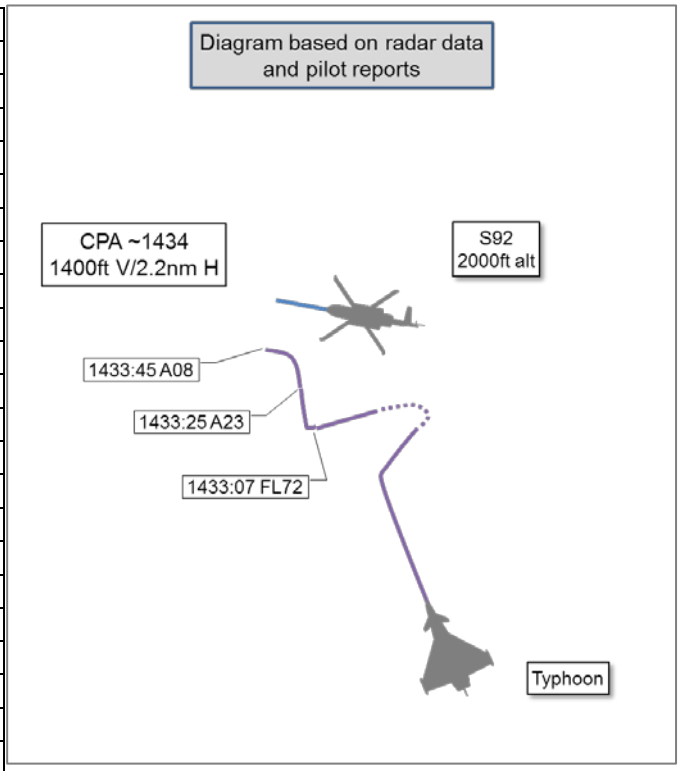
## AIRPROX REPORT No 2018213

Date: 16 Aug 2018 Time: 1434Z Position: 5656N 00039E Location: Aberdeen 106R/98D

## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

| Recorded | Aircraft 1 | Aircraft 2 |
|---|---|---|
| Aircraft | S92 | Typhoon |
| Operator | Civ Comm | HQ Air (Ops) |
| Airspace | Scottish FIR | Scottish FIR |
| Class | G | G |
| Rules | VFR | VFR |
| Service | Traffic | Basic |
| Provider | Aberdeen | Boulmer |
| Altitude/FL | 2000ft | 600ft |
| Transponder | A, C, S | A, C, S off |
| **Reported** | | |
| Colours | NK | NK |
| Lighting | NK | NK |
| Conditions | VMC | VMC |
| Visibility | NK | NK |
| Altitude/FL | 2000ft | NK |
| Altimeter | NK | QNH (997hPa) |
| Heading | NK | NK |
| Speed | 135kt | NK |
| ACAS/TAS | TCAS I | Not fitted |
| Alert | TA | N/A |
| **Separation** | | |
| Reported | 200ft V/1-2nm H | Not seen |
| Recorded | 1400ft V/2.2nm H | |




**THE ABERDEEN REBROS CONTROLLER** reports that the S92 was returning from an offshore platform to Aberdeen. They had requested FL040 but had been given a cruising level of 2000ft because the HELS controller had agreed coordination whereby the military were not below altitude 5000ft and Aberdeen helicopters were not above altitude 3000ft. When the S92 was at about 98nm on the 106 radial from Aberdeen, the controller observed a 5122 squawk that appeared to be descending below the coordinated level. He called it to the S92 pilot as "fast-jet traffic, left 9 o'clock at 6 miles tracking north, descending to similar level, looks like it will pass just behind you" or words to that effect. As it appeared to be passing just behind he did not offer avoiding action as he could not see any turn which would improve the situation. The S92 pilot said they were visual with it and the controller checked that they were visual and happy to continue. The 5122 squawk was then seen to turn to go ahead of the aircraft and continue his descent to below altitude 1000ft. The Aberdeen controller called the controller at Boulmer to inform him of what had happened; the Boulmer controller advised him that he would 'be filing'. The S92 pilot and Aberdeen controller also confirmed they would be filing. The controller also noted that another military aircraft was operating with its transponder off, and therefore showing as primary-only on HELS and not at all on REBROS, despite a previous call to Boulmer to ask them to 'get him to squawk'. This increased the workload of both HELS and REBROS controllers.

**THE BOULMER CONTROLLER** reports that he was the Red-Air Weapons Controller (WC) with 4 x Typhoon, 2 x Hawk and 2 x DA20 Falcon on frequency. The airspace in use was D613A-D. On their entering the airspace, he cleared all formations in the block sea-level to FL660. The No2 Typhoon pilot switched to the Blue-Air primary frequency to receive the 'War Type'[1] call. Meanwhile, the Boulmer controller received coordination with Aberdeen from the Blue-Air WC that his aircraft would be not below 5000ft on the Orkney (997hPa) and Aberdeen traffic not above 3000ft on RPS (1003hPa). The Blue-Air WC then gave him the War-Type call from the blue lead which was "War-Type 1, Hard deck

[1] A pre-start declaration of the sanctuaries and operating altitudes that will be used, dependent on weather factors.

5000ft, 997". When the No2 Typhoon came back up on the Red-Air primary frequency, the Boulmer controller passed the War-Type call and the coordination with Aberdeen of not below 5000ft on 997hPa. All formations acknowledged the War call but only the Hawk and Falcon formations responded to the coordination. The Boulmer controller did not chase an acknowledgement of the coordination with the Typhoon formation due to calling in the tactical picture. During the tactical phase, the Blue-Air WC highlighted that the No2 Typhoon was descending to low-level. The Boulmer controller tried raising the No2 Typhoon on the radio but received no answer. At this point the controller did not have a radar return on the No2 Typhoon so he asked the Typhoon formation leader to confirm the height of the No2, to which the reply was that he was at 8000ft. The Aberdeen controller then phoned stating that he had just had a report from one of his helicopters that they had been visual with a Typhoon at the same level. The Boulmer controller was confused by the height information given by the Aberdeen controller and could not work out whether the Typhoon had been at 600ft or at 2000ft. By the time the conversation was coming to an end, the Boulmer controller had a radar return on the No2 Typhoon at 8000ft; he assured the Aberdeen controller the Typhoon was now at 8000ft, as shown by the radar return.

**THE S92 PILOT** reports that they were aware D613 was notified as active. On departure he requested a climb to FL040 but was advised that coordination was only available to a maximum of 3000ft for helicopters and Military not below 5000ft. As a result, he elected to stay at 2000ft. At a position about ADN 106/98, they simultaneously received a TCAS Traffic Advisory and ATC notification. On the TCAS, he saw a contact indicating 200ft below, which the co-pilot estimated to be at a range of about 1-2 miles. They observed the TCAS target descend to 600ft indicated, turn away aggressively, and then zoom-climb vertically for some time. ATC was notified and an AIRPROX submitted

The S92 pilot did not make an assessment of the risk of collision.

**THE TYPHOON PILOT** reports that he was the tactical lead of the Typhoon formation lead pair and the Red-Air Mission Commander. Upon check-in with Boulmer he was cleared to work within D613, surface to FL660. He informed the Red-Air WC that he would be switching to the Blue-Air primary frequency for the weather call as directed by the Blue lead. This was acknowledged. When he returned to the Red-Air primary frequency he informed the controller that Blue lead had declared War-Type 1 with a hard deck of 5000ft on 997hPa. The Red-Air WC then declared the War-Type and hard deck for all Red-Air aircraft, which the Typhoon pilot acknowledged. The Typhoon pilot noted that the plan was for the lead and No2 Typhoons to be used in the first presentation and then to hand over to Typhoons 3 and 4 when they arrived on station for the second presentation. However, after the first presentation, the remaining Red-Air aircraft required another 5min to set up for run 2 and because Typhoons 1 and 2 were immediately available, it seemed appropriate to provide a single group presentation straight away. The Typhoon pilot briefed the presentation plan, a high/low split, but, for an unknown reason, he thought he was cleared from surface (not below 250ft) to FL660; when they committed, he descended to low-level. When approaching low-level he heard some garbled R/T from Boulmer and the No1 Typhoon pilot. He immediately realised that he had made a mistake and quickly climbed to 8000ft. The Typhoon pilot did not see any traffic at low level.

## Factual Background

The weather at Aberdeen was recorded as follows:

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METAR EGPD 161450Z 23008KT 9999 VCSH SCT044TCU 15/11 Q1003 RERA TEMPO SHRA=
METAR COR EGPD 161420Z 23012KT 190V270 9999 SCT043 19/09 Q1003 NOSIG=
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## Analysis and Investigation

### NATS Ltd Unit Investigation Report

### Executive Summary

Following agreed coordination with ASACS (Boulmer) that their traffic would be not below Alt 5000ft and Aberdeen helicopter traffic not above Alt 3000ft, one of the coordinated Boulmer squawks,

5122, was then observed descending below 5000ft. Passing 3000ft it made an abrupt right turn towards [S92 C/S] cruising inbound to Aberdeen at 2000ft on an Offshore Traffic Service, and continued descent to 600ft before rapidly climbing again and turning away from the helicopter. The pilot of [S92 C/S] stated that they received a TCAS TA and would file an ASR. Boulmer confirmed the 5122 squawk was a Typhoon. The S92 operating authority later confirmed that the pilot of [S92 C/S] was filing an Airprox.

**Description of the event**

1406:00 – A coordination request was initiated by the Aberdeen HELS controller with ASACS Boulmer for operations under the Danger Area 613 complex. The coordination agreed was: Boulmer traffic not below altitude five thousand feet Orkney 997 and Aberdeen helicopter traffic not above altitude three thousand feet QNH1003. It was agreed that this coordination applied to Boulmer squawks 5120-27.

1410:35 – [S92 C/S] called REBROS on lift from the [offshore] platform. They requested the 104 HMR at FL40 to return to Aberdeen. REBROS identified them, gave an Offshore Traffic Service and advised no known traffic to affect their climb to altitude 2000ft but said that agreed coordination with the military prevented climb any higher than that. At this time the military squawks were all observed operating at high levels, above FL300.


Figure 1 – 1431:55


Figure 2 – 1432:28

At 1431:55 (Figure 1), the 5122 squawk can be seen at FL362, about 10nm south of [S92 C/S], tracking north. (For scale, the green dashed range arcs are 20nm apart.).

At 1432:28 (Figure 2), the 5122 squawk was now at FL219 and had turned northeast, now 8nm south east of [S92 C/S]

At 1433:07 (Figure 3), the 5122 squawk was now at FL72 and had made a very abrupt left turn onto west-southwest, tracking almost parallel to [S92 C/S], range 6nm. Average rate of descent had been just under 25,000ft/min but it was still indicating above the coordinated lowest level of 5000ft.

At 1433:25 (Figure 4), the 5122 squawk made a very abrupt 90˚ right turn onto north, during which the Mode C was lost. It rolled out tracking directly towards [S92 C/S], range 5nm, and, when the Mode C could be seen again, it briefly indicated 3000ft, then 2300ft and still descending. [S92 C/S] was level at 2000ft. The REBROS controller passed the following traffic information to [S92 C/S]: - "[S92 C/S] Military jet traffic left nine o'clock range two thousand feet tracking north, looks like might pass behind you". [S92 C/S] replied "visual, [S92 C/S]".


Figure 3 – 1433:07


Figure 4 – 1433:25


Figure 5 – 1433:45


Figure 6 – 1434:38

At 1433:45 (Figure 5), just after descending through the level of [S92 C/S], the 5122 squawk turned west to parallel [S92 C/S], range 2.3nm and descended to 800ft. REBROS called Boulmer and asked to speak to the controller. The 5122 squawk meanwhile levelled at 600ft, and the closest lateral distance from [S92 C/S] was 2.19nm while it was still at 600ft, before it turned left onto a south westerly track and started to climb again.

The Boulmer controller became available on the phone line and REBROS explained that the 5122 squawk had been down to 600ft. The Boulmer controller said that he had been told it would be descending to FL80. The aircraft was now indicating 5500ft and climbing (Figure 6) but REBROS confirmed that it had been sighted by the helicopter crew below their level of 2000ft so there was no doubt that it had been well below the coordinated base of 5000ft. The Boulmer controller said they would file a report. (Distance between the solid and dashed green range arcs is 10nm). The REBROS controller advised [S92 C/S] that they were now clear of the military aircraft and explained what had occurred. The pilot reported that, in addition to being visual with the fast-jet, they had received a TCAS Traffic Alert and stated that while it was not their intention to file an Airprox as such, they would file an ASR on the event.

## Investigation

The Watch Manager spoke to ASACS Boulmer after this event, and they were able to confirm the 5122 squawk was a Typhoon. They said that the coordinated base level of 5000ft had been passed to the pilot, but that the pilot had not specifically acknowledged it. However, the pilot had referred to having a "hard deck" of 5000ft in a subsequent exchange before the event, implying that they were aware of their requirement to remain above 5000ft. The RAF Safety Investigator working on this event later confirmed that the pilot of [No 2 Typhoon C/S] had been aware of the 5000ft limit but had thought it was an exercise hard deck rather than for coordination against traffic below. The investigator explained that the Typhoon had been part of an exercise involving 8 aircraft working in pairs. Once the Typhoon pair had completed their high level "presentation", they had a bit of time while the next pair set up and, wanting to maximise the training benefits of the sortie, they decided to perform a previously discussed manoeuvre where one stayed high and the other dropped to very low-level.

While carrying this out, the No2 Typhoon pilot forgot the hard deck of 5000ft. The pilot stated that he did not see [S92 C/S] at any time. The Watch Manager also spoke to the pilot of [S92 C/S] after the flight arrived back in Aberdeen. He confirmed that he had filed an ASR, and had also selected Airprox within that report.

The S92 Company Chief Pilot later confirmed from the text of the ASR that the crew of [S92 C/S] received a TCAS TA at the same time that the REBROS controller passed the first Traffic Information. When they acquired the jet visually, their TCAS indicated it was 200ft below them and they estimated it was approximately 1-2 miles from them. They saw it descend to 600ft indicated by TCAS, and then turn away from them and zoom climb vertically.

The REBROS controller said that he had filed an Airprox because of the potential danger that the Typhoon had posed to [S92 C/S] by busting the coordinated base level of 5000ft and descending so rapidly, combined with very abrupt and unpredictable lateral manoeuvres. Two radar updates before the REBROS controller passed Traffic Information to [S92 C/S], the No2 Typhoon was indicating FL072, so was still above the agreed base, which the REBROS controller had no reason to believe they would descend below. The Mode C indication on No 2 Typhoon was then lost and, when it reappeared, was at 2300ft. The aircraft had also now turned right by 90˚ in the space of one radar update and was tracking straight towards [S92 C/S]. At this point REBROS immediately passed Traffic Information. The pilot of [S92 C/S] did not realistically have time to request Deconfliction Advice, but did report visual with the jet. The controller said that he had already considered that the best deconfliction advice for [S92 C/S] would have been to continue straight ahead anyway.

## Military ATM

An Airprox occurred on 16 Aug 18 at approximately 1430 UTC, 98nm east of Aberdeen between a Typhoon and an S92. The Typhoon was receiving a Basic Service from Boulmer, the S92 was receiving a Traffic Service from Aberdeen Radar.

The No 2 Typhoon was part of a 4-ship formation conducting air combat training with 2 x Hawks and 2 x DA20 Falcons. The exercise was due to take place within the D613A-D complex between the surface and FL660. The S92 was returning to Aberdeen from [an offshore] oil rig and had requested FL40 for the transit. The Aberdeen Radar controller agreed co-ordination with the Boulmer WC which limited the S92 to not above 3000ft and all exercise traffic not below 5000ft.

The Boulmer WC passed this restriction to all their aircraft in the form of an exercise 'hard deck' of 5000ft and then further amplified the hard deck by confirming this was against co-ordinated Aberdeen traffic. This restriction was read back by the Hawk and Falcon formations but was not read back by the Typhoon formation. Some 22min after the hard deck had been passed, the Aberdeen Radar controller alerted the Boulmer WC to the fact that one aircraft (the incident Typhoon) was at about 600ft and in confliction with the S92.

The Typhoon unit conducted a thorough investigation which noted that the Typhoon pilot had not fully assimilated the hard deck information and incorrectly assumed that the pre-briefed lower limit of 250ft was in force. A contributory factor to this incorrect mental model was a lack of readback of the altitude restriction from the Typhoon formation to the Boulmer WC. CAP 413 lists all instructions which require a mandatory readback and this includes level instructions.

**UKAB Secretariat**

The S92 and Typhoon pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[2]. If the incident geometry is considered as converging then the Typhoon pilot was required to give way to the S92[3]. If the incident geometry is considered as overtaking then the S92 pilot had right of way and the Typhoon pilot was required to keep out of the way of the other aircraft by altering course to the right[4].

## Comments

**HQ Air Command**

This Airprox led to a detailed safety investigation on the unit concerned and a number of recommendations have been forthcoming from that investigation.

Whilst it is apparent from the information provided by the Typhoon pilot that there was most likely a cognitive failure in not recalling the hard deck against coordinated traffic, there were other barriers here that were also weakened that may have prevented this Airprox from occurring. The other pilot in the formation admits to perhaps not devoting the attention to the airborne re-briefing that he would normally dedicate to a less experienced pilot, and thus missed the fact that the incident pilot intended to descend below the hard deck; the Boulmer controller could have insisted on a readback to the hard deck information from the Typhoon formation (thus reinforcing that knowledge in the minds of the Typhoon pilots); the Typhoon pilots could have included the Boulmer controller in the airborne re-brief, which may have provided the controller with the opportunity to respond to the Typhoon pilot's intention to descend below the hard deck.

When the procedural and the Typhoons' Air Traffic Service barriers were defeated, there were other means to alert the crews to the presence of the other aircraft – the Aberdeen controller alerted the S92 pilot to the presence of the Typhoon and the TCAS on the S92 displayed this as a contact. Consequently, the S92 pilot became visual with the manoeuvring Typhoon with sufficient time to materially affect the separation should he have deemed it necessary. The Typhoon is not yet fitted with an ACAS but an incremental capability upgrade to address this is now underway.

## Summary

An Airprox was reported when an S92 and a Typhoon flew into proximity over the North Seas at 1434hrs on Thursday 16th August 2018. Both pilots were operating under VFR in VMC, the S92 pilot in receipt of an offshore Traffic Service from Aberdeen and the Typhoon pilot in receipt of a Basic Service from Boulmer.

## PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

[2] SERA.3205 Proximity.
[3] SERA.3210 Right-of-way (c)(2) Converging.
[4] SERA.3210 Right-of-way (c)(3) Overtaking.

The Board first considered the No2 Typhoon pilot's actions and quickly agreed that his descent below the coordinated level of 5000ft had been the result of a cognitive failure due to his initial mental model of the exercise area extending from surface to FL660 and his lack of assimilation that the 5000ft base was an altitude coordination against non-exercise traffic, not simply an exercise construct. The Board considered possible contributory factors and after some discussion agreed that the key mitigation to cognitive failure was the direct involvement of the Boulmer controller. Members agreed that the No2 Typhoon pilot not reading back his clearance from Boulmer and the Boulmer controller not challenging the lack of readback were contributory prior to the No2 Typhoon pilot's rapid descent, and that the lack of surveillance returns as the No2 Typhoon descended and when at low-level was also contributory because it denied the Boulmer controller SA on the impending level-bust and proximity to the S92.

Members also noted that the No1 Typhoon pilot could also have played a part by correcting the No2 Typhoon pilot when he briefed an incorrect base height, assuming the No1 Typhoon pilot had assimilated the 5000ft coordinated altitude.

In the event, the Board agreed that the cause of the Airprox had been that the No2 Typhoon pilot descended below the coordinated level and flew in to conflict with the S92. However, a number of other barriers had operated correctly (Aberdeen surveillance and Traffic Information, S92 TCAS and lookout) and the Board was satisfied that these barriers, along with the resultant separation at CPA of 1400ft vertical and 2.2nm horizontal meant that, although safety had been reduced, there had been no risk of collision; risk Category C.

## PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Typhoon pilot descended below the coordinated level and flew in to conflict with the S92.

Contributory Factors: 1. The Typhoon pilot did not read back his clearance and the Boulmer controller did not detect the lack of read-back.

2. The Typhoon did not paint on the Boulmer radar.

Degree of Risk: C.

Safety Barrier Assessment[5]

In assessing the effectiveness of the safety barriers associated with this incident, the Board concluded that the key factors had been that:

**ANSP:**

**Situational Awareness and Action** were assessed as only **partially available** because, although the Aberdeen controller could see Typhoon No2 descending to low-level on his radar display, this information was not displayed on the Boulmer controller's display.

**Flight Crew:**

**Regulations, Processes, Procedures, Instructions and Compliance** were assessed as **ineffective** because the Typhoon No 2 pilot descended below the coordination level.

**Tactical Planning** was assessed as **ineffective** because the Typhoon No2 pilot did not comply with his known clearance level.

[5] The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the UKAB Website.

**Warning System Operation and Compliance** were assessed as **effective** but only **partially available** because only the S92 was equipped with an electronic warning system.