briefing that was required to conduct the missile profile. When asked at the brief whether he was content with the missile profile, the Hawk pilot said that he was content but still wished it to be covered in the brief (which it was). However, he was under the impression that the formation leader took this to mean that he had no experience in this missile profile. The Hawk pilot was used to briefing all profiles within the sortie brief, regardless of currency and he was therefore at liberty to ask for it to be covered as it was good practice to remind each other of the profile required. The Hunter pilot states that the Hawk pilot had asked how they should fly the profile and that he had been required to go into a lot more detail than what is laid down in the Flight Profiles and Threat Simulations for JSATO [Joint Support Air Tasking Organisation] Aircraft publication. He states that it was more than an overview of the profile and that he was required (amongst other things) to brief throttle settings and GPS manipulation to achieve a TOT. At this point in the brief it would have been expected that the Authorising Officer would have stepped in as it is his responsibility iaw MRP RA 2306 to ensure that crews are competent.

Both the master and revised Pilots Logs (PLOGs) state that there is a simultaneous TOT of 0931. The Hunter was on top the RN warship at 0931:04 and the Hawk was on top the NATO warship at 0931:38.

The Hunter pilot reported that the VMC sanctuaries for the earlier FBA Exercise serials were briefed as 100ft and below for the Hunter and 400ft and above for the Hawk, although the aim was to remain in visual contact. He did not specifically brief the minimum height of 1000ft QNH for the Hawk on the missile profile as he thought that element was obvious to all; he did brief a L turn through S for the Hunter and a R turn through N for the Hawk. There would also be a geographical deconfliction between the two ac due to the disposition of the ships. 1000ft is a sensible cut-off height for the missile profile for the No 2 ac; however, it is stated in the Flight Profiles and Threat Simulations for JSATO Aircraft handbook that the aircraft is to end up on the target at its lowest cleared height. Nothing is mentioned about a pair's missile profile. (It has also been briefed that ac No 2 is not to descend below 2000ft until lead has called below 1000ft – this guidance has not been seen to be documented.) The 300ft height separation has also been mentioned by the Hawk pilot's unit but where the figure is laid down cannot be identified.

It is impractical to use the ships' disposition to form the basis of a geographical deconfliction plan especially when the targets are involved in a dynamic situation such as the 'Thursday War'. It was briefed that the Hunter would attack the RN warship, which was to the W of the TG and the Hawk would attack the NATO warship that was further N and that the deconfliction plan of the Hunter turning L through S with the Hawk turning R onto N to RTB Yeovilton would be a sensible off-target plan. The de-confliction plan was not questioned at the brief by the Hawk PIC. Had both aircraft been tasked against the same target, the geographical de-confliction plan as briefed would have stood a better chance of being effective.

The Hawk PIC stated that no updated target location information had been given to them by the Falcon DA20 or Plymouth MIL so he radioed for an updated position and entered it into their GPS. As they descended towards the target they realised that the ship at the coordinates passed to them was not their target; however, they carried on with the missile profile, adjusting their course and

height to overfly the correct ship. The Hawk was on-top its target NATO warship at 0931:38, making it 38sec late on TOT; the crew did not make an 'On-Top' RT call. They then continued as briefed. However, he then saw the Hunter right wing low, blooming into his vision and called 'pull up' to the PF and took control (it was stated in the debrief that at this point the Hunter pilot had had visual contact on the Hawk for 20sec prior to the incident).

The 0928 picture (from the Command Management System (CMS) of the RN warship shows the Hawk's target NATO warship is 105° at 3.2nm from the Hunter's target RN ship, further S than the reported position, which meant that the Hawk had to turn further S to achieve its on-top. This increased the risk of an Airprox as it placed the Hawk into the path of the Hunter executing a hard L turn off-target, which was contrary to the briefed plan of the Hunter pilot heading S until the Hawk had turned R off-target to RTB.

The TI states that there should be a time separation of one minute between the Hunter and its playmate; this was not briefed as the Hunter pilot briefed they would have the same TOT.

Regardless of the TOT confusion, if a strict height deconfliction plan had been briefed then the Airprox would not have happened.

It seems that there is no standardised sanctuary height for a VMC war. When operating on different sqns and ac types there have been different heights used by each. During the sortie that culminated in the Airprox, the primary separation was geographic. In a member of the investigative team's opinion using geographic separation on moving targets does not give enough of a safety factor.

The Hawk pilot's unit and other RN Hawk units apply a generally accepted VMC sanctuary of 300ft and 500ft respectively, but neither has been able to find the source document that states this. Also, there is disparity between individual pilots as to what the vertical separation criteria are. Again, this observation about reduced safety factors was not brought up at the post flight de-brief. Importantly, no clear guidance exists as to what point ac are to take up their VMC sanctuary.

The Hawk pilot commented in his Airprox report that the Mission Commander could have declared an IMC 'war', which may have avoided the Airprox. The Mission Commander declares an IMC/VMC 'war' based on conditions for the area in which all the ac are operating as a 'package' and as best as he can across the area of operations. Once the jets are 'launched' from the attacking ac [the Falcon DA20] they are responsible for changing the type of 'war' profile (IMC/VMC) - based on the conditions they encounter at the time. The Hawk pilot had assessed the conditions as marginal but within limits.

The Hawk co-pilot has stated that before descending on the missile profile, a discussion was held within the ac questioning what the deconfliction plan was. There was an element of doubt as to the full plan, but the Hawk crew elected to continue due to the briefed lateral separation of the surface units. Therefore, there was a misunderstanding whilst airborne of what the de-confliction plan was within the Hawk cockpit post the pre-flight brief.

The SA within the Hawk cockpit of the surface picture was incorrect. The NATO warship - the Hawk crew's target - was actually S and E of the RN warship. This was due in part to the fact that the position of the NATO warship passed to the Hawk crew by Plymouth MIL was actually that of a sister ship.

The Hawk co-pilot stated that after the on-top of the NATO warship he commenced a R turn to RTB to Yeovilton and at the same time the Hawk PIC called avoiding action on the Hunter. The CMS recording shows the Hunter flying O/H its target, continuing W and, once 1.5nm clear of the ship, turning L through S onto E. At the same time, the Hawk rolled out onto approx 200° at the same altitude as the Hunter. If the Hawk had remained on 200° it would have passed ahead of the Hunter by approximately 0.75nm. However, the Hawk makes a hard R turn onto 280° where both ac achieve Closest Point of Approach (CPA) which was less than ¼nm. Both ac then continue on these

headings and the separation opens. The Hawk remains on 280° until 0933:10 before turning onto a NE heading.

In the DASOR submitted by the Hunter pilot it is stated that 'Normally, when 2 Hawks are simulating missiles, the aircraft conduct a 30-second staggered launch in order to achieve lateral and time de-confliction over the target area. A height de-confliction is also briefed with sanctuaries to be honoured until the aircraft are visual with each other'. This information cannot be located in any reference/guidance document.

The Hunter pilot believes that the Hawk crew agreed at the debrief that the deconfliction plan had been degraded by the Hawk crew. However, the restriction on the Hawk not to descend below 1000ft was not covered in the brief. Further, the actual geographic disposition of the ships meant that geographic separation alone would be insufficient. Therefore, the deconfliction plan was insufficient throughout.

None of the aircrew questioned could locate the SOP for the handing over of formation lead and continuing the briefed sortie in the event of comms degradation.

<u>Recommendations within the Unit Investigation DAEMS Report</u>

Ownership of the Flight Profiles and Threat Simulations for JSATO ac publication should be reassigned; given a Books of Reference (BR) title and its contents used to help populate a Hawk flying guide and tactics manual (TACMAN).

A clearly defined VMC height sanctuary is to be defined and detailed within The Flight Profiles and Threat Simulations for JSATO Aircraft publication. Specifically, it is to mandate each occasion when the VMC sanctuary is to be applied.

A standardised briefing template is to be established for RN Hawk operations and is to be included in a Hawk Flying guide.

Element leaders are to be nominated on the PLOG.

Sanctuaries are to be included as part of the out brief and detailed in the authorisation sheet.

Authorising officers are to be reminded of their responsibilities as detailed in MRP RA 2306 – specifically, they are to ensure that the Aircraft Commander or Formation Leader has thoroughly planned his mission, alternate mission or duty.

HQ Navy Cmd to introduce a competency requirement…that details the required competencies and currency criterion that are to be maintained for Hawk pilots scheduled to fly FOST flight profiles.

If position updates are anything other than Mode 2 derived, then that is to be relayed by Plymouth Mil to the requesting unit.

Bar Alt/RADALT (altitude/height datums) should not be mixed where multiple ac (including mixed ac types) are using vertical separation as part of their de-confliction plan.

The missile profile as detailed in the Flight Profiles and Threat Simulations for JSATO Aircraft is to be reviewed to confirm the accuracy of the data contained within it and thereby assure safety of flight.

The pair's missile profile is to be included in The Flight Profiles and Threat Simulations for JSATO Aircraft publication and its requirement confirmed by FOST.

The second ac in a pairs missile profile shall not descend below 1000ft unless visual with the lead ac whereupon it can continue the descent to its authorised minima.

The requirement to make an on-top call during a missile profile is to be included in the Flight Profiles and Threat Simulations for JSATO Aircraft publication.

The VMC criterion that has to be maintained in order to conduct ADEX flight profiles safely (during a VMC war) is to be reviewed by NFSF (FW).

Due to the inadequacy of the guidance on how to fly the required missile profile and the distinct lack of guidance on what constitutes a FBA profile – consideration should be given to creating a Hawk TACMAN.

None of the aircrew involved could locate the SOP for the handing over of formation lead and continuing the briefed sortie in the event of comms degradation. The publication was not sighted through the course of the investigation - the procedure as detailed is to be located, briefed to the Hawk DDH and then transferred into the Hawk Flying Guide.

Aircrew and Air Traffic personnel are to be reminded of the regulations at MRP 1410(1) Para 41 specifically that they should call an Airprox at the time of the event.

A nominated unit should sponsor the production of a dedicated RN Hawk Flying Guide.

Aircrew are to be reminded of the need to remain clear of Ship's HIRTAs.

HQ NAVY CMD comments that an extremely thorough and detailed investigation has highlighted a number of key weaknesses in the planning, briefing and execution of the sortie and listed 21 contributory factors to the cause of this Airprox. Some 36 separate recommendations were made by the investigation team and there are many lessons identified which are pertinent to the safe operation of ac in similar circumstances, including the importance of thorough briefing and robust authorisation.

UKAB Note (2): Subsequent to the RNFSC Investigation, the Hunter pilot's company made a number of observations, abbreviated extracts of which are included herein.

THE HUNTER PILOT'S COMPANY, in addition to receiving a copy of the RNFSC report, conducted its own review into the incident, to extract lessons learned and to make changes, if deemed necessary, to mitigate the risk of this sort of incident happening again. This review involved the Hunter pilot and two other company pilots who flew in the mission, the substantial amount of planning & briefing material used to prepare for the sortie and notes made from the sortie debrief.

The TI was produced by the company as a requirement of their internal processes. No inputs were received from the RN Hawk community (operators or NCHQ), although they were invited to contribute several times.

Whilst reviewing the RNSFC report it became apparent that the authors have a slight misconception regarding the way the sorties are planned and the division of responsibilities and accountabilities between the two contractors. As a consequence some of the recommendations may be misplaced.

The PLOG has no formal standing. It is a document produced by the Falcon leader to co-ordinate the Falcon and Hunter/Hawk formation participation to make it easy to spot conflictions between the formations. It is very Falcon-centric. It is not a FLYPRO and it does not, and should not, contain details of Hunter/Hawk formation domestics, sanctuaries, deconfliction plans, off-target manoeuvre, egress plans, loser plans, FBA profiles, ROE, etc. Sanctuaries change constantly, depending on the phase of the sortie, the type of attack, the Wx, Helo 'no-fly' zones, pilot experience, etc. There is no 'one size fits all'.

No evidence was found of any flaws in the planning and briefing process used by the Hunter crews. However, this is not to say that lessons cannot be learned from this incident: the Hunter pilot could have accentuated the off-target plan. In addition it is noted that, when operating in unfamiliar and inexperienced mixed formations, extra care should be taken to ensure positive confirmation of critical

events before moving on to the next phase of the sortie, even if this prejudices completion of a subsequent task. In this case, with hindsight, the Hunter pilot should not have turned back to head for the East Gate for the next missile profile (even though he remained west of the RN Ship target until 38sec after the TOT) without positive confirmation that the Hawk was off-target.

This sortie was not routine business; extensive planning and preparation had been conducted in the weeks beforehand, which was thoroughly and comprehensively briefed, as evinced by the extensive briefing material made available to all crews, the detail of the briefing on all aspects of the sortie and in particular on the technique for emulating the missile attack. A final irony was that after the sortie the Hawk pilot's authorising officer congratulated the Hunter pilot on the quality of the brief.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, a report from the RNFSC together with a copy of the ships Command Management System plot and reports from the appropriate ac operating authorities.

The Board commended the pilots concerned and the RNFSC for the comprehensive reports provided into this Airprox and a very thorough investigation that had highlighted a number of issues. The RNFSC report had dealt comprehensively with the regulatory aspects underlying this encounter and addressed them via a comprehensive list of recommendations.

Visual attack profiles of this nature demand robust visual deconfliction measures an experienced pilot Member opined, but simple rules can take into account the geographical spread of the targets, attack directions and altitude restrictions, which if rigidly applied can be effective. A CAT pilot Member suggested the deconfliction plan could have worked if it had been followed, despite the fact that it was based on a geographical deconfliction involving mobile targets together with minimal vertical separation. The vertical deconfliction measures at the culmination of the missile profile was not briefed satisfactorily and there was an assumption on the part of the Hunter pilot that the Hawk crew would fly no lower that 1000ft until visual contact had been established with his ac. It was also pointed out that both ac were operating to different altitude references; the Hawk crew relying on a barometric altimeter but the Hunter pilot with the added benefit of a RAD ALT. If the vertical deconfliction in the target area had been stressed more positively, then there would have been less room for potential confusion within the Hawk crew; nevertheless, if there was any doubt on their part they should have turned away to the N. The CMS plot shows the Hunter pilot 'on top' his target RN ship at 0931:04, over 6nm WSW of the Hawk. However, he had then turned about and was heading E'ly at 0931:38 when the Hawk was 'on top' its target NATO ship. In the Board's view, if the Hunter pilot had followed his own deconfliction plan by clearing the target area further to the S, he would have been several miles away from the Hawk at the time the latter was 'on top' and no conflict would have arisen. The absence of an 'on top' call by the Hawk did not aid the Hunter pilot's SA. Without this call the Hunter pilot had no positive confirmation of where his No2 was or that the latter was off-target until he saw it. However, it was evident from the CMS plot that the Hunter pilot had turned E well before the Hawk was 'on top' its target NATO ship and had set the Airprox in train before the Hawk crew could have made this call. The Members agreed unanimously that the Cause of this Airprox was that the Hunter pilot did not adhere to the briefed deconfliction plan.

The Hawk PIC had spotted the Hunter 'blooming' in the canopy ahead and gave the order to the PF to 'pull-up', whilst taking control of his ac from the rear-seat pilot at 250ft amsl and initiating a climbing R turn. However, the Hunter pilot had seen the Hawk somewhat earlier as it cleared another NATO ship at low-level several miles away; he took no avoiding action as he was content that there was no Risk of a collision. The Airprox is not shown on radar recordings available to the UKAB and the CMS plot gave no indication of the ac levels as they passed, so the vertical separation could not be accurately assessed. However, the CMS plot does show the two ac just before they pass port-to-port; minimum horizontal separation is stated within the RNFSC account to be about ¼nm. Given that the Hunter pilot had remained very low, with the Hawk in sight throughout, and was

able to take robust action if needs be, the Board agreed unanimously that no Risk of a collision had existed in the circumstances conscientiously reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Hunter pilot did not adhere to the briefed deconfliction plan.

Degree of Risk: C.