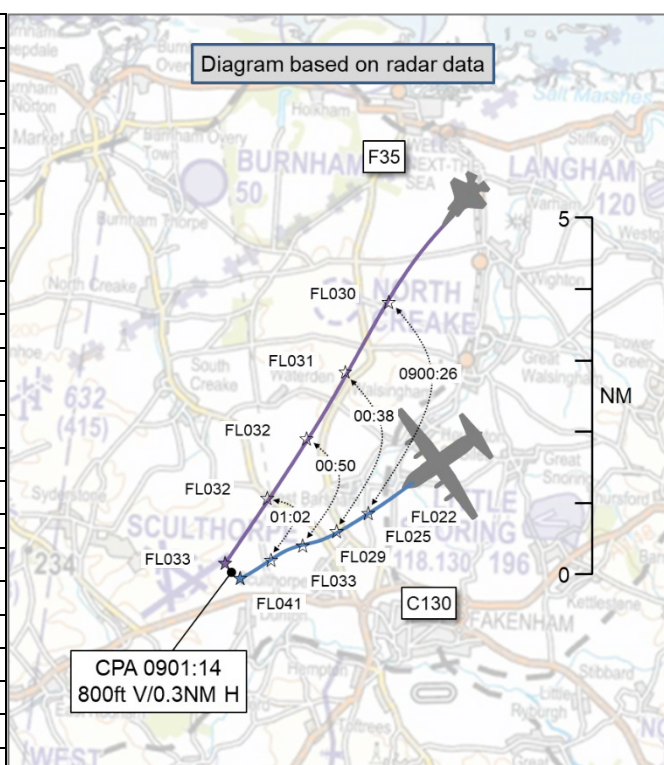


## AIRPROX REPORT No 2023037

Date: 30 Mar 2023 Time: 0901Z Position: 5251N 00047E Location: Sculthorpe

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	C130	F35
Operator	Foreign Mil	HQ Air (Ops)
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR <sup>1</sup>	VFR
Service	Traffic	Traffic
Provider	Swanwick (Mil)	Marham
Altitude/FL	FL041	FL033
Transponder	A, C, S+	A, C, S+
<b>Reported</b>		
Colours	Grey	Grey
Lighting	NR	HISL, nav
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	2000ft climbing	2500ft
Altimeter	QNH (NK hPa)	NK (NK hPa)
Heading	270°	180°
Speed	NK	320kt
ACAS/TAS	TCAS II	Not fitted
Alert	RA	N/A
<b>Separation at CPA</b>		
Reported	300ft V/0m H	0ft V/1NM H
Recorded	800ft V/0.3NM H	



**THE C130 PILOT** reports that, upon completion of their training, the C130 crew ascended to 2000ft to establish communication with Marham followed by Swanwick, who provided a Traffic Service and clearance to climb to FL140. As the crew initiated their climb towards the Lichfield Corridor, Marham issued a traffic advisory for an F35 approaching from the 4 o'clock position at about 2500ft. Despite initially having visual contact with the aircraft and receiving TA indications on their TCAS, the crew soon encountered clouds, after which their TCAS triggered a RA directing them to climb to avoid a potential collision. Shortly after exiting the clouds, they regained visual contact with the F35 as it passed underneath, about 300ft below.

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

**THE F35 PILOT** reports in the descent to RAF Marham under a Traffic Service when ATC made them aware of a low-level contact 8 miles to the left of the nose and advised, if not sighted, to stop descent at 2500ft. They gained tally with the C130 and called this to ATC. Shortly after, they lost tally and radar contact so levelled at 2500ft and requested an update from ATC. ATC advised the C130 was now climbing through their level as they regained tally, estimating a CPA of approximately 1NM at the 11 o'clock and co-height. This occurred approximately 15NM to the northeast of Marham. They then continued the recovery and landed at Marham.

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

**THE SWANWICK CONTROLLER** reports they were the East Bank Tac Right controller. Personnel in position consisted of themselves, a second controller (both EM) and a Supervisor. At some point during their time in position they felt overloaded and remarked to the Supervisor that they did not wish to take on any further aircraft because they were starting to feel stretched. Due to having low staffing levels at

<sup>1</sup> Reported as VFR but above 3000ft at CPA and likely within 1000ft/1500m of cloud.

the time, the second controller was still taking their break requirements and could not provide any relief or open a second TAC position. With several [pilots] on frequency taking HS transits into the 323's, tanking and a large split, they requested if 'North' could take some [aircraft] slightly earlier than expected to help relieve them. At some point a [C130] free-called the ICF requesting a Traffic Service, climbing FL140 for the Daventry [they recalled] and it all became 'slightly too much'. They reiterated several times that they didn't want any more [aircraft], however, unfortunately they kept coming.

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

**THE SWANWICK SUPERVISOR** reports that the East Bank sector was scheduled to have 7 staff for the period 0700-1500L (2 'mornings', a morning Supervisor, an 0900L start, a 1000L start and an 1100L start), which was 1 controller below the minimum required to declare a full staffing quota. Unfortunately, the 0900L controller called in sick, which put the sector to 6 controllers. At the point of the overload, there were 3 members of staff available, one of whom was on a mandatory break as they were on console from 0730L-0930L. This left themselves as the Supervisor and the controller submitting this DASOR; staff numbers were bolstered when the break finished and the 1000L controller arrived. It was noted as being a busy period on console for the controller; there were a number of high level transits, one F35 returning to base, one KC135 at high level for an ARA as well as the final half of AAR in ARA8 prior to operational tasking. The [Swanwick Mil] traffic levels were exacerbated by equipment problems at [RAF Boulmer CRC], where their radar recording failure meant they were unable to provide radar services outside of the D323 Complex, so [Swanwick Mil] was working transits of aircraft that would otherwise have been with [RAF Bpoulmer CRC]. At the time of the incident mentioned, the package of fighters [handled by RAF Boulmer CRC] had been handed to RAF Marham for instrument recoveries. The controller was handling a pair of Typhoons in East Anglia and had prenotes on 2 single Typhoons for a practice diversion to Leuchars. This was then joined by [a calibrator aircraft] which was setting up at Wittering. [The C130 pilot] free-called from Sculthorpe already in a climbing profile. The controller placed a squawk upon it and they encouraged them to find out what the aircraft was doing, as often they ask for a service which would be better provided by a LARS unit. The pilot stated they were climbing out of low level at Sculthorpe and requested the Lichfield Corridor for Wales. This was acknowledged and the appropriate climb for the corridor given, along with a Traffic Service, with traffic in the Marham RTC being called. The controller was then busy passing the previously mentioned traffic to the North sector and having to react to 2 formations of 3 Typhoons stating that the weather in the D323 Complex was unsuitable for their sortie and [that they] wished to proceed to the now vacant ARA8 area. The [pair of Typhoons in East Anglia] also requested to move to the Vale of York in search of better weather. With all of this happening simultaneously, and with themselves acting as a 'pseudo-Planner', both the controller from the break and the 1000L controller arrived and the traffic was re-allocated and split to allow for greater unit capacity. The second Tac controller took the general handling Typhoons in ARA8 and the Vale of York and the 1000L controller assumed the Planner role, allowing themselves to return to Supervisor duties.

**THE MARHAM CONTROLLER** reports they were the Approach controller with 3 inbound, 2 x F35 as a [single] flight and a single F35 in a 5-mile trail, being controlled by Swanwick Mil and Hotspur. Both handovers were conducted and all [pilots] were on [the same frequency] under their control. They initially identified the flight and then the singleton and gave them the weather and QFE to get them descending 'as required'. At about 10-15NM away from the first flight, they called a low-level track and the flight was happy to continue descending, became visual with the [low-level track] and the aerodrome and switched to [another Marham frequency]. They also called the low-level track to the singleton F35 [pilot] who replied 'looking'. Because they continued to track and descend towards the traffic, they called the low-level track again at roughly 7NM with a suggested stop descent at 2500ft QFE as the low-level track was indicating 1500ft. The F35 pilot called 'visual' so nothing else was done as they were under a Traffic Service and continued their descent and own navigation towards the aerodrome. They noticed the low-level track starting to climb but were unable to establish the level it was climbing to as the aircraft was on the Marham Zone frequency, and the Zone controller was also trying to establish their level. It was only after the aircraft had already passed the F35 that it was established that the traffic was climbing to FL140 and switching to Swanwick Mil. The F35 pilot had called the controller on approach, saying they were no longer visual with the C130 and asked for an update. At this point the traffic was 2-3NM south, roughly 700ft below, but climbing. It was called and then called again at which point they were

co-level with 1-2NM lateral separation. The F35 pilot finally called visual as they were working hard to update them. However, with them having called visual it carried on tracking towards the aerodrome and then switched to [another Marham frequency].

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

**THE MARHAM SUPERVISOR** noticed the low-level track in the flight path for both sets of tracks inbound to Marham. A prompt was given to the Approach controller to pass Traffic Information to them and this was conducted promptly. They heard the initial call of 'visual' and switched their attention on the frequency to the first pair joining visually with Tower on to [Tower frequency]. When they looked back at the screen the low-level track had climbed through the level of the second track inbound which had been stopped at 2500ft to avoid it. They believed the track was going to remain low-level and was under a Basic Service/listening watch from Marham. The next call they heard on the Zone frequency was that the C130 was climbing to 'FL140 Switching to Swanwick Mil'. This was unexpected and happened very quickly and the tracks appeared to be in very close proximity at that point, exact figures unknown.

## Factual Background

The weather at Marham was recorded as follows:

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METAR COR EGYM 300920Z 23016KT 9999 VCSH BKN018 12/08 Q1002 TEMPO 5000 SHRA SCT018TCU
RMK WHT TEMPO WHT=
METAR EGYM 300850Z 23018KT 9999 BKN020 // 12/09 Q1002 TEMPO 5000 SHRA SCT018 RMK WHT
TEMPO WHT=
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TAF EGYM 300800Z 3009/3018 23015KT 9999 SCT025 TEMPO 3009/3018 24018G28KT 5000 SHRA
BKN018CB PROB30 TEMPO 3010/3015 2500 +TSRA PROB30 TEMPO 3015/3018 4000 +SHRA=
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## Analysis and Investigation

### Military ATM

An Airprox occurred on 30 Mar 23 at approximately 0900, approximately 15NM to the northeast of RAF Marham. The C130 [crew] had been operating at low-level at Sculthorpe in receipt of a Basic Service from the Marham Zone controller before then climbing to FL140 on transit to the Lichfield Radar Corridor in receipt of a Traffic Service from the Swanwick Mil Controller. The F35 [pilot] was conducting a visual recovery to RAF Marham in receipt of a Traffic Service from the Marham Approach controller.

Utilising occurrence reports and information from the local investigation, outlined below are the key events that preceded the Airprox. Where available they are supported by screenshots to indicate the positions of the relevant aircraft at each stage. The screenshots are taken from a combination of replays using both unit and NATS radars. As NATS radars are not available to the Marham controllers they may not be entirely representative of the picture available, however the unit radars provide the exact radar view seen by the controllers.

The trainee Marham Zone controller was providing a Basic Service to the C130 operating at low-level at Sculthorpe and had no other aircraft on frequency. The C130 had not been identified and was displaying a low-level SSR code (7001). The Marham Approach controller was providing a Traffic Service to 3 F35s recovering visually to RW24 with the aircraft established as a pair followed by a singleton. In accordance with the Marham Flying Order Book, both the pair and singleton had been issued own navigation with descent as required. The Swanwick Military controller was providing a Traffic Service to two Typhoons conducting Basic Fighter Manoeuvres within the East Anglia Military Training Area,<sup>2</sup> whilst also in receipt of 3 prenotes. As a result of controller sickness

<sup>2</sup> UKAB note: The Typhoons were actually operating below the East Anglia MTA.

and break requirements, no further controller positions were established, although the Swanwick Mil Supervisor was assisting with the management of landline calls.

At 0857:35, the C130 [pilot] informed the Marham Zone controller that they were complete at Sculthorpe and intended to climb to 14,000ft for a transit to the Lichfield Radar Corridor. The Marham Zone controller acknowledged this request at 0858:06 and reiterated own navigation as per the Basic Service being provided.



Figure 1 (0858:32): Traffic information provided by the Marham Approach controller (Unit radar)

Following the lead F35 pair reporting visual with the C130, at 0858:32 the Marham Approach controller provided Traffic Information to the trailing F35 singleton *“traffic, southwest 10 miles, tracking northeast, indicating 1300ft”*. The F35 [pilot] reported the C130 as *“not sighted”*. Between 0859:00 and 0900:00<sup>3</sup> the C130 [crew] free-called the Swanwick Military controller requesting a *“FL140 transit over to the Lichfield Corridor”*. This request was subsequently acknowledged, a Swanwick Military SSR code (3316) issued and, following identification, a climb to FL140 with Traffic Service issued. No Traffic Information was provided by the Swanwick Military controller to the C130 [crew] on either the F35 pair or singleton, with the Swanwick Military controller’s attention then moving to the Typhoon formation following their request to transit north due to weather.

<sup>3</sup> Tape transcript timings only provided to the minute intervals and not the second.



Figure 2 (0859:18): Updated Traffic information provided by the Marham Approach controller. (Separation 7.0NM) (unit radar left, NATS radar right)

At 0859:18 the Marham Approach controller provided updated Traffic Information to the [singleton] F35 on the C130, “*previously called traffic now south 4 miles, manoeuvring, indicating 1400ft, if not sighted stop descent height 2500ft*”. The F35 [pilot] reported the C130 as “*sighted*” and continued in the descent. At 0859:41 the Marham Zone controller issued the C130 with a Marham Zone SSR Code (3660) to facilitate the requested climb from low-level and transit to the Lichfield Radar Corridor. On observing the Swanwick Military SSR code (3316) the Marham Zone controller questioned the incorrect SSR code. At 0900:17 the C130 [pilot] informed the Marham Zone controller that they were in contact with Swanwick Military and established in the climb to FL140.



Figure 3 (0900:22): Short-Term Conflict Alert (STCA) received by both the Marham Approach controller and Marham Zone controller. (Separation 3.2NM) (unit radar left, NATS radar right)

At 0900:22, Short-Term Conflict Alerts (STCA) were received by both the Marham Approach and Marham Zone controllers. Simultaneously with the STCA, at 0900:25 the F35 [pilot] reported the C130 as now “*un-sighted*” and requested an update. At 0900:31, the Marham Approach controller provided updated Traffic Information to the F35 on the C130, “*traffic is now south by 2 miles, similar direction, indicating 600ft below*”. The F35 [pilot] elected to hold at 2500ft, to which the Marham Approach controller provided further Traffic Information “*the traffic is now climbing through your level*”. Concurrently at 0900:28, the Marham Zone controller provided Traffic Information to the C130 [crew] on the F35, “*traffic believed to be you has traffic, north 2 miles, tracking southwest, indicating 600ft above*”. The C130 [pilot] reported the traffic “*in-sight*” and about to go into cloud.





Figure 4 (0900:58): Updated Traffic information provided by the Marham Approach controller. (Separation 1.1NM) (unit radar left, NATS radar right)

At 0900:58, the Marham Approach controller provided further updated Traffic Information to the F35 [pilot] on the C130, “*previously called traffic now, south 1 mile, similar height, indicating 200ft above*”. The F35 [pilot] reported the C130 as “*visual*” and continued in the descent. At 0900:59, the Marham Zone controller provided updated Traffic Information to the C130 [crew] on the F35, “*previously called traffic is, north 1/2 mile, indicating 500ft below*”. Again, the C130 [pilot] reported the traffic “*in-sight*”.

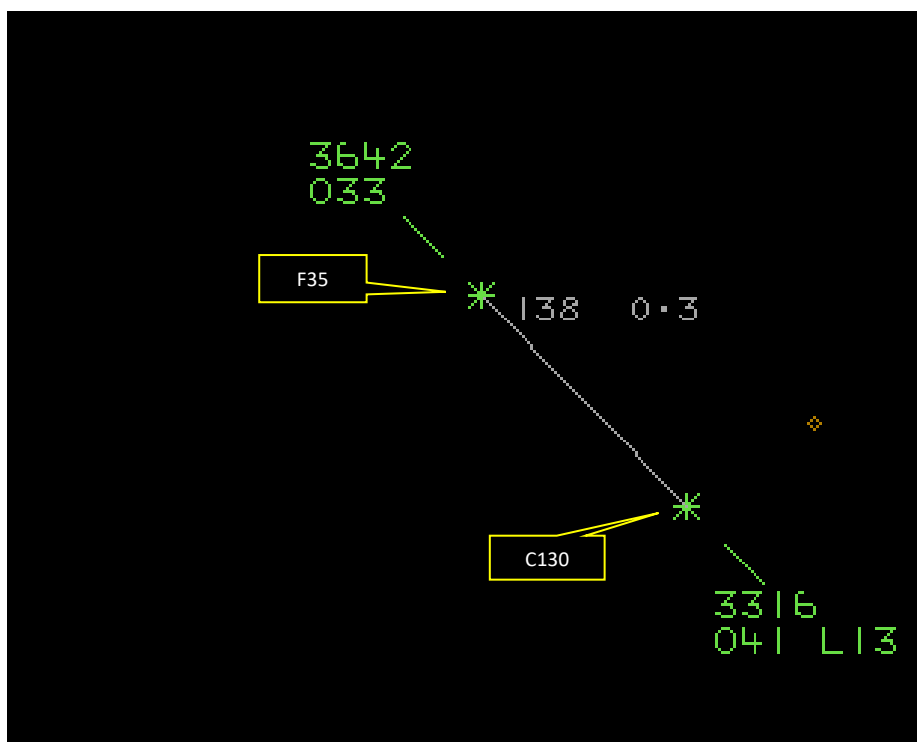


Figure 5 (0901:16): CPA, measured at 0.3NM and 800ft separation (NATS radar)

The local investigation conducted by RAF Marham considered both the F35 and Marham ATC reports. The investigation identified the cause of the Airprox as a loss of safe separation between non-co-operating aircraft due to the C130 continuing to climb through the known height of the F35. Several BM-related causal and aggravating factors were identified that were believed to have contributed to the Airprox: The limited availability of controllers at Swanwick Military resulted in the Swanwick Military controller becoming over-loaded and subsequently [not] providing adequate Traffic Information to facilitate the C130 climb from low-level.

The local investigation conducted by 78 Sqn (Swanwick Military) identified the cause of the Airprox as a loss of safe separation between non-co-operating aircraft due to inaccurate hazard assessment and perception by the controller. Several BM-related causal and aggravating factors were identified that were believed to have contributed to the Airprox:

There was an unexpected increase in workload outside of planned moves which resulted in controller overload and distraction through a lack of traffic management.

As a result of controller illness, the bank was operating with 6 controllers, 2 below the minimum requirement for routine operations. This significantly impacted controller availability when managing an increase in workload.

As a result of the causal factors identified, the following mitigations for local action were proposed by 78 Sqn (Swanwick Military):

Briefing of Supervisors regarding their responsibilities to support controllers.

Re-issue of orders to highlight the importance for controllers to inform Supervisors when accepting pre-notes/free calls that increase workload.

A Supervisor forum instigated to discuss the occurrence and direct intervention techniques.

### **Mil ATM Analysis**

The Marham Approach controller provided accurate and timely Traffic Information throughout the recovery profile for both the lead F35 pair and trailing F35 singleton. This Traffic Information enabled visual acquisition of the C130 by the F35 pilot along with subsequent re-acquisition when the F35 pilot lost visual with the C130 mid-descent. When providing an updated traffic picture following the F35 [pilot's] request, the Marham Approach controller initially [did not] provide information regarding the C130's climb. However, they did immediately provide this information when assessing that the F35 pilot's plan to hold at 2500ft was not compatible with the climbing C130 profile. The Marham Zone controller, whilst initially providing an ATS to the C130, was not the ATS provider at the point of the Airprox, when considering the climb and Traffic Service provided by Swanwick Military. On acknowledgement of the C130 pilot's intentions, the reiteration of own navigation was suitable in line with the continued heading inbound to Sculthorpe and below terrain safe altitude. When made aware the C130 [pilot] was in contact with Swanwick Military the Marham Zone controller continued to ensure Traffic Information was provided as accurately as possible regarding the F35, through both an initial and updated call. This Traffic Information provision was more than the requirements for the Basic Service being provided but proved essential in the C130 pilot achieving visual acquisition of the F35. The Swanwick Military controller, whilst operating at an increased intensity, [did not] provide the C130 [crew] with Traffic Information regarding both the F35 pair and singleton. Upon approval of the FL140 climb the Swanwick Military controller was the only controller aware of the changing nature of aircraft profiles with Marham Approach and Zone still expecting the C130 to remain at low-level. Therefore, due to the proximity of the aircraft involved, it was essential that the Swanwick Military controller either provided suitable Traffic Information to the C130 pilot and/or liaison with Marham ATC to inform them of the climbing profile and possible interaction. Proactive liaison with Marham ATC would have enabled the descent profile of the F35 to be amended accordingly to suit the climbing C130 profile. In addition to the local investigation, the following BM-related causal/aggravating factors were identified by 2 Gp BM:

Whilst operating at an increased intensity, the Swanwick Military controller did not suitably reduce the Traffic Service provision being provided iaw CAP774 Ch 1 Para 11 – Reduced Traffic Information/Deconfliction Advice. Such a reduction would have ensured the C130 [crew] was aware of the increased lookout requirement or alternatively requested a service from another agency i.e., Marham Zone.

### **UKAB Secretariat**

The C130 and F35 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>4</sup> If the incident geometry is

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<sup>4</sup> MAA RA 2307 paragraphs 1 and 2.

considered as overtaking then the C130 pilot had right of way and the F35 pilot was required to keep out of the way of the other aircraft by altering course to the right.<sup>5</sup>

## Marham Investigation

The Marham investigation provided the following sequence of events, observation and causes:

The F35 pilot was visually recovering to RAF Marham heading 220° and receiving an ATS from them when they were informed of traffic ahead and slightly below, with advice to stop descent at 2500ft QFE if not sighted. The F35 pilot initially sighted the C130 (heading approximately 250°), which was closing from above, slowly converging from right-to-left and low in the 11 o'clock position, which then became obscured by cloud, so levelled as requested at 2500ft QFE.

The C130 pilot was talking to RAF Marham as they were pulling out of low-level after work at Sculthorpe and was advised of the F35 closing from the north. The C130 pilot acknowledged this and was also concurrently working with Swanwick to negotiate a climb to FL140 for entry to the Lichfield Corridor. At 30sec to go to CPA, and with clearance from Swanwick received, the C130 pilot started a climb. At 20sec to CPA, the C130 pilot was updated with Traffic Information from Marham on the F35, now reported to them as 'at 2 miles north and 600ft above'. 10sec prior to CPA the C130 pilot stated 'traffic in sight' and started to climb but soon went into cloud and lost tally. At 0901:00 the F35 was reported as 500ft below as the C130 pilot regained tally and both aircraft began to increase separation on their planned ground tracks.

Observation: Swanwick Mil was both under-staffed and unable to manage the unplanned free-calling volume of pilots calling for an ATS and was consequently over-loaded and therefore under-performing. The C130 pilot was given a squawk and ultimately a climb clearance without the necessary level of deconfliction being undertaken by Swanwick which, when issued, subsequently allowed the C130 [pilot] to climb into conflict with the F35.

Causes:

Swanwick Mil did not co-ordinate the climb-out request from the C130 pilot against other traffic and provided a clearance to them to climb, which then brought [the C130] into an unsafe proximity with the F35.

The C130 pilot had a clearance to climb and did so without maintaining visual on the F35 and did not stop the climb against it when tally was lost, nor did they mitigate against closure by deviating heading away from the potential merge.

The F35 pilot had maintained 2500ft against the initially sighted C130 believed to be below and remaining level, but with a converging track, and did not also vector away from the last sighted position believing height separation alone was sufficient to prevent closure.

## Comments

### HQ Air Command

This incident highlights the importance of prioritisation and accurate hazard assessment, especially in a high workload situation. The limited availability of controllers at Swanwick Military resulted in the Swanwick Military controller becoming over-loaded and Traffic Information on the F35 was not passed to the C130 [crew]. Swanwick Military has identified contributory factors in this area and has proposed mitigations to address supervision and support for controllers during high workload periods. The Marham Zone controller is to be commended for providing information on the F35 to the C130 [crew] above that required for a Basic Service and indeed considering they were not the ATS provider for the C130 [crew] at the time. It was this information passed by Zone that allowed the C130 pilot to gain visual (albeit briefly) with the F35. Under a Traffic Service, pilots retain

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<sup>5</sup> MAA RA 2307 paragraph 14.



responsibility for collision avoidance. When the F35 and C130 pilots were given Traffic Information, with less than 600ft and 2 miles separation both could have taken action to maintain separation, both vertically and horizontally. A Deconfliction Service may have been more appropriate, particularly if the pilots were unable to maintain visual separation due to IMC.

## **USAFE**

The USAF C130 was operating VFR whilst carrying out approach training at an unmade airfield/MOD training area. The [C130 unit] operates at this field on a daily basis. In line with established local procedures, the C130 [crew] had called Marham Zone as they were routing inbound to the training area but maintained their low-level squawk and operated primarily on Low Level Common frequency. During the climb-out from the last approach the C130 crew (stopping at 2000ft) called Marham Zone and reported that their intentions were to climb out (to FL140) and route towards the Lichfield RC. The crew then called Swanwick Mil East as the correct controlling agency for the enroute to request a climb and routing to the Lichfield RC. The crew received a squawk and a climb to FL140, no Traffic Information was given by Swanwick Mil East at this point. As the crew was receiving their climb from Swanwick Mil East, Marham Zone called on Box 2 and issued a squawk. Recognising that they were now under the service of a different agency, the C130 crew informed Marham that they had switched to Swanwick Mil East and were climbing FL140 towards the Lichfield RC. Despite this the Marham controller recognised the conflict and, using their initiative, continued to give Traffic Information against the F35. This action directed the crew to obtain visual and scan their ACAS display for the traffic. Due to radio traffic on the Swanwick Mil frequency the crew was unable to coordinate with the Swanwick Mil controller. As the crew had been issued a clearance to climb they expected that the conflicting traffic had been coordinated against their clearance (they expected they had been given Traffic Information as situational awareness, so they would not be surprised by its presence). The crew sighted the F35, through gaps, above a scattered cloud layer at around 2000ft, the crew had the F35 visual each time an ATC agency called Traffic Information, however the C130 entered the scattered cloud layer and received a RA on passing approximately 2000ft. The crew followed this RA which took them above the cloud, into VMC, where they regained visual with the F35 passing below them. It was after this point the Swanwick Mil East [controller] passed Traffic Information on the F35 passing behind. Following the occurrence, the [C130 unit] made contact with all of the agencies involved to discuss and share accounts of the occurrence and develop learning points for all. USAF operations in East Anglia are intensive and the USAF works very closely in liaison with local operators, especially RAF Marham, in order to understand each other's operations and build best practice for safe operations.

## **Summary**

An Airprox was reported when a C130 and an F35 flew into proximity near Sculthorpe at 0901Z on Thursday 30<sup>th</sup> March 2023. The F35 pilot was operating under VFR in VMC in receipt of a Traffic Service from Marham Approach and the C130 pilot, in IMC at CPA, under IFR in receipt of a Traffic Service from Swanwick Mil.

## **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 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 table displayed in Part C.

The Board first discussed the pilots' actions and agreed that, despite some issues in the application and understanding of a FIS, either pilot could have been more positive in maintaining a greater degree of separation if they had had better situational awareness of the other's intentions. Members reiterated that, ultimately, collision avoidance in Class G airspace is a pilot responsibility which can be assisted by using a surveillance-based service. The USAFE Board advisor briefed members that it appeared the USAFE C130 pilot may have reverted to a degree of 'learned behaviour' from their training and operating in US airspace, in that the Swanwick instruction to 'climb FL140' could have been interpreted

as a clearance to climb and that they had been clear of other traffic in order to do so. However, under a UK FIS Traffic Service there was no traffic deconfliction. Unfortunately, the Swanwick Mil controller was operating under a high workload due to the lack of manning (CF2) and in the event did not pass Traffic Information (CF1) to the C130 pilot. The Board discussed at length the lack of controllers at Swanwick, and how the overload was handled, and agreed that the controller had been engaged in a number of tasks (CF5) which had resulted, at least in part, in them not passing Traffic Information to the C130 pilot on agreement of the Traffic Service (CF3, CF4). A military ATC member briefed that the C130 had initially appeared to have been tracking towards its home base and, with a 7001 squawk, had been presumed to have been intending to remain at low-level (below 2000ft). With this assumption, the F35 track for recovery to Marham had been entirely reasonable. When the C130 had turned and started to climb, the Marham Approach controller had been left with the dilemma of not knowing what the C130 would do next and hence had been limited in their options as to how best to assist the F35 pilot. In the event, a level-off had been suggested, Traffic Information passed and the F35 pilot had seen the C130. Additionally, the C130 pilot had contacted the Marham Zone controller and, even though not under a FIS, they had been passed relevant and timely Traffic Information. The Board commended both Marham controllers for their actions, that went 'above and beyond'. Turning to the pilots, the F35 pilot had seen the C130 and members wondered whether they could have taken more effective action as the C130 had flown into cloud. The C130 pilot had received Traffic Information from the Marham Zone controller and had the F35 displayed on TCAS, although members thought they may not have assimilated this as conflict information (CF7) because of their assumptions of a clearance generated by the previously discussed 'learned behaviour'. Consequently, the C130 pilot had not adapted their plan (to climb and turn right towards the Lichfield Corridor) in order to prevent them closing on the F35 (CF6). In the event, the C130 pilot had received a TCAS RA (CF8) which had helped to increase separation at CPA, but members noted that the effectiveness of TCAS in Class G could be less than in CAS due to the potential unpredictable manoeuvring of the other aircraft. Lastly, the see-and-avoid barrier had also been compromised when the C130 had flown into cloud, with the aircraft obscured from each other (CF9). The Board then discussed at length the potential systemic contributory factor of the effect of level of demand, in both volume and duration, on Swanwick Mil operations. Military ATC advisors briefed the Board on the current situation and measures in hand to address it.

Turning to risk, one member felt that safety had been much reduced, but the majority of members agreed that in this case risk of collision had been averted, Risk C. Lastly, the Board commended the C130 crew and operating authority for their proactive involvement in this Airprox and thanked them for their full participation.

## **PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK**

### Contributory Factors:

2023037				
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
<b>Ground Elements</b>				
<b>• Regulations, Processes, Procedures and Compliance</b>				
1	Human Factors	• ATM Regulatory Deviation	An event involving a deviation from an Air Traffic Management Regulation.	Regulations and/or procedures not fully complied with
<b>• Manning and Equipment</b>				
2	Organisational	• ATM Staffing and Scheduling	An event related to the planning and scheduling of ATM personnel	
<b>• Situational Awareness and Action</b>				
3	Human Factors	• ANS Traffic Information Provision	Provision of ANS traffic information	TI not provided, inaccurate, inadequate, or late
4	Human Factors	• Conflict Resolution – Not provided	An event involving the non provision of conflict resolution	
5	Human Factors	• Task Monitoring	Events involving an individual or a crew/ team not appropriately monitoring their performance of a task	Controller engaged in other tasks
<b>Flight Elements</b>				
<b>• Tactical Planning and Execution</b>				

6	Human Factors	• Insufficient Decision/Plan	Events involving flight crew not making a sufficiently detailed decision or plan to meet the needs of the situation	Inadequate plan adaption
• Situational Awareness of the Conflicting Aircraft and Action				
7	Human Factors	• Understanding/Comprehension	Events involving flight crew that did not understand or comprehend a situation or instruction	Pilot did not assimilate conflict information
• Electronic Warning System Operation and Compliance				
8	Contextual	• ACAS/TCAS RA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system resolution advisory warning triggered	
• See and Avoid				
9	Contextual	• Visual Impairment	Events involving impairment due to an inability to see properly	One or both aircraft were obscured from the other

Degree of Risk: C.

### Safety Barrier Assessment<sup>6</sup>

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

#### **Ground Elements:**

**Regulations, Processes, Procedures and Compliance** were assessed as **partially effective** because the Swanwick Military controller did not provide Traffic Information to the C130 crew.

**Manning and Equipment** were assessed as **ineffective** because Swanwick Military East Bank was operating below the required manning level for routine operations.

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **ineffective** because the Swanwick Military controller cleared the C130 pilot to climb to FL140 in proximity to the F35 without passing Traffic Information.

#### **Flight Elements:**

**Tactical Planning and Execution** was assessed as **partially effective** because the C130 pilot continued to climb and close with the F35 despite having received Traffic Information, TCAS indications and their visual sighting of it.

**Situational Awareness of the Conflicting Aircraft and Action** were assessed as **partially effective** because the C130 pilot did not assimilate conflict information and the F35 pilot continued on track despite losing visual contact with the C130.

**See and Avoid** were assessed as **not used** because the C130 was in cloud at about CPA.

<sup>6</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

<b>Airprox Barrier Assessment: 2023037</b>		Outside Controlled Airspace					
Barrier	Provision	Application	Effectiveness				
			Barrier Weighting				
			0%	5%	10%	15%	20%
Ground Element	Regulations, Processes, Procedures and Compliance	✓	!				
	Manning & Equipment	!	✗				
	Situational Awareness of the Conflicition & Action	✓	✗				
	Electronic Warning System Operation and Compliance	✓	✓				
Flight Element	Regulations, Processes, Procedures and Compliance	✓	✓				
	Tactical Planning and Execution	✓	!				
	Situational Awareness of the Conflicting Aircraft & Action	✓	!				
	Electronic Warning System Operation and Compliance	!	✓				
	See & Avoid	✓	○				
<b>Key:</b>							
	Full	Partial	None	Not Present/Not Assessable	Not Used		
Provision	✓	!	✗	●	○		
Application	✓	!	✗	●	○		
Effectiveness	■	■	■	■	□		