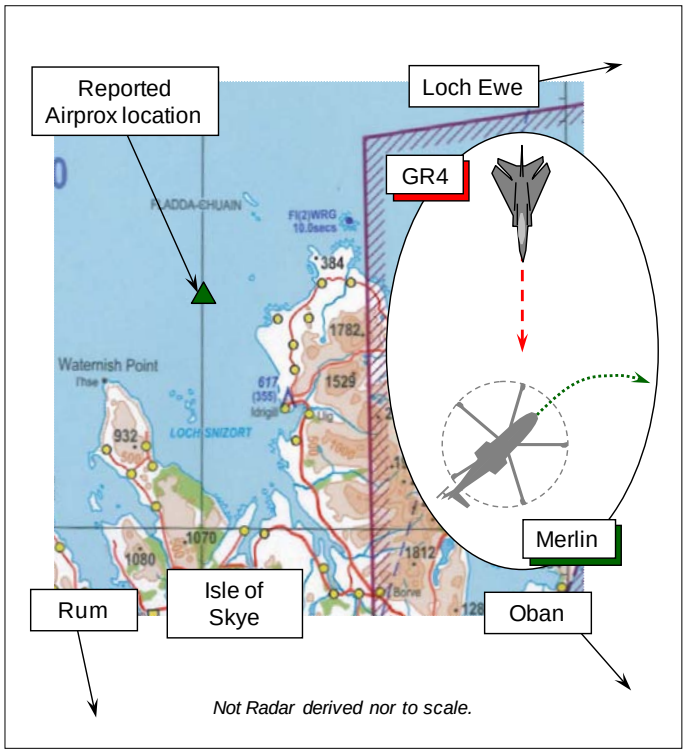
AIRPROX REPORT No 2012055

Date/Time:	19 Apr 2012 1612Z	
Position:	5740N 00630W (Mouth of Loch Snizort - Isle of Skye)	
Airspace:	Scottish FIR	(*Class: G*)
	Reporting Ac	*Reporting Ac*
Type:	Merlin HM1	Tornado GR4
Operator:	HQ Navy	HQ Air (Ops)
Alt/FL:	500ft QNH (985hPa)	610ft QNH (985hPa)
Weather:	VMC NK	VMC CLBC
Visibility:	20km	20km
Reported Separation:	250ft V/¼nm H	400ft V/½nm H
Recorded Separation:	Not recorded	



BOTH PILOTS FILED

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE AGUSTA WESTLAND MERLIN HM1 HELICOPTER PILOT reports he was flying a VFR transit with passengers on board from Oban to a warship in the vicinity of Loch Ewe during Exercise JOINT WARRIOR. After departing Oban at 1520Z he routed through the Sound of Mull, E of Rum and W of the Isle of Skye at 135kt, 500ft RAD ALT with the BAR ALT set to the Force QNH (985hPa).

They were in communication with the embarked Air Safety Cell - C/S EAGLE - on the UHF safety frequency of 313·175MHz to assist with deconfliction from an Air Defence Exercise (ADEX), which had commenced at 1530Z; they were also passing 'Ops Normal' calls to the warship via HF. Unable to speak directly to EAGLE because of high ground until they were NW of Skye, traffic could be heard on the frequency so they asked the HF radio operator aboard the warship to relay their helicopter's position to EAGLE so that the Air Safety Cell could deconflict the Exercise fast-jets. This was confirmed on HF as being done and EAGLE was heard to impose a 'hard deck' [lower operating limit] of 1500ft FORCE QNH for all participating fixed-wing ac because of multiple helicopters in the vicinity. Participating helicopters were limited to operating not above 500ft FORCE QNH to allow 1000ft separation.

As his Merlin rounded the NW side of the Isle of Skye, direct communication was established with EAGLE on UHF. Approaching a position 57°40'N 006°30'W on a heading of about 045° EAGLE warned of low-level traffic ahead. About 30secs later EAGLE repeated the warning and a Tornado GR4 was spotted in their 10 o'clock 5-6nm away heading towards them at a similar altitude, but on an approximate heading that would take the jet slightly astern. Initially the GR4, heading approximately 200°, looked to be passing clear astern, but it was then seen to turn onto a heading, he thought of about 150°, towards his Merlin and remained on a steady bearing. To avoid the GR4, he was forced to turn hard R and initiate a rapid descent to 250ft RAD ALT as the GR4 passed ¼nm astern and 250ft above his Merlin with a 'high' Risk of collision.

Some 20secs later the crew of an unidentified ac [reported by the GR4 crew to be another Exercise callsign] was heard to ask EAGLE if an altitude restriction had been imposed on fixed-wing ac. EAGLE reiterated that a 'hard deck' of 1500ft was in force for fixed-wing ac due to multiple rotary-

wing contacts in the area. The GR4 was then seen to climb rapidly and proceed towards the SE. An Airprox was reported on landing aboard the warship.

The Merlin has a maritime grey low-conspicuity camouflage scheme; the white HISLs were on. TCAS is not fitted.

THE TORNADO GR4 NAVIGATOR reports with HUD recorder transcript that he was flying as the bounce (No3) against a pair of GR4s during an evasion training sortie. Two Tornado GR4 ac – Nos 1 & 2 – had departed from Lossiemouth independently as a pair and transited to the W coast of Scotland [S of Skye], which was the only area with suitable weather for their sortie. Descending to low level with Scottish MILITARY he then switched to EAGLE Safety on 313·175MHz [no ATS was established]. A squawk of A7001 was selected with Modes C and S on.

After switching frequency and listening [since 1606:01] they heard the Merlin crew on frequency, together with two other callsigns. Before contact was established with EAGLE he heard another callsign being 'cleared' to operate not below 1500ft QNH in a position 57° 53'N 005° 49' W [a point of land W of Loch Ewe], with the Merlin inbound at 300ft and not above 500ft from Waternish Point. Two-way RT contact was then established with EAGLE [at 1609:23, "*Eagle Safety,* (GR4 formation C/S) *formation of two GR4s currently low-level to the south end of Isle of Skye transiting to the south..training request if there is any exercise traffic in the local vicinity to affect".* The No3 GR4 navigator perceived that EAGLE advised of rotary traffic north of the Isle of Skye between Stornoway and Loch Ewe and 'south [of Skye] no immediate traffic to effect', the controller believing another ac to be 'south west of Benbecula approximately 30nm'. [The Merlin's position was, however, some distance S of that reported by EAGLE and was ahead of rather than behind the GR4]. Based on this information they elected not to carry out any evasion training until S of the Isle of Skye and to remain above 500ft to deconflict from the Exercise rotary-wing traffic; the No1 and No2 were then advised there was no traffic to affect to the S of Skye. Just before the Airprox EAGLE passed TI to the Merlin crew [at 1611:21, "[Merlin C/S] *EAGLE 1..heads up..traffic north east of your position range 10 miles southbound believed to be GR4 indicating unintelligible non exercise".* This TI was updated to the Merlin crew at 1612:07, *"..previously reported traffic now north approximately four and a half miles tracks south-west indicating low-level".*]

Flying at 610ft amsl, 2000ft clear below cloud with an in-flight visibility of 20km, hearing this information the No3 started a L turn to remain N of the Merlin which was first sighted at a range of 2nm, to the NW of Skye flying straight and level. The Merlin crew then called on the RT visual [at 1612:26, adding 8sec later *"..we are visual he's* [the No3 GR4] *just passed approximately half a mile astern of us".* At 1612:33, the No3 GR4 crew reported to EAGLE visual with the Merlin. The response from EAGLE was *"..roger believe he did call but..thought they would be..further south than the called position".*]

The No3 crew was visual with the Merlin and did not feel that any avoiding action was necessary, passing ½nm away and 400ft clear above the helicopter at the closest point with a 'low' Risk of collision. Another pilot with an Exercise callsign then called on the RT asking if there were any flight restrictions, to be told Exercise fixed-wing assets had a 'hard-deck' of 1500ft.

The ac's white strobes were on.

UKAB Note (1): Despite being requested, to date no report has been received from the EAGLE Safety controller who was aboard a foreign warship participating in Exercise JOINT WARRIOR.

UKAB Note (2): This Airprox occurred outwith recorded radar coverage.

UKAB Note (3): Several Y Series NOTAMs were issued by LF Ops relating to Ex JOINT WARRIOR 121. These NOTAMs warned military crews of 'intense aerial activity involving multiple fast-jet and rotary wing aircraft…..'. However, these NOTAMs all referred to Exercise airspace blocks further E than the Airprox location, extending no further W than 005°50'W.

AUS also issued an Airspace co-ordination notice - ACN 2012-04-0066 – applicable to this Exercise, within which it is stated at para 7:

> 'Eagle Safety. Two ATC Safety Cells will be established and will operate from the most appropriate ships subject to exercise requirements. Callsigns are Eagle One and Two and Eagle Safety frequencies are 313.175 MHz (North) and 362.250 (South).'

HQ NAVY comments that Eagle Safety is an ATC function that is established during JOINT WARRIOR and NATO exercises that have significant aviation input. The benefit from an Air Safety Cell (ASC) being embarked within the force that has no exercise role is that it can concentrate solely on Air Safety. This Airprox is an example of exactly why the ASCs are established and serves to highlight the requirement for there to be third party deconfliction, primarily of exercise players but also against non-participants. The frequencies for ASCs (callsign EAGLE) are promulgated in exercise instructions; in this instance it is noted that the Tornado crew had the frequency and were monitoring it. EAGLE frequencies are safeguarded from exercise jamming and are not encrypted at all; indeed the ASC has the authority and ability to order cease jamming of any frequency, if required for Air Safety purposes.

Due to the nature of the terrain in the vicinity of this Airprox, the Merlin could not establish 2-way comms with the ASC embarked aboard the foreign warship. During these exercises it is normal for the ATC team on an aircraft carrier to also monitor the EAGLE frequency and to provide assistance where necessary in order to deconflict their own aircraft operations. The communications fit within a warship is somewhat limited and in this instance the ship's SATCO was liaising with the ASC via the standby radio, whilst the ship's on-watch ATCO was using their own HOMER frequency. SATCO relayed information to the Merlin using the EAGLE frequency in order to overcome the terrain masking difficulties.

A 1500ft hard-deck was imposed for exercise traffic, but the Tornado formation ac were non-participants and had not asked for a service from EAGLE. In Class G airspace it would not have been possible for EAGLE to impose the hard-deck on the Tornados, however the call to the other participants of multiple rotary-wing traffic operating up to 500ft should have prompted a requirement for appropriate altitude separation to be applied. Formal identification of the Tornados did not take place, however timely traffic information was passed to the Merlin in order for them to take avoiding action.

It is noted from the HUD tapes attached to the ASIMS report that the initial sighting of the Merlin was in the Tornado's 12 o'clock, crossing R-L, and the pilot maintained a left hand angle of bank with the Merlin drawing left across the HUD and below, showing the GR4 passing behind the Merlin and above it. Had the Tornado not turned left the separation would have been greater.

An exercise such as JOINT WARRIOR will always create scenarios where differing types of aircraft will be attempting to operate in the same airspace as either red or blue participants, or as no-play strangers. There is an enduring need for the embarkation of ASCs in order to provide real world Air Safety as far as possible. This safety net was in place, and worked in this instance. Margins could have been greater though had the Tornado crew not flown so close to the Merlin once it was sighted, or had honoured the hard-deck imposed on participating FW aircraft.

HQ AIR (OPS) comments that the lack of a report from the EAGLE ASC controller makes conclusions hard to draw, except from the information provided in the No3 GR4 HUD recording. Based on the evidence from the crews involved it appears that the non-exercise No3 GR4 transited the vicinity under normal Rules of the Air and the crew was aware of the Merlin from listening out on the EAGLE SAFETY frequency. The No3 GR4 was a non-exercise aircraft and so the exercise altitude restriction would not have applied, and there is no evidence that EAGLE SAFETY attempted to impose an altitude restriction on the GR4. The crew report hearing snippets of information regarding other aircraft receiving altitude restrictions but none that applied to them, although this is at odds with the understanding of the Merlin crew, which was that the restriction applied to "all fixed-wing aircraft".

The GR4 crew's position and intentions call to EAGLE before the Airprox was somewhat confused and did not assist the controller's SA. In any case, the controller was able to call TI to the Merlin based on radar data and the reciprocal of this was used by the GR4 crew to gain 'tally' and avoid the conflict. The GR4 crew's 'left turn to maintain north of the Merlin' did not achieve its stated aim and continued after they reported having gained visual contact at 2nm. This exacerbated the situation by reducing the horizontal separation distance and triggering the Merlin pilot's avoiding action. The turn initially placed the Merlin in the centre of the GR4 HUD but was eased at closer range ensuring that no actual risk of collision existed.

Considering the Merlin's reported altitude of 300ft, the transit altitude selected by the GR4, which would normally be at 250ft, was reasonable [610ft RAD ALT]. Although the GR4 navigator reports receiving a BS from EAGLE this was not the case and no service was agreed. Nevertheless, EAGLE could have requested the GR4 crew to maintain above 1500ft for deconfliction purposes but this would have required explicit agreement, which was not requested. The incomplete and misleading position reports in this instance contributed significantly.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the crews of both ac; a transcript, still photos and video of the relevant GR4 HUD recording, together with comments from the appropriate operating authorities.

The Board discussed the issue of the NOTAM'd Exercise airspace and the applicability of any 'hard deck' for fixed-wing ac; Members agreed with HQ Navy Command's contention that the GR4, as a non-participating ac, remained outwith the Exercise JOINT WARRIOR scenario and whilst in transit in Class G airspace was not compelled to abide by any Exercise 'hard-deck' limitation. Nevertheless, aware of the EAGLE Safety frequency, the GR4 crew had wisely listened out and then subsequently called the controller as they transited S toward their intended RV with other elements of the formation. The Board was briefed on the difficulties of producing an accurate transcript from the HUD recording, but the GR4 pilot's Station had reaffirmed that it was the No3 crew that made the RT call to EAGLE at 1609:23, which described the position of the No1 & 2 but did not describe the position of the No3 bounce GR4. This call, Members agreed, would have subsequently confused the EAGLE Safety controller as the information given did not make it plain that their's was a single GR4 – the No3 - southbound to the N of Skye to join up with the two GR4's to the S. The absence of a report from the EAGLE Safety controller aboard the foreign warship was unfortunate; it could have assisted greatly here and the Navy Command Member apologised for its lack of availability to the Board. However, it was plain that EAGLE did not perceive a confliction between the Merlin and No3 GR4 beforehand based on the information given by the No3 GR4 crew. Fortunately, the No3 crew was already aware from listening to the RT that a helicopter was operating at 300ft, and below 500ft from Waternish Pt. Hence the No3 GR4 crew's decision to transit at an altitude greater than 500ft. The Navy Command Member contended that the GR4's recorded level of 610ft RAD ALT was not a sufficient margin above the reported altitude of the Merlin. However, an HQ Air fast–jet Member explained that whilst operating in the 'see and avoid' environment of Class G airspace, outside the NOTAM'd area over open water where they would normally select a low-level transit altitude of 250ft, the No3 GR4 crew had taken due account of the presence of the Merlin below 500ft by flying higher than normal. With information gleaned from listening to RT calls from exercise traffic and EAGLE Safety, the GR4 crew saw the Merlin at a range of 2nm they report. However, the HQ Air (Trg) Member remained unconvinced that the GR4 pilot had seen it this early because of the continued L turn shown on the HUD recording; he perceived that the No3 GR4 navigator saw it first at closer range after the Merlin pilot's avoiding action descent. Nonetheless, the HUD 'shots' convinced the Members that the GR4 had passed clear above and astern of the Merlin, which was unmistakably evident on the recording clearing to port and below.

Within the promulgated airspace the Merlin crew would quite reasonably not have expected to encounter participating fixed-wing at their level at all, with Exercise JOINT WARRIOR ac operating above the 1500ft 'hard-deck' where specified by EAGLE Safety, so the helicopter crew was probably

quite surprised to see another fixed-wing ac in the area below this altitude. The Ops LF Advisor added an important point of advice here for Exercise planners; if they wish to exclude other non-participating military ac from the lower reaches of the LFS during major exercises then, subject to relevant staff approval from Ops LF/Air Staff, it is feasible to overlay an Exercise area with a blanket LFS restriction for non-exercise participants.

The ATS provided to the Merlin crew by EAGLE was not specified in their report, nonetheless, it was evident from the GR4 HUD recording that EAGLE Safety had spotted the No3 GR4 'stranger' at a range of 10nm, called it to the Merlin crew and provided an update at a range of 4½nm. This enabled the Merlin crew to acquire the GR4 heading towards them in their 10 o'clock 5-6nm away. As the Merlin was operating below 500ft, with the GR4 shown to be at 610ft – both operating on RAD ALT – vertical separation was not less than about 110ft, but the Board understood that where they might have thought this was Exercise traffic and expected greater separation of about 1000ft from it, this would have been a concern to the Merlin crew. The Members agreed unanimously that this Airprox had resulted because the GR4 crew flew close enough to cause the Merlin crew concern.

In considering the inherent Risk, the Board perceived that after sighting the GR4, the Merlin pilot's robust avoiding action of a hard R turn and rapid descent to 250ft RAD ALT would have been highly effective in quickly increasing the vertical separation clear below the GR4 to 360ft. The Merlin pilot estimated in his written account that the Tornado passed ¼nm astern. The GR4 crew's own horizontal estimate was ½nm astern, which was also that passed on the RT to EAGLE by the Merlin crew at the time. The GR4 crew saw no need for avoiding action when they saw the Merlin, probably because of the prompt and robust avoiding action already taken by the Merlin pilot, which would have placed the helicopter beneath them at slightly less than their own estimate of 400ft. Nonetheless, with separation in the order of 360ft vertically and the GR4 passing ¼ - ½nm astern, this was enough to convince the Members that no Risk of a collision had existed in the circumstances reported here.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The GR4 crew flew close enough to cause the Merlin crew concern.

Degree of Risk: C.