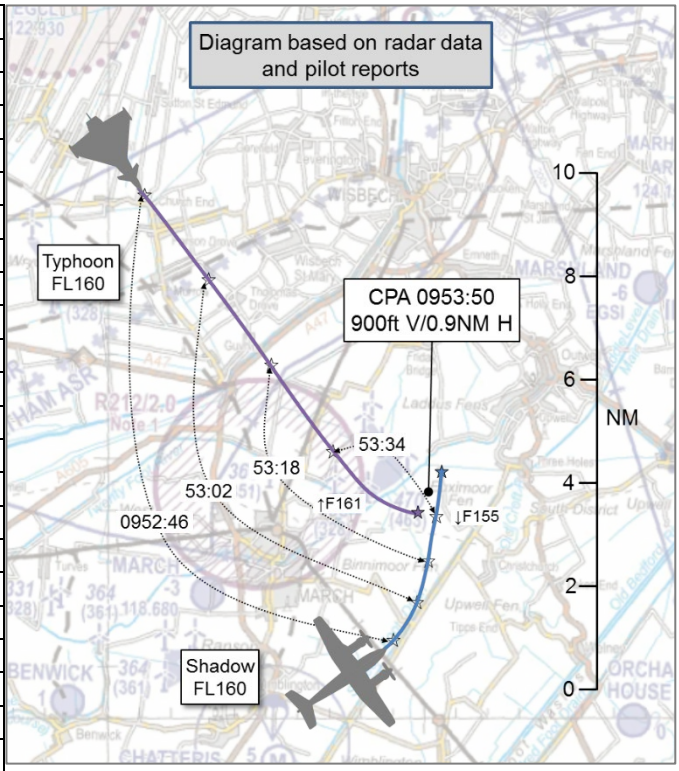
AIRPROX REPORT No 2020068

Date: 14 Jul 2020 Time: 0954Z Position: 5234N 00010E Location: 5NM S of Wisbech

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Shadow	Typhoon
Operator	HQ Air (Ops)	MoD ATEC
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Traffic
Provider	Coningsby App	Swanwick(Mil)
Altitude/FL	FL152	FL161
Transponder	A, C, S	A, C
Reported		
Colours	Grey/White	Grey
Lighting	NR	NR
Conditions	NK	NK
Visibility	20km	>10km
Altitude/FL	FL160	FL160
Altimeter	SPS (1013hPa)	SPS (1013hPa)
Heading	NR	Turning 160°-100°
Speed	NR	NR
ACAS/TAS	TCAS II	Not fitted
Alert	RA	N/A
Separation		
Reported	300ft V/150m H	500ft V/1000ft H
Recorded	900ft V/0.9NM H	



THE SHADOW PILOT reports that, at the time of the incident, there was widespread BKN/OVC cloud at approximately 5000ft across most of Norfolk and two air exercises NOTAM'd at Muckleburgh and Little Snoring. They had been tasked to support an additional air exercise in the vicinity of STANTA.[1] They had initially been operating there, level at FL160, with a Traffic Service provided by Lakenheath Approach. Unfortunately, due to the OVC cloud below them, they curtailed their participation in this exercise and requested to operate further to the NW, in a swathe of clear air between King's Lynn and March. Lakenheath handed them over to Coningsby Approach. Again, ATC provided them with a Traffic Service. At the time of the incident, they had been conducting self-generated mission training for approximately 30min. A pair of Typhoons was also operating within approximately 20NM of their position, generally at FL170 and FL180. This pair was not on the same frequency as them. ATC notified them of proximate air traffic which was one of the previously mentioned Typhoons. At this point, the traffic was co-altitude (on TCAS), in their 9 o'clock and closing, crossing behind them. They continued to monitor the position of this traffic on both TCAS and with their EO sensor, but were not visual. As [the Typhoon] closed further, they received a TCAS TA and then an RA requesting them to 'DESCEND, DESCEND'. They complied with this and were then instructed to 'LEVEL OFF' by TCAS. They were now at approximately FL150. As they levelled off, the pilot and the Sensor Operator were both finally able to visually acquire the traffic and they saw a Typhoon in their 7 o'clock at approximately 150m. It then passed behind and above them. They notified ATC of the RA as they were descending. Once clear of the conflict they elected to continue their training at FL140.

The pilot assessed the risk of collision as 'Medium'.

THE TYPHOON PILOT reports that their formation was operating as two singletons at the time of the incident, carrying out independent exercises. The formation was in receipt of a Traffic Service from Swanwick(Mil) in the block FL150-160, with their aircraft operating at FL160. They were between test

[1] Stanford Training Area.

points, link-flying and not involved in LDP[2] operations at the time of the incident. The pilot called radar contact with the Shadow 9sec after the initial ATC point-out and was visual 2sec later using the pilot's helmet mounted display. This was approximately 45sec prior to the closest point of approach. They subsequently flew a gentle turn (1.6g) behind the Shadow, whilst also avoiding CAS to the south. They perceived there to be no risk of collision and were unaware that the Shadow had declared an Airprox until after landing. East Anglia airspace is very busy and it is not always possible to coordinate due to aircraft being on different ATC frequencies. Other users should note that fast jets (FJs) in this area will most likely be operating with Swanwick(Mil), rather than taking a LARS from one of the numerous airfields.

As FJ aircrews routinely operate in close proximity with both FJs and multi-engine aircraft (whilst performing AAR), their perception of the risk of MAC once visual is undoubtedly not the same as some other users. As a result, most FJ aircrews are not familiar with TCAS warnings and the significant separation distances associated with them. The requirement to maintain significant separation from TCAS equipped aircraft, even if visual, was discussed with all squadron pilots after this event.

The pilot assessed the risk of collision as 'None'.

THE CONINGSBY DEP/LARS CONTROLLER reports that they had 3 x Traffic Service aircraft operating on VHF; there were no aircraft on the departures frequency. [The Shadow pilot] was operating to the west of Marham at FL 160. Due to their location, the range being used for control was greater than usual and offset. Numerous Typhoons were called to [the Shadow pilot] as they operated. On one occasion, traffic was called to [the Shadow pilot] as NW 8NM tracking SE (towards them) indicating similar level. The pilot did not respond so they repeated the Traffic Information louder as 'NW 3NM tracking SE indicating similar level'. As the pilot responded to this, the controller could hear the TCAS RA in the cockpit. The pilot then informed them that they were responding to a TCAS RA and were going to file an Airprox. [The Shadow pilot] subsequently asked for the callsign of the Typhoon, which they could not provide as the aircraft was not working Coningsby. They spoke to the pilot on landing and they informed the controller that they had heard the traffic called twice. The pilot stated that they responded to the RA to descend and believed the Typhoon was 150m away laterally and just above. The pilot believed that the Typhoon may have been visual with them as it was heading behind.

The controller perceived the severity of the incident as 'Low'.

THE SWANWICK(MIL) CONTROLLER reports that they were under training at the time when [a pair of Typhoons] was transiting for general handling in the East Anglia MTA at FL160. Traffic wearing a Coningsby squawk was seen transiting the area at FL160. Traffic was called to [one of the Typhoons] under a Traffic Service, to which the pilot replied 'sensor'. [The Typhoon] then came out of a turn onto a converging track with the Coningsby squawk. The traffic was then called south-east at around 10NM to which the pilot replied 'sensor' shortly before replying visual at 7NM, to which the controller then called the same traffic again, despite the pilot calling visual, at 1NM indicating 500ft below. The pilot responded with 'visual again'. The pilot then requested to elevate and was offered the block FL160 to FL180.

The controller perceived the severity of the incident as 'Low'.

THE CONINGSBY SUPERVISOR reports that they were supporting the ADC with their task, with 3 in the visual circuit. On returning to the ACR, they were informed of an incident regarding a TCAS RA involving a Shadow being controlled on the LARS frequency. They noted the time and location of the incident and the callsigns involved. They ensured that the Departures/LARS controller was swiftly given a break from console to note down the details of the incident while they were still fresh in their head. After a few hours, the Supervisor managed to speak to both the pilot of the Shadow and the conflicting Typhoons. [The Shadow pilot] informed them that they had reacted to the TCAS RA and, after doing so, had noticed a Typhoon passing above, looking to have taken its own visual avoiding action. Furthermore, [the Shadow pilot] informed them that they would be raising their own report once

[2] Laser Designation Pod.

debriefed from their sortie. Finally, the pilot of the Typhoon informed them that Swanwick(Mil) had called [the Shadow] to themselves and that they had reported visual with the Shadow.

Factual Background

The weather at Marham was recorded as follows:

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METAR EGYM 140950Z 30012KT 9999 FEW035 SCT200 17/10 Q1016 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

The Typhoon pilot was in receipt of a Traffic Service from Swanwick(Mil) FL160. They were conducting an independent exercise although, at the time of the Airprox, they were between test points, link-flying and were not involved in LDP operations. The Typhoon pilot reported radar contact with the Shadow R1 9sec after the initial Traffic Information was passed and became visual shortly afterwards. The Typhoon pilot subsequently flew a gentle turn (1.6g reported) behind the Shadow R1 whilst avoiding CAS to the south. Further Traffic Information relating to the Shadow R1 was passed by Swanwick(Mil) with the Typhoon pilot confirming again that they were visual. The Typhoon pilot perceived there to be no risk of collision. The Typhoon pilot reported separation to be 500-1000ft above and behind.

The Shadow R1 pilot was in receipt of a Traffic Service from Coningsby Deps/LARS, having been handed over previously from Lakenheath, and reported widespread BKN/OVC cloud at approximately 5000ft. The Shadow R1 pilot had been conducting self-generated training for around 30min prior to the Airprox, having had their initial tasking curtailed due to weather. Traffic Information on the Typhoon was passed to the Shadow pilot which was showing as co-altitude on TCAS and crossing behind. The Shadow pilot reported that, whilst monitoring on TCAS and with their EO sensor, they were not visual and, as the Typhoon closed further, they received a TCAS TA followed by an RA requesting them to descend, which they followed. The Shadow pilot did not feel like they could request a service from Swanwick(Mil) as they had not contacted Swanwick(Mil) in advance. The Shadow pilot reported separation to be 150m behind and 100m above.

The Swanwick(Mil) controller was under training at the time of the incident and was only working one other aircraft. The Coningsby Deps/LARS controller was providing a Traffic Service to 2 other aircraft at the time of the incident. It is unknown whether the two controllers passed Traffic Information to each other via landline although timely Traffic Information was passed by both controllers with updates provided due to the proximity of the Typhoon and the Shadow.

Figures 1-6 show the positions of the Typhoon and the Shadow at relevant times in the lead up to and during the Airprox. The screenshots are taken from a replay using the NATS Radars, which are not utilised by Coningsby, therefore may not be entirely representative of the picture available to the Coningsby controller. Traffic Information was passed to the Shadow R1 pilot indicating that separation from the Typhoon was 8NM; however, this was not captured by the radar replay.

Further Traffic Information was passed to the Shadow R1 pilot by Coningsby Deps/LARS. Swanwick(Mil) had passed Traffic Information to the Typhoon pilot 5sec prior. Separation at this point was 7.4NM (see Figure 1). The Typhoon pilot initially reported sensor contact 9sec after the initial Traffic Information and reported visual almost immediately afterwards. Separation at this point was 6.2NM (see Figure 2).

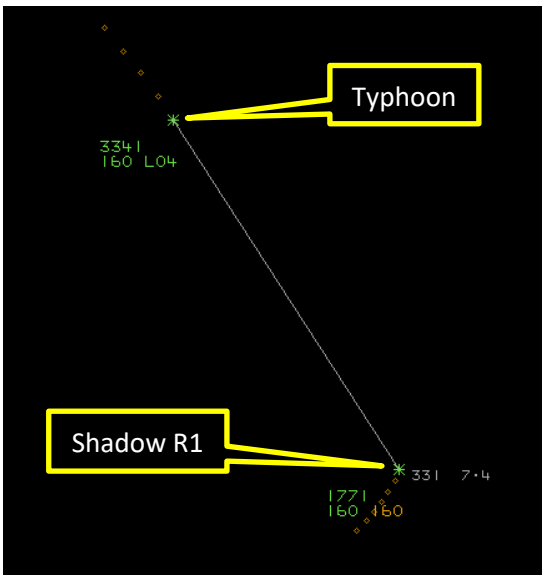


Figure 1 - Second set of Traffic Information passed to Shadow R1 pilot.

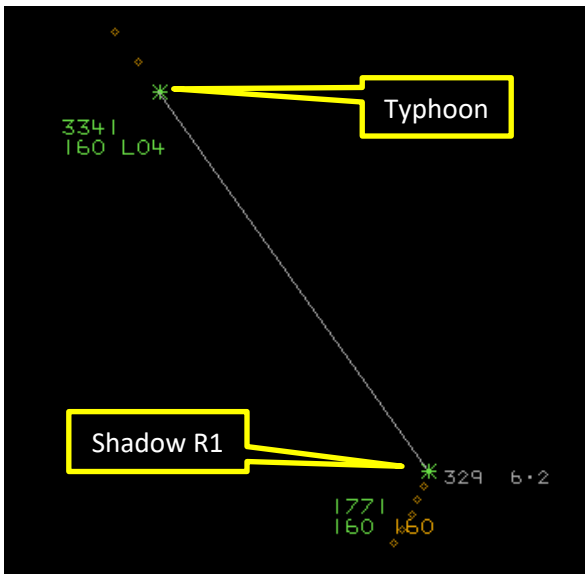


Figure 2 - Typhoon Pilot reports visual with Shadow R1.

Further Traffic Information was passed to the Shadow R1 pilot by the Coningsby Deps/LARS controller 15sec after the last set of Traffic Information. Separation had decreased to 4.2NM (see Figure 3). The Swanwick(Mil) controller passed further Traffic Information to the Typhoon pilot 24sec after the first Traffic Information from which they had reported visual with the Shadow R1 5sec later. Separation had decreased to 2.4NM and 500ft (see Figure 4).

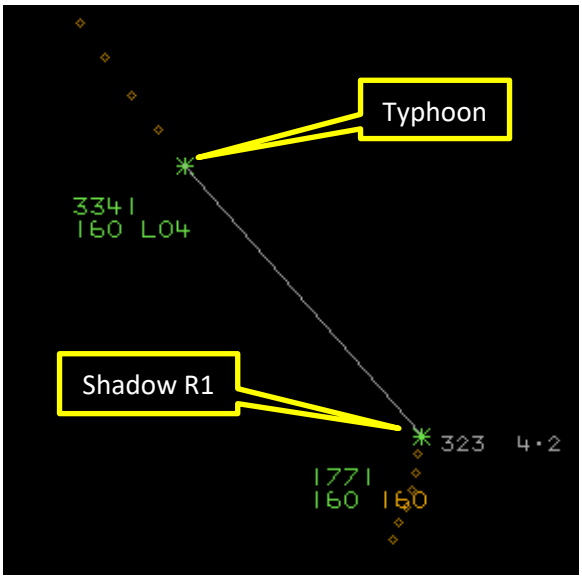


Figure 3 – Further Traffic Information passed to Shadow R1 pilot.

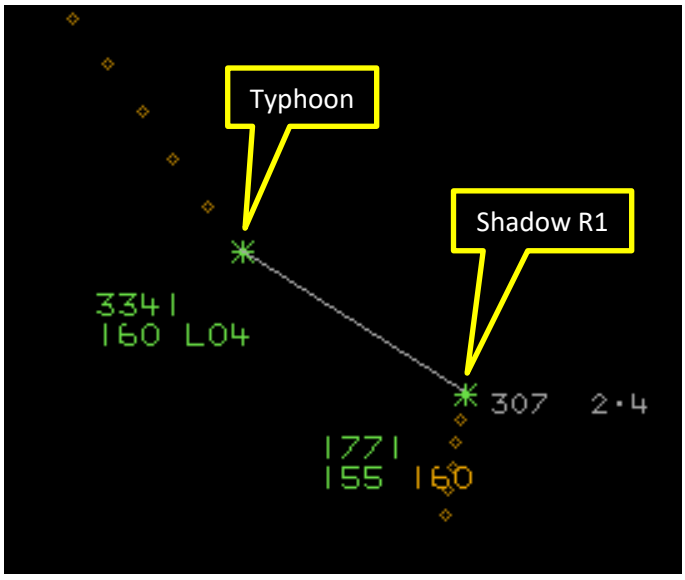


Figure 4 – Further Traffic Information passed Typhoon pilot.

The Shadow R1 pilot reported "*TCAS RA levelling-off*" 23sec after their last Traffic Information. There had potentially been an attempt by the Shadow R1 pilot to report the TCAS RA; however, this was inconclusive on the tape transcript. Separation at this point was 1.4NM and 800ft (see Figure 5). CPA was measured as 0.9NM and 900ft, with the Typhoon passing behind the Shadow R1 (see Figure 6).

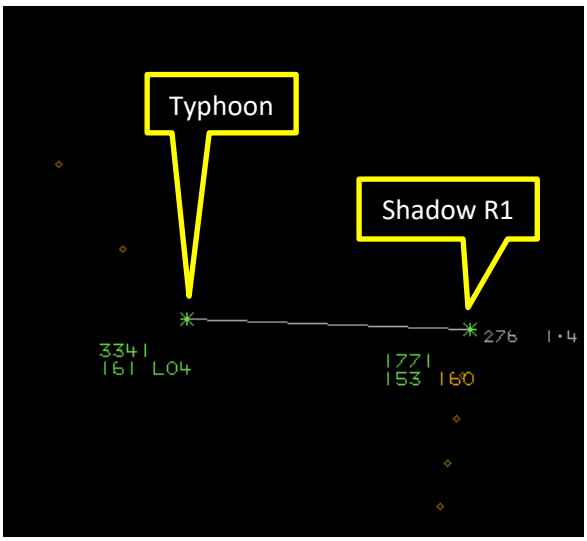


Figure 5 – Shadow R1 pilot reported "TCAS RA levelling-off".

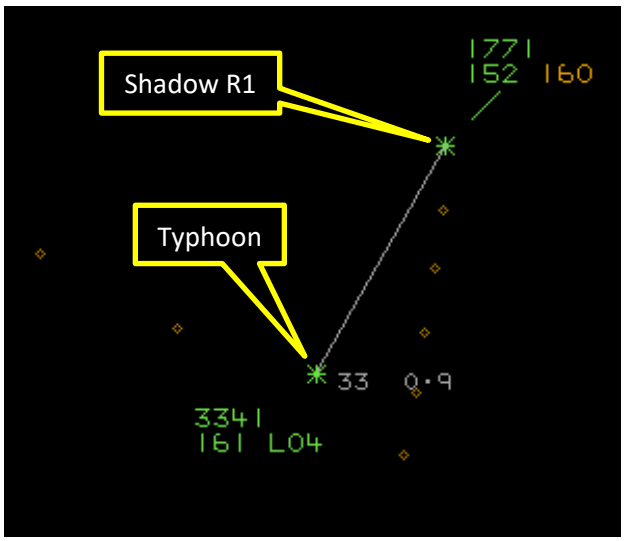


Figure 6 – CPA.

Timely Traffic Information was passed to both the Typhoon and Shadow R1 pilots and the Swanwick(Mil) controller should be commended for providing updated Traffic Information due to the proximity, although the Typhoon pilot had previously reported visual with the Shadow. It is unfortunate that, despite being visual with the Shadow, the Typhoon pilot flew close enough to trigger a TCAS RA. Having both aircraft on the same frequency would have provided the information to the Shadow pilot that the Typhoon pilot was visual with them. It is unknown whether this would have been an option as the Shadow R1 pilot did not request a handover to, or contact, Swanwick(Mil) to ascertain whether they could have been given a radar service.

UKAB Secretariat

The Shadow 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.[3] If the incident geometry is considered as converging then the Typhoon pilot was required to give way to the Shadow.[4]

The Shadow crew had the following additional thoughts post-event:

- The location of the TCAS RA is in an ATS 'grey area', given its proximity to both Marham and Coningsby LARS. Some ATS are also provided by Swanwick(Mil) below the EAMTA (FL245-550).

- Proximity of this large area of uncontrolled airspace to Waddington, Coningsby, Marham and Lakenheath makes it a hotspot for military traffic. This effect is further compounded when poor weather limits scarce live aircrew flying.

- Shadow crews have previously been briefed to avoid Norfolk where possible, but in this case they were due to support an exercise.

- The Shadow lacks speed of manoeuvre compared to a fast jet (FJ), so they have a limited capability to avoid conflicting FJ traffic.

- Swanwick(Mil) issued a note to units in May 2020 stating that 'un-prenoted or free-calling aircraft pose additional risk as they increase the potential for Swanwick(Mil) controller overload and service refusals.' The communication further stated that units should be instructed '….to engage with the appropriate Swanwick(Mil) Supervisor at the sortie planning stage.' In light of this, the crew did not feel empowered to contact Swanwick(Mil) for a service in lieu of Coningsby. Given they were

[3] MAA RA 2307 paragraphs 1 and 2.
[4] MAA RA 2307 paragraph 12.

planning to support the exercise and then go straight to [their destination airfield] in the airways, they did not contact Swanwick(Mil) in advance.

The Shadow squadron commander agreed with the observations made by the Shadow crew and highlighted the point that the aircraft were on different frequencies. If both pilots could hear traffic calls to each other and understand what each other were doing then he assessed that there would be fewer encounters of this kind.

Comments

HQ Air Command

This Airprox was subject to a Local Investigation resulting in no recommendations but highlights the complexities of working in East Anglia airspace, which is used by multiple different Air Systems all potentially working on different frequencies. It is becoming more evident that manning levels, due to COVID, within ATS providers are also adding a layer of complexity. Crews are advised not to free-call Swanwick(Mil) and to notify them in advance if they plan to use them, reducing the risk of controllers being overloaded. This meant the crew of the Shadow did not feel empowered to use Swanwick(Mil) and thus, remained on a Coningsby LARS frequency, missing SA-critical communications that the Typhoon pilot was visual. Upon receipt of the TCAS RA, the actions carried out by crew of the Shadow were correct and timely and, after gaining visual with the Typhoon but without the information that the Typhoon pilot was visual with them, felt that the risk of collision was high by virtue of the Typhoon's position. Equally, with the Typhoon pilot having no knowledge that the Shadow pilot was visual or that they were happy with the pilot of the Typhoon being visual with them, it would have been prudent to have given the Shadow a much wider berth, as getting that close to the Shadow, in this situation, seems unnecessary and avoidable. Due to the crew of the Shadow reacting to the TCAS RA and the pilot of the Typhoon being visual, the risk of collision was low.

Summary

An Airprox was reported when a Shadow and a Typhoon flew into proximity 5NM south of Wisbech at 0954Z on Tuesday 14th July 2020. Both pilots were operating under VFR in VMC, the Shadow pilot in receipt of a Traffic Service from Coningsby Approach and the Typhoon pilot in receipt of a Traffic Service from Swanwick(Mil).

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities. Relevant contributory factors mentioned during the Board's discussions are highlighted within the text in bold, with the numbers referring to the Contributory Factors (CF) table displayed in Part C.

Due to the exceptional circumstances presented by the coronavirus pandemic, this incident was assessed as part of a 'virtual' UK Airprox Board meeting where members provided dial-in/VTC comments.

The Board first considered the actions of the Shadow pilot and agreed that, on receipt of the Traffic Information from the Coningsby controller and the indications presented by their TCAS display, they had been concerned by the proximity of the Typhoon (**CF3**). A lengthy discussion then followed regarding the Shadow pilot's choice of ATSU; the Board heard from a military area controller member that Swanwick(Mil) had found that, during restrictions on manning due to COVID-19, the likelihood of controller overload and potential refusals of Service had increased. This was due, in part, to individual ATC units having to implement COVID-19 restrictions on the numbers of controllers on console, thus naturally reducing the capacity of that unit, but also due to Swanwick having to introduce similar COVID-19 manning restrictions. This had led to an advice note being issued from Swanwick(Mil) to military flying units requesting them to pre-note their intentions and not rely on free-calling Swanwick(Mil) for

an ATS, although the note clearly stated that Services would be provided wherever possible, irrespective of whether the mission had been pre-noted beforehand. However, members felt that the Shadow pilot had taken this advice note to mean that, unless pre-noted, they would not have been able to request an ATS from Swanwick(Mil) and so had elected to request a Traffic Service from first Lakenheath, and then Coningsby, to achieve their mission aims. Members felt that the Shadow pilot being on a different frequency to that of the Typhoon pilot had led to them being unaware that the Typhoon pilot had been visual and had thus been contributory to the Airprox (**CF1**). That being said, the Board noted that the Shadow pilot had received Traffic Information on the Typhoon from the Coningsby controller which had led to them becoming visual with the Typhoon as it passed behind and above them (**CF6**), albeit that this had been after the Shadow pilot had followed the RA from their TCAS (**CF4**).

Turning to the actions of the Typhoon pilot, the Board heard from a military member that many FJ crews operate with TCAS or are accustomed to operating in an environment with TCAS-equipped aircraft, and therefore they did not feel that the Typhoon pilot's assertion that FJ pilots in general are less likely to take account of the TCAS 'bubble' had been accurate. Additionally, the Board heard that the Typhoon pilot's use of the word 'sensor' would have indicated to the controller that, although not a recognised codeword, the Typhoon pilot had had situational awareness of the presence of the Shadow from their onboard systems. The Board further agreed that the Typhoon pilot had become visual with the Shadow at a range of 7NM and, therefore, considered that the Typhoon pilot, whilst assessing that there had not been a conflict between the 2 aircraft (**CF5**), had nevertheless flown close enough to the Shadow to cause concern on the part of the Shadow pilot (**CF2**, **CF7**). The Board also heard from the MAA advisor that, following issues surrounding the reporting processes involved in this Airprox, a review of MAA RA1410 - Occurrence Reporting and Management was underway to remove ambiguity in the current wording of the regulation pertaining to the notification of an Airprox by a third party.

The Board then discussed the actions of the controllers in this event and quickly agreed that both controllers had acted in accordance with the provisions of their agreed Traffic Services, in that they had passed timely and accurate Traffic Information to their respective pilots; it had then been for the pilots to take any action they deemed necessary. Therefore, The Board agreed that, apart from the manning restrictions in place due to COVID-19 that had already been discussed (**CF1**), there were no other factors pertaining to the ground elements that had contributed to this Airprox.

Finally, members discussed the risk involved in this event. The Board noted that TCAS is not optimised for flight in Class G airspace but, nonetheless, the Shadow pilot had received a TCAS RA. However, it was noted that, although the Shadow pilot had not been visual with the Typhoon until it had passed above and behind, they had had situational awareness from Traffic Information and TCAS of the proximity of the traffic. Additionally, the Typhoon pilot had become visual with the Shadow at range and, therefore, any risk of collision had effectively been removed. Accordingly, the Board concluded that, although safety had been degraded, there had been no risk of collision and therefore assigned a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2020068		
CF	**Factor**	**Description**	**Amplification**
	Ground Elements		
	• Manning and Equipment		
1	Organisational	• ATM Staffing and Scheduling	Sub-Optimal establishment or scheduling of staff
	Flight Elements		
	• Situational Awareness of the Conflicting Aircraft and Action		
2	Human Factors	• Lack of Action	Pilot flew close enough to cause concern despite Situational Awareness
3	Human Factors	• Situational Awareness and Sensory Events	Pilot was concerned by the proximity of the other aircraft

	• Electronic Warning System Operation and Compliance		
4	Contextual	• ACAS/TCAS RA	
	• See and Avoid		
5	Human Factors	• Perception of Visual Information	Pilot perceived there was no conflict
6	Human Factors	• Perception of Visual Information	Pilot was concerned by the proximity of the other aircraft
7	Human Factors	• Lack of Individual Risk Perception	Pilot flew close enough to cause concern

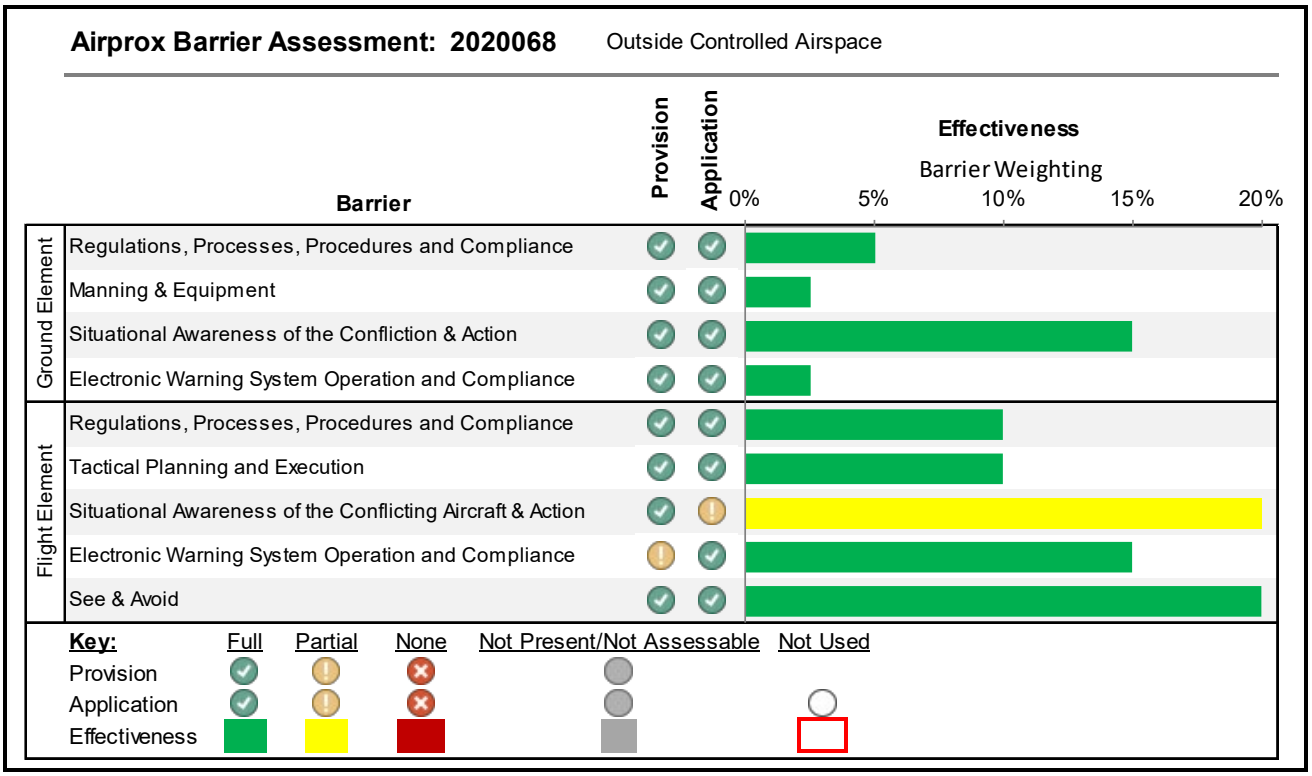
Degree of Risk: C

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:

Flight Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the Typhoon pilot did not take sufficient account of the effect of their flight vector on the TCAS fitted to the Shadow.



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