



provided Jester's take-off time didn't slip, there would be no conflict. At the out-brief, CADS was played through and checked by the crew and the Duty Authoriser. No conflicts were shown. Importantly, the play through happened before the Mustang formation had placed a 'tac-box' (an area specified by Mustang in which they would be manoeuvring tactically) on the northern plain and so this tac-box was not known about by Jester. Jester 2 subsequently needed to take a spare aircraft and this caused a delay to their planned take-off time. When signing out the spare aircraft, Jester 2 QFI asked the Duty Authoriser to slip their CADS and low-level booking times, and to telephone Mustang's Duty Authoriser as there could now be a conflict between the pairs. Although not time-pressured, the QFI did not physically re-check CADS, this was done by the Duty Authoriser who noted that a conflict now appeared at 1155, (see Figure 1), as Jester entered Mustang's 'tac-box' at the time that Jester were planning to exit low-level and climb to medium level.

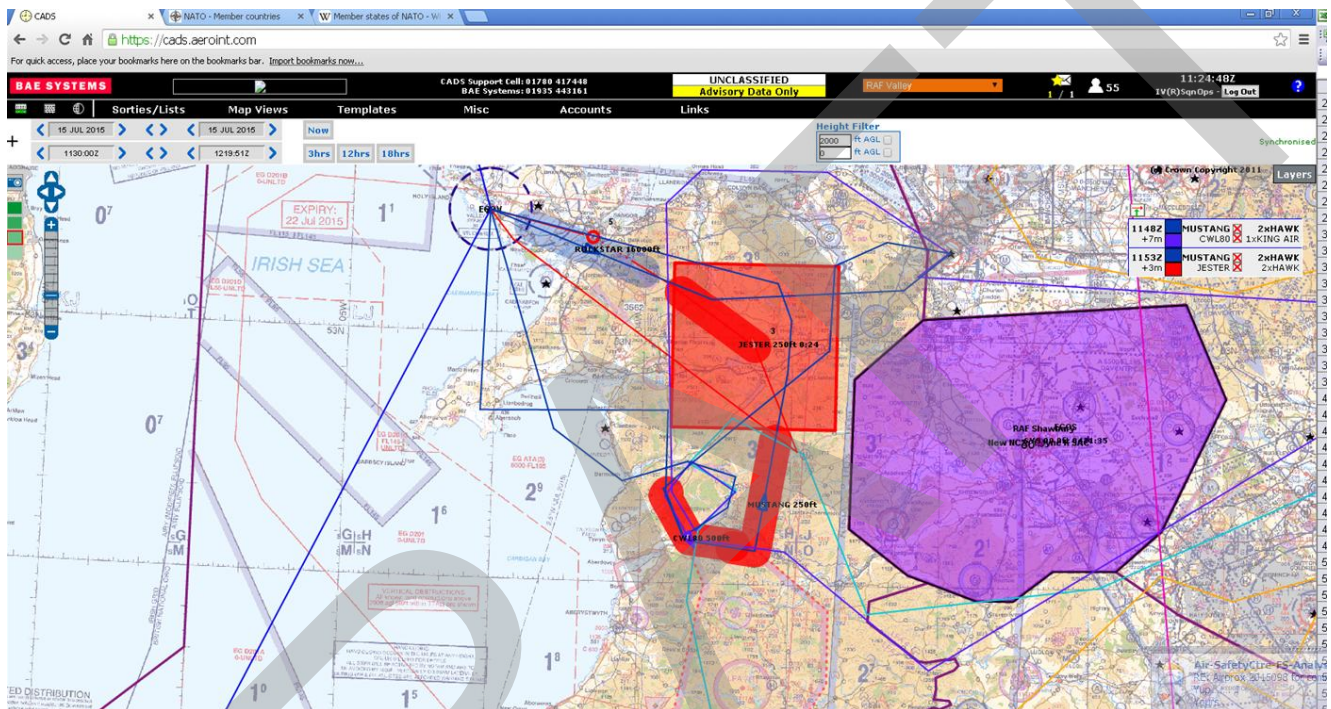


Figure 1 screenshot of CADS forecasting the routing of the two formations.

As Jester 2 crewed-in to the replacement aircraft he reported the details to the lead crew on the radio. Mustang were also starting up at the time, and so Jester lead asked Mustang to contact him on the formation 'chat' frequency, which they did, and a deconfliction plan was discussed. From this it was established that Mustang would approach the northern plain at 1150z, flow north to Lake Brenig for a target which they would attack twice, spending 5 minutes in total on the plain.

Once airborne, at 1140:40 Mustang made a call to Jester on the low-level deconfliction frequency stating that they were 3 minutes away from the northern plain. This was acknowledged, and Jester lead decided to action an operational tactical manoeuvre that would take the formation away from the northern plain, where they would hold clear while Mustang flowed north to their target. At 1142:37, as the formation recovered from their manoeuvre, 2 TCAS contacts appeared and a traffic audio warning sounded. Jester lead turned away from the TCAS conflict; Jester 2 also received a traffic warning at 1142:47 and Jester 2 QFI directed the student to climb, shortly afterwards spotting one aircraft low and slightly behind. Mustang made another transmission on the low-level frequency that they had seen Jester at Lake Bala and were heading north to their target. This was acknowledged by Jester.

Immediately after this, at 1143:22, Mustang transmitted that they were now resetting south. This call was not acknowledged by either of the Jesters, who were now split by 9nm and had implemented their blind sanctuary plan (a height stack). Between 1143:22 and 1145 a series of calls were made between Jester 1 and 2 as they organised a rejoin. As it transpired, not realising that Mustang had split into separate units, both of the Jester crew had spotted Mustang 2 and believed it to be their

lead/wingman. At 1144:52 Jester 1 attempted to join Mustang 2. In the next 40 seconds further radio calls were made both on the Low-Level frequency and on Jester's formation frequency, and it became clear that a break down in situational awareness had occurred. Only at this point did Jester become aware that Mustang had also split. Jester lead then elected to climb the formation to 5000ft and hold until Mustang had completed their training. He noted that despite that fact that he had mis-identified Mustang as his wingman, he assessed the risk of collision as low because he was visual with the aircraft at range.

He assessed the risk of collision as 'Low'.

## **Factual Background**

The weather at Valley was reported as:

METAR EGOV 151150Z 34010KT 9999 FEW035 15/07 Q1021 BLU NOSIG

## **Analysis and Investigation**

### **UKAB Secretariat**

Both pilots shared an equal responsibility for collision avoidance and for not flying into such proximity as to create a danger of collision<sup>1</sup>. If the incident geometry is considered as head-on, or nearly so, then both pilots were required to turn to the right<sup>2</sup>.

## **Comments**

### **HQ Air Command**

A number of barriers to MAC were only partially effective in the lead-up to this incident: both formations had entered their routes onto CADS but some information was incomplete; the supervisors of the formations consulted each other and agreed a plan that relied on time deconfliction that was eroded by a delay to the take-off of one of the formations; the back-up plan of deconfliction by radio was subject to radio performance at low level in undulating terrain. In an ostensibly see-and-avoid environment the final barrier of lookout – cued by the TCAS II fitted to the Hawk T2s – led to sufficient separation between aircraft being achieved. The lessons here are clear – a number of tools exist to minimise the likelihood of MAC but lookout remains the final – and vital – barrier.

## **Summary**

An Airprox was reported on 15 July 2015 at 1145 between two Hawks in LFA 7. Both Hawks were VFR and VMC and were conducting low-level sorties in the LFA. Neither pilot was receiving an ATS. Prior to take-off CADS had highlighted a confliction and the pilots were aware that the other would be operating in the area. The incident takes place beneath the radar cover of the NATS radars, so the exact separation is not known.

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

Information available consisted of reports from the pilots of both aircraft and radar photographs/video recordings, and reports from the Operating Authorities.

The Board first considered the actions of the pilots and noted with some disappointment that despite both of these formations being from the same unit, CADS being used, one-to-one discussions on deconfliction taking place before take-off, and RT calls being made during an encounter prior to the

<sup>1</sup> Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions).

<sup>2</sup> SERA.3210 Right-of-way (c) (1) Approaching head-on.

Airprox in question, the 2 formations had still managed to come into unintended close proximity. The Board noted that during initial planning it had become obvious to the formations that there was a potential confliction if Jester delayed, which became a reality when Jester's take-off time slipped. Although commendable that the pilots had made themselves aware of the conflict, and had formed a contingency plan to overcome it, it was evident that this plan had not been robust enough in that it relied on 2 highly dynamic formations establishing contact at low-level in mountainous terrain in order to pass information to each other. Superficially, this plan looked sound, but it rested on an assumption that the other formation would hear the transmissions. Although it was not for the Board to detail specifically how the formations should have operated, members with military fast-jet experience felt that there should have been a 'hard' deconfliction line imposed such that unless positive clearance had been obtained that one of the formations had exited the area, the other should not proceed beyond.

The Board discussed at some length whether there were any supervisory issues at play. They noted that the Duty Authoriser was aware of the initial potential confliction problem if Jester delayed, but perhaps didn't intervene enough to ensure that any contingency deconfliction plan was robust. It was also unclear to the Board whether Jester 2 was ever made aware of Mustang's 'tac-box' when CADS was checked on the re-brief after the first aircraft went unserviceable. In the end, the Board agreed that, whilst the Duty Authorisers had the chance to add some input which might have helped cue the pilots to the issues, ultimately the responsibility for robust deconfliction lay with the individual pilots.

The Board noted that there had been a number of barriers in place to prevent a confliction from occurring, CADS, radios and timing, but these were all eroded to the point where only TCAS and pilot look-out were present. In the end, members felt that it was probably the TCAS alerts to Jester formation that gave the pilots the information they needed to avoid Mustang on the first encounter, and that the second encounter and subsequent Airprox had resulted from a loss of situational awareness from Hawk(B) pilot when he mis-identified Hawk(A) as his wingman and tried to join up in formation with him, from a head-on position, thereby startling the Hawk(A) pilot. Turning to the cause of the Airprox, the Board initially debated this as a late sighting. However, although they acknowledged that Hawk(A) pilot didn't see Hawk(B) until the last moment, it was evident that Hawk(B) pilot was visual with Hawk(A) the whole time, and was actually intentionally manoeuvring in his proximity to effect a join up with what he thought was his wingman. In the end, members agreed that the most apt description of the incident was that the Hawk(B) pilot had flown close enough to Hawk(A) to cause its pilot concern. That being said, they thought that there were also two contributory factors: firstly, that there had been a loss a situational awareness by Hawk(B) pilot; and, secondly, that the deconfliction plan between Jester and Mustang was not robust enough. Notwithstanding, in discussing the risk, the Board agreed that although the separation may have been less than ideal, because Hawk(B) pilot was always visual with Hawk(A), there was no risk of collision and so the incident was assessed as Category C, timely avoiding action had been taken.

### **PART C: ASSESSMENT OF CAUSE AND RISK**

Cause: Hawk(B) pilot flew close enough to Hawk(A) to cause its pilot concern.

Contributory Factor(s):

1. Loss of situational awareness by Hawk(B) pilot.
2. The back-up deconfliction plan between Jester and Mustang was not robust enough.

Degree of Risk: C.