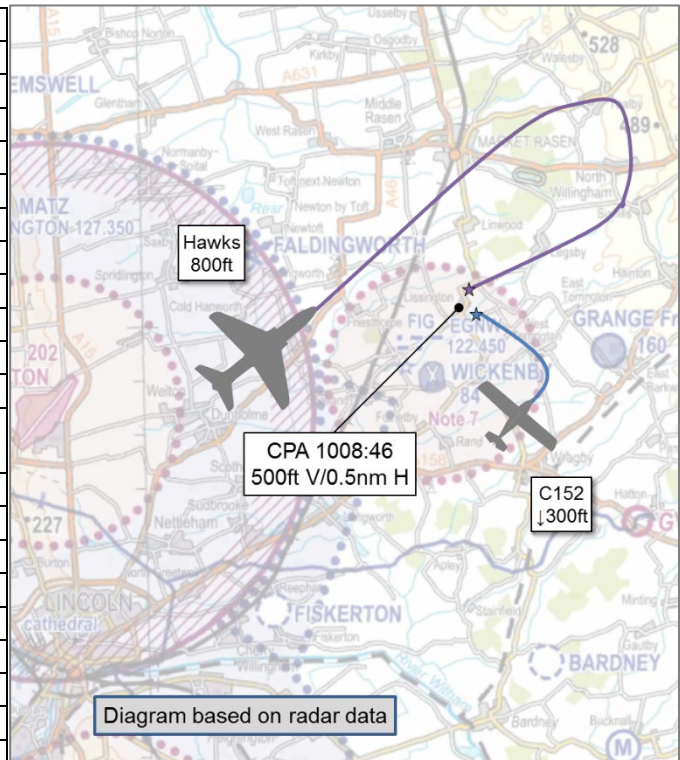


**AIRPROX REPORT No 2018252**

Date: 12 Sep 2018 Time: 1008Z Position: 5318N 00020W Location: Wickenby

**PART A: SUMMARY OF INFORMATION REPORTED TO UKAB**

Recorded	Aircraft 1	Aircraft 2
Aircraft	C152	Hawk
Operator	Civ FW	HQ Air (Ops)
Airspace	Wickenby ATZ	Wickenby ATZ
Class	G	G
Rules	VFR	VFR
Service	AGCS	Traffic
Provider	Wickenby	Waddington
Altitude/FL	400ft	900ft
Transponder	A, C, S	A, C
Reported		
Colours	Yellow, White	Red
Lighting	Strobes	Strobes, Nose light
Conditions	VMC	VMC
Visibility	>10km	10km
Altitude/FL	600ft	1200ft
Altimeter	QFE (1019hPa)	QFE
Heading	220°	245°
Speed	70kt	350kt
ACAS/TAS	Not fitted	Not fitted
Separation		
Reported	200ft V/400ft H	600ft V/1.2nm H
Recorded	500ft V/0.5nm H	



**THE C152 PILOT** reports that he had recovered to the Wickenby circuit from the east and established comms with the ground unit on 122.455mhz. The student performed 2 circuits; it was an initial introduction to the circuit so workload was high. The first circuit went without incident. On the second, with the aircraft configured for landing, they turned onto final for RW21. He saw the formation of Red Arrows pass above, slightly to the right of his position and within the Wickenby ATZ. A flying school colleague made a call to the Waddington ATC Supervisor who reported he had witnessed the incident on radar.

He assessed the risk of collision as 'Medium'.

**THE HAWK PILOT** reports that the sortie commenced with a display take-off from RW22, which comprised a left-hand 180° turn onto an almost reciprocal heading of 045° at 1000ft QFE. During the turn and roll-out on heading, the weather to the northern half of R313 was observed to be unexpectedly worse than previously noted, or than that forecast, with low-cloud and poor visibility. Not wanting to turn the formation left into the poor weather, and unable to turn right due to the proximity of Wickenby's ATZ, he asked the navigation officer (communicating with ATC) to inform Waddington ATC that they would be exiting R313 to the NE. The purpose of exiting R313 was to conduct a right-hand turn once clear of Wickenby ATZ, and then re-enter the southern portion of R313 as expeditiously as possible. The call to ATC was made to elicit more Traffic Information than their normal traffic calls. Once in a suitable area, about 9nm from the centre of R313, he commenced a turn to the right with the intention of rolling out on a westerly heading. During the turn, Traffic Information was given as 070°, 7nm from the datum point of the centre of R313 (ATC datum referencing is SOP for RAFAT Ops in R313) at a similar level. No other Traffic Information was received. Mentally plotting the traffic position to be just to the north of the Wickenby ATZ at a similar level and therefore a potential confliction with their intended roll-out heading, he rolled the formation out on a heading of approximately 230°. Whilst aware of the Wickenby ATZ, his attention was focused on getting visual contact with the conflicting traffic. A

further traffic call was received, but this time with reference to the formation, and immediately the traffic was picked up 3.5nm away and 500ft below. Crucially, the traffic was now called as 'possibly in the Wickenby circuit, indicating 600ft' which immediately increased situational awareness and confirmed the visual acquisition. The formation was at 1200ft Scampton QFE. A right-hand climbing turn was initiated, to ensure further separation from both the traffic and the Wickenby ATZ, but was conducted in a gentle manner (15° AOB) to ensure visual contact was maintained. The formation passed approximately 1.2nm behind (NNE of) the traffic, which was now on a south-westerly heading away from the formation's flightpath, and 600-700ft above. With visual contact on both the traffic and Wickenby's runway (at the time he assessed them to be 2nm from the runway), he knew they had come close to entering the ATZ, but it was only when informed by ATC that he became aware that they had infringed the ATZ. Of note, the Skymap GPS in his aircraft only has the position of Wickenby's centre point marked as a dot, but no 2nm ATZ boundary. The initial traffic call (leading to the belief that the traffic was north of its actual position, therefore restricting the roll-out heading), the time taken to acquire the traffic, the gentle nature of the ATZ-avoiding 9-ship formation turn, and poor GPS fidelity meant that he inadvertently strayed into the Wickenby ATZ whilst focussing on traffic avoidance.

He assessed the risk of collision as 'Low'.

**THE WADDINGTON APPROACH CONTROLLER** reports that she was working with Approach and Director bandboxed at the time of the incident. She was providing a service to RAFAT for a R313 sortie. They informed her that they would be leaving the confines of R313 and asked whether there was any traffic to affect. There were 2 radar contacts that she considered a factor so she gave Traffic Information on them. One of these tracks was within the Wickenby ATZ and once she had called the traffic the pilot called visual. She asked them to confirm they would be remaining outside the Wickenby ATZ and they confirmed they would. She then observed them continuing on track and infringing the ATZ, she informed them of the infringement on frequency.

She perceived the severity of the incident as 'Low'.

**THE WADDINGTON SUPERVISOR** reports that the Approach controller's report was an accurate account of the occurrence. Wickenby contacted him by telephone and he explained the sequence of events. They told him that RAFAT would normally have contacted them on their VHF frequency for clearance to penetrate the ATZ, but on this occasion they did not.

## Factual Background

The weather at Scampton was recorded as follows:

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METAR EGXP 121050Z 26009KT 9999 SCT016 BKN025 14/11 Q1022 WHT=
METAR EGXP 120950Z 25010KT CAVOK 13/10 Q1022 BLU=
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The Scampton forecast was as follows:

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TAF EGXP 120722Z 1209/1218 27010KT 9999 FEW020 PROB30 TEMPO 1209/1210 SCT020=
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## Analysis and Investigation

### Military ATM

The Hawks had departed RAF Scampton for a routine flying display practice within R313 and were receiving a Traffic Service from Waddington Approach as per standard procedure. The weather in the operating area was reported as worse than expected resulting in the Hawk formation leaving the confines of R313. Whilst positioning to re-enter R313, the Hawk formation entered the Wickenby ATZ.

Figures 1-4 show the positions of the Hawk formation and the C152 at relevant times in the lead up to and during the Airprox. The screen shots are taken from a replay using the Claxby Radar, which

is not utilised by RAF Waddington, therefore is not representative of the picture available to the controllers. There were discrepancies in the timing of the radar replay and the timing of the RT transmissions of approximately 1min 10 secs.

Due to weather issues, the Hawk formation informed Waddington that they need to leave the confines of R313 and requested information on any traffic to affect. Traffic Information was given on two aircraft, one to the northeast, which was squawking 4271, and the C152. This Traffic Information noted that the C152 was east of Scampton by 10nm and 'just south of you at the moment' (Figure 1).

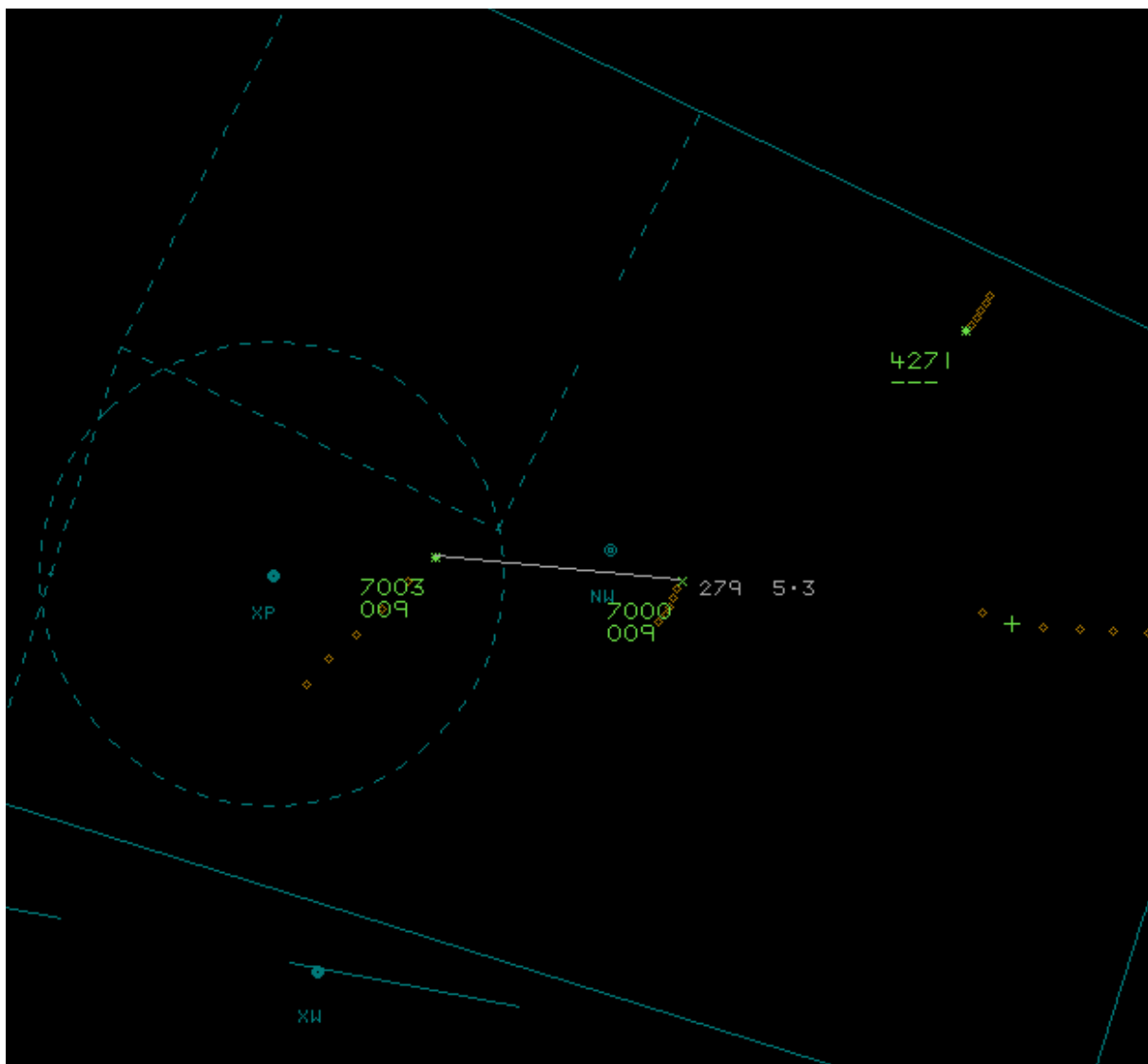


Figure 1

The Hawk formation, having turned to reposition for R313, requested an update on the 'traffic to the south'. This information appears to have been misunderstood by the controller who passed Traffic Information on the aircraft squawking 4271 which was now south east of the Hawk formation, not the C152 which had previously been reported as 'just south of you at the moment' (Figure 2).

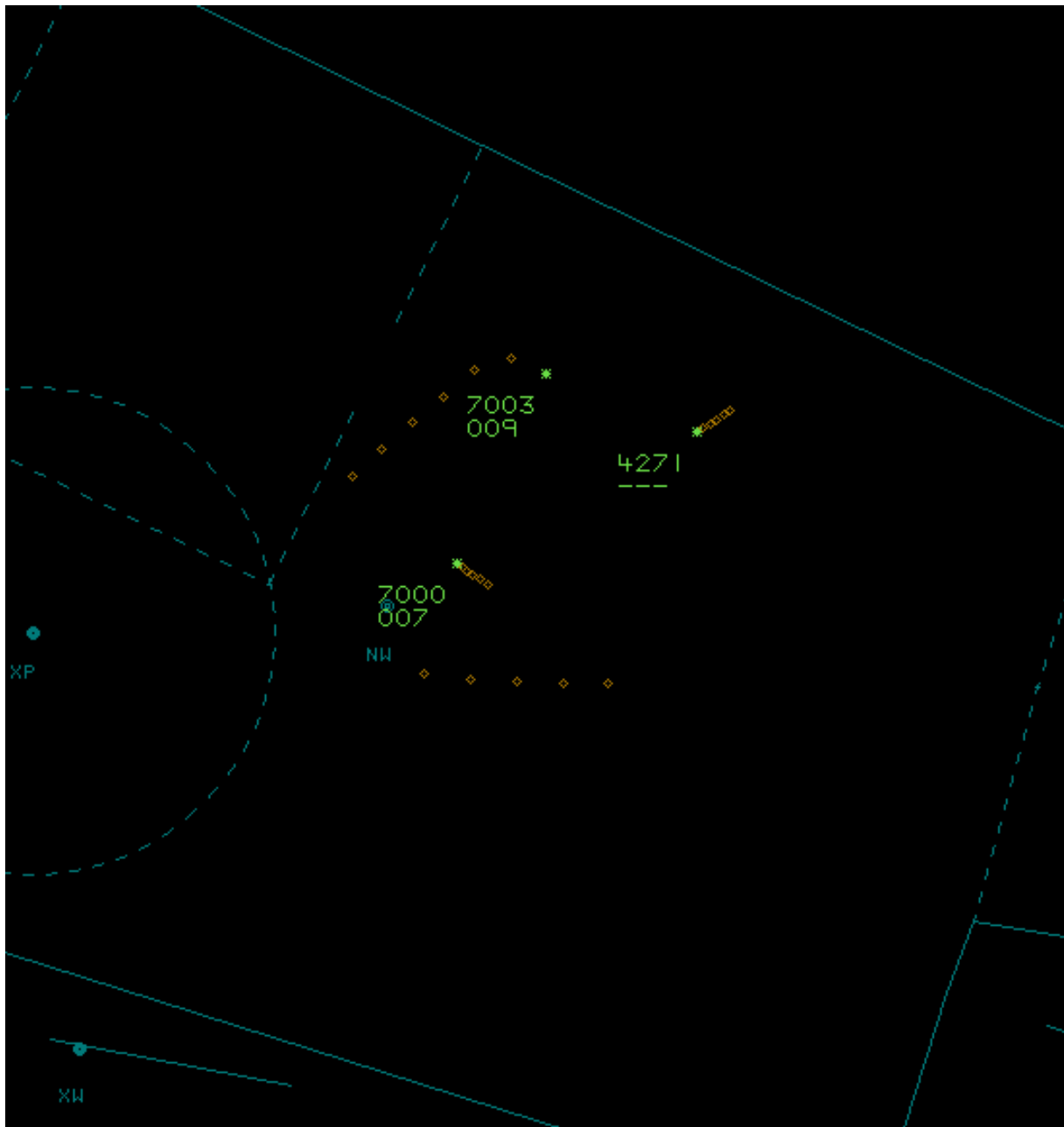


Figure 2

Some 15secs after this information was passed, the Waddington Approach controller passed Traffic Information on the C152 and the Hawk pilot reported visual with it approximately 20sec after the information was passed (Figure 3).

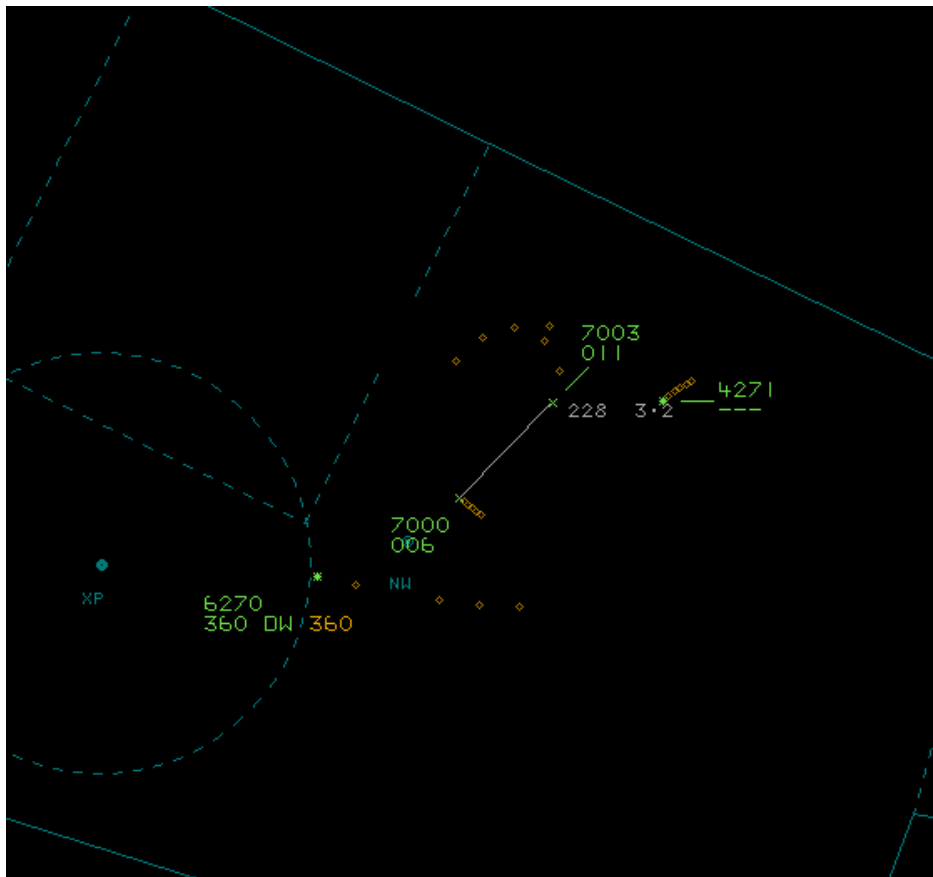


Figure 3

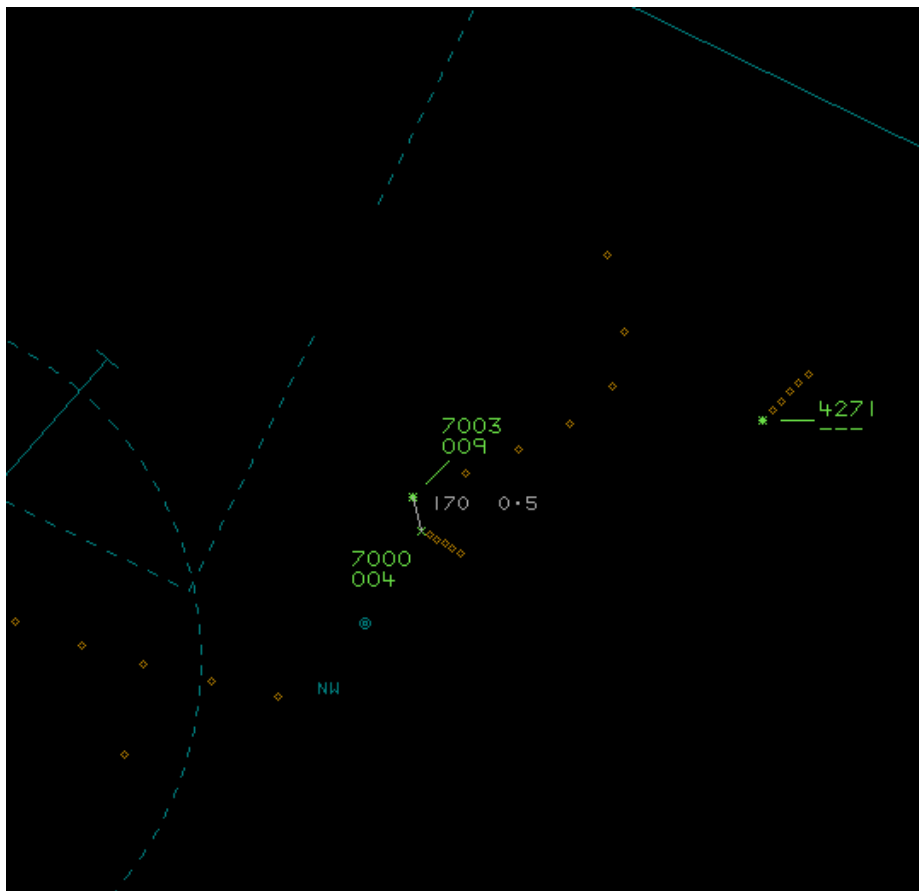


Figure 4: CPA

CPA occurred at 1008:47 (Figure 4) some 10sec after the Hawk formation reported visual with the C152 and was measured at 0.5nm and 500ft.

Having been forced out of R313 by poor weather, the Hawk formation requested information on conflicting traffic which was duly passed. The update in Traffic Information requested by the Hawk pilot appears to have been misunderstood by the controller although accurate Traffic Information on the C152 was passed shortly afterward. Whilst trying to avoid the traffic to the east and reposition for R313, the Hawk formation penetrated the Wickenby ATZ and into conflict with the C152. However, having been passed accurate Traffic Information, the Hawk pilots were visual with the C152 prior to CPA.

### **UKAB Secretariat**

The C152 and Hawk pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard<sup>1</sup>. An aircraft operated on or in the vicinity of an aerodrome shall conform with or avoid the pattern of traffic formed by other aircraft in operation<sup>2</sup>. Pilots should not enter an ATZ without the prior permission of the controlling authority.<sup>3</sup>

### **Comments**

#### **HQ Air Command**

The unit investigation into this Airprox – which was reported initially as an airspace infringement – found a number of contributory factors to the loss of separation with the traffic in the Wickenby circuit.

Given the proximity of Wickenby to EG R313, the Hawk pilots are all well aware of the need to avoid the ATZ or, if unable, to contact Wickenby. In this instance, by the time the Hawk pilot was aware that he was about to penetrate the ATZ it was too late to inform Wickenby. Quite rightly, the Hawk pilot was prioritising ensuring safe separation from the traffic over avoidance of the airspace. The initial Traffic Information on the Wickenby traffic was slightly in error in range, but this in itself should not lead to an error in locating the traffic. The Hawk pilot mentally plotted the Cessna to be just north of the Wickenby ATZ; his subsequent positioning of the formation took account of where he *perceived* the Cessna to be, not where it actually was, and so he flew closer to Wickenby than he had planned to. Subsequent Traffic Information was accurate and the Hawk pilot gained visual with the Cessna and identified it as Wickenby circuit traffic. Crucially, had the controller mentioned that the traffic appeared to be in the Wickenby circuit then any doubt as to the location of the Cessna would have been removed. That said, it is not clear if that information was available to the controller at the time.

ATC alerted the formation to their proximity to Wickenby airspace and the Hawk pilot visually judged himself to be outside the Wickenby ATZ; the fidelity of the on-board navigation equipment was insufficient to confirm to the pilot that he was, in fact, within the ATZ. That said, the priority is always to avoid the other aircraft – airspace considerations must be secondary. Although the Hawk pilot gained visual with the Cessna at an estimated range of 3.5nm, his manoeuvrability was limited due to the presence of 8 other aircraft in close formation with him. However, he judged that he had sufficient formation manoeuvrability to achieve adequate separation from the Cessna.

### **Summary**

An Airprox was reported when a C152 and a formation of Hawks flew into proximity in the Wickenby ATZ at 1008hrs on Wednesday 12<sup>th</sup> September 2018. Both pilots were operating under VFR in VMC,

<sup>1</sup> SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

<sup>2</sup> MAA RA 2307 paragraph 15.

<sup>3</sup> MAA RA 2330 paragraph 13.

the C152 pilot was in the visual circuit at Wickenby and in receipt of a AGCS. The Hawk pilot was leading a large formation that had just left R313, was in receipt of a Traffic Service from Waddington.

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

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

The Board first looked at the actions of the C152 pilot. He was instructing a student in the visual circuit at Wickenby, and could reasonably expect to be protected from transiting aircraft by the ATZ. When on finals, the formation of Hawks flew above and to his right, within the ATZ. Coming from behind as they were, he could not be expected to see the Hawks before they overflowed him, and therefore the Board concluded that there was little more he could have done in the circumstances.

For their part, the Hawk formation was manoeuvring to keep clear of unexpected cloud to the north of EG R313 and the lead pilot elected to route to the north-east of Scampton. Having been given Traffic Information on two aircraft, the lead pilot mentally plotted the C152 as being to the north of the Wickenby ATZ and, in avoiding this incorrectly perceived location by routing to the south as he transited back to Scampton, thought that he could do so whilst still remaining just to the north of the Wickenby ATZ. Having rolled the formation out on what he perceived to be the best heading to return to Scampton, the large formation was not then easy to manoeuvre rapidly when the formation lead realised too late that the C152 was in fact within the Wickenby visual circuit. Some members wondered if the lead pilot had become task focused in his desire to return to the confines of R313 as soon as possible and begin the display practice; if he had continued the turn onto 270° when initially turning back (and effectively retracing his outbound track), he could have both avoided Wickenby and the C152 incorrectly perceived position rather than trying to squeeze between it and the Wickenby ATZ. However, members acknowledged that hindsight could not account for the dynamic pressures on the formation leader who was trying to manoeuvre an unwieldy formation, mentally plot and avoid conflicting traffic, achieve a display datum and visually navigate to avoid the Wickenby ATZ. In the latter respect, and noting the Hawk pilot's comments about the GPS within the aircraft, the military member confirmed that the GPS was indeed sub-optimal, but that there was a programme in place to upgrade it. Unfortunately, the military member was unable to provide a time-frame for when the upgrade would be completed.

Turning to the role of ATC, the Board noted that the controller had initially called the traffic as range and bearing from Scampton, as per SOPs, and then, when updating it, as range and bearing from the Hawks. She wasn't to know that the Hawk pilot had an incorrect mental model of where the traffic actually was, but members agreed that if the controller had been able to tell the Hawk pilot that the conflicting traffic was within the Wickenby circuit this would have immediately improved his mental model. During this discussion, controller members noted that although the controller could have used the words 'believed to be in the Wickenby circuit', she had no way of knowing for sure that the C152 was in fact remaining in the Wickenby circuit or about to exit the ATZ. Noting that some airfields use the squawk 7010 to indicate that aircraft are operating in the visual circuit, controlling members pointed out that only an ATCU could instruct the use of 7010; given that Wickenby had no ATC, they were not therefore able to instruct pilots to adopt the squawk. However, controller members opined that an LOA or similar between Waddington and Wickenby could be put in place such that Waddington effectively provided the authority to use 7010, and so the Board resolved to recommend that Waddington and Wickenby should put such a procedure in place thereby enhancing Waddington ATC's situational awareness not only for Red Arrows operations but also for general LARS provision.

In determining the cause of the Airprox the Board quickly agreed that whilst avoiding the reported traffic, the Hawks had inadvertently entered the Wickenby ATZ and flew into proximity with the C152. Notwithstanding the inadvertent airspace infringement, with regard to the risk, members noted that the Hawk pilot had been visual with the C152 before CPA and had flown 500ft above and 0.5nm to the north of it. Accordingly, the Board agreed that, although safety had been reduced, there had been no risk of collision; Risk Category C.

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

Cause: Whilst avoiding reported traffic, the Hawks inadvertently entered the Wickenby ATZ and flew into proximity with the C152.

Degree of Risk: C.

Recommendation: That Wickenby and Waddington consider the use of the 7010 squawk for Wickenby circuit traffic.

Safety Barrier Assessment<sup>4</sup>

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

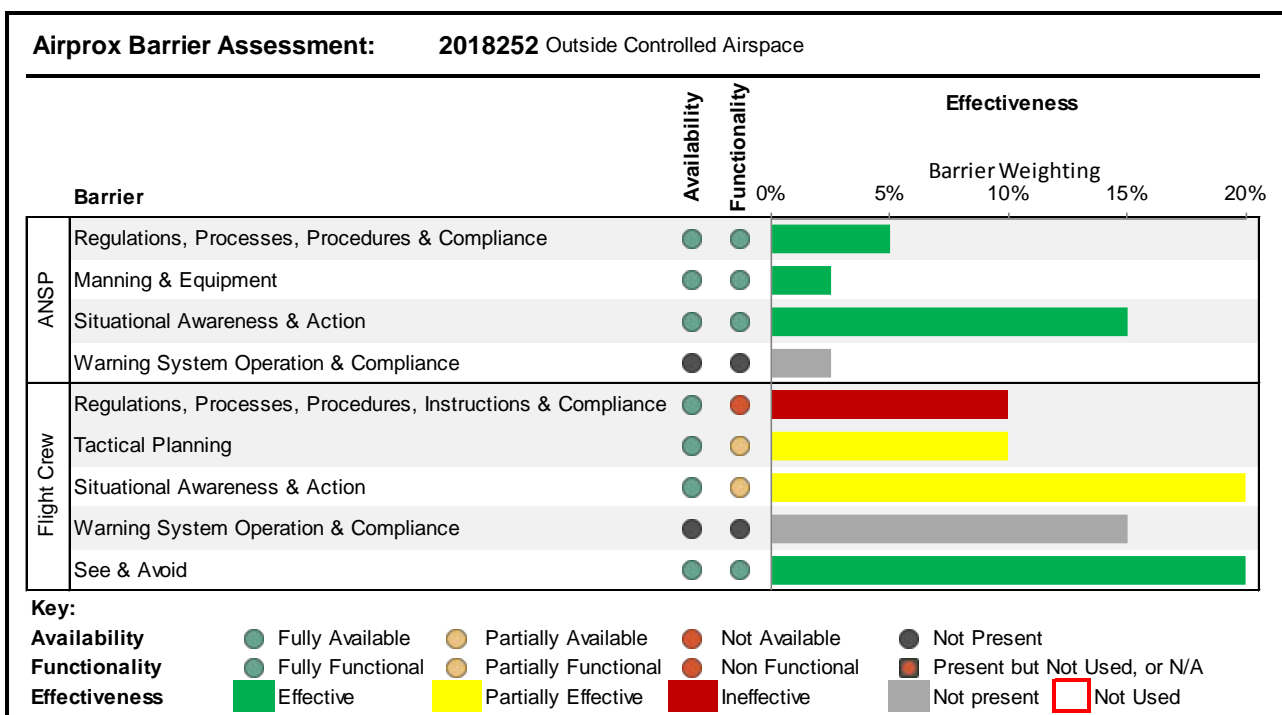
**Flight Crew:**

**Regulations, Processes, Procedures, Instructions and Compliance** were assessed as **ineffective** because the Hawk formation flew through the Wickenby ATZ.

**Tactical Planning** was assessed as **partially effective** because although the Hawk pilot planned to avoid the C152, he didn't ensure that he remained clear of the ATZ.

**Situational Awareness and Action** were assessed as **partially effective** because the Hawk pilot had a flawed mental model and, as a result, didn't effectively act upon the Traffic Information provided by ATC.

**Warning System Operation and Compliance** were not present, neither aircraft was fitted with a CWS.



<sup>4</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](http://www.ukab.co.uk).