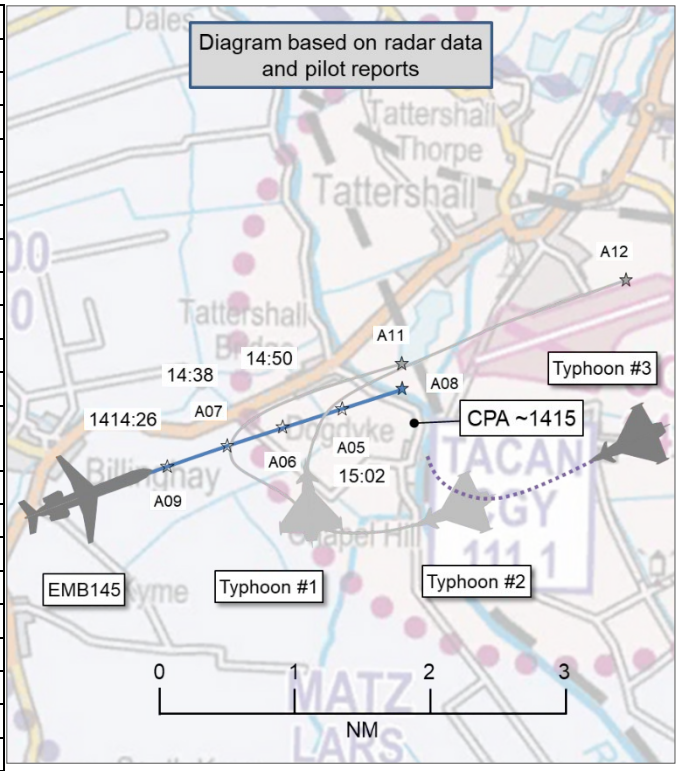
AIRPROX REPORT No 2023050

Date: 03 Apr 2023 Time: 1415Z Position: 5305N 00014W Location: 1NM WSW RAF Coningsby

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	EMB145	Typhoon #3
Operator	Civ Comm	HQ Air (Trg)
Airspace	Coningsby ATZ	Coningsby ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	ACS
Provider	Coningsby Tower	Coningsby Tower
Altitude/FL	800ft	NK
Transponder	A, C, S+	None
Reported		
Colours	White, blue	Grey
Lighting	Anti-col, beacon, taxi	NK
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	800ft	700ft
Altimeter	QFE (NK hPa)	NK (1029hPa)
Heading	072°	030°
Speed	120kt	170kt
ACAS/TAS	TCAS II	Not fitted
Alert	TA	N/A
Separation at CPA		
Reported	Not seen	0ft V/0.5NM H
Recorded	NK	



THE EMB145 PILOT reports that on initial handover to RAF Coningsby they requested vectors to an SRA to RW07, anticipating a visual approach. Once visual with the field, and at approximately 5NM, [the Radar controller] informed them the airfield was in their 10 o'clock position at which point they declared visual and requested a visual approach. A visual approach was approved and they were transferred to Tower frequency. They checked in with Tower on left base and flew a visual approach. They recalled then calling 'final 07' and the response from Tower was vague, however, they do recall being told there were '3 in' to which they understood there were three aircraft in the circuit and began looking. They observed the first aircraft on a right base turn which was subsequently instructed to go-around. This call was immediately followed by a second Typhoon declaring 'Minimum Fuel'. There were two Typhoons still on the downwind leg with one about to turn right base. Typhoon No.1 passed in front of them at a range of approximately 1NM, which triggered a 'Traffic Advisory' on the TCAS. This Typhoon was making a right hand turn to orientate itself on the deadside of the circuit pattern to follow the missed approach. At this point they heard a second go-around instruction but with a similar callsign on frequency they asked the controller to confirm whether the instruction to go-around was for themselves or for Typhoon No.2.[1] The ambiguity they perceived was that the controller said "Go-Around deadside" which was not a term they would expect to hear having come off an instrument approach, coupled with the fact there was a Typhoon on their left (deadside) they could not comply with the instruction. They then asked the Tower controller to clarify the go-around instruction to which they replied "right-hand". They proceeded to maintain runway track, climbed to 2000ft and made a wide right-hand visual circuit.

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

[1] The EMB145 and Typhoon callsigns each consisted of a 2-syllable word followed by 2 digits, both having an almost identical second syllable and the same 2 digits.

THE TYPHOON #3 PILOT reports that during the upwind turn, following a low approach, they heard the following check-in: "Coningsby Tower it's [EMB145], turning final runway 07". ATC responded with "[EMB145], Coningsby Tower, join runway 07RH QFE 1029, got 3 in". The other pilot responded with "[EMB145]". With the fuel passing 900kg and concerned at where this new arrival would arrive in the circuit, the Typhoon pilot called "[Typhoon], Downwind to land, minimum fuel", in order to ensure priority and land above the [minimum landing fuel] of 800kg. Twenty-two seconds later, after [the Typhoon ahead in the circuit] went around, Coningsby Tower called " [EMB145 C/S], you have one ahead with minimum fuel, join or go-around deadside". [EMB145 C/S] responded with "Join, [EMB145 C/S]". At this point, the Typhoon pilot reached the end of the downwind leg with the perception that [EMB145 C/S] was on a join and therefore no factor for their final turn. They looked into the turn to see [the Typhoon ahead in the circuit] going around, tipped final with the associated comm and at 1414:47 were given clearance to land. At 1414:51, [EMB145 C/S] called "[EMB145 C/S], confirm we were on a continue approach?". ATC responded with "[EMB145 C/S], negative, go-around circuit height". This was acknowledged and actioned at around the same time that the [EMB145] passed through their Head-up Display [HUD], co-altitude at 600ft and about 3000ft ahead. The Typhoon pilot was very surprised to see [the EMB145] in front of them, but perceived no collision risk. They eased left and up to increase separation before recommencing the final turn for an uneventful landing. They considered it luck rather than judgement that they did not pass closer, because they were 'belly up' for a large part of the final turn. Following discussion with the ATC Supervisor on the ground, it appeared that [the EMB145 pilot] joined via left base, essentially flying an opposite circuit to themselves, which allowed them to get down to about 500ft on the extended centreline with no clearance to land.

The pilot perceived the severity of the incident as ‘Medium’.

THE U/T CONINGSBY TOWER CONTROLLER reports [the EMB145] came in visually on RW07RH, initially coming in on radar and then changed to visual recovery with 3 Typhoons already in the circuit. As [the EMB145 pilot] requested to land with gear down, [Typhoon #1] went minimum fuel late downwind. [The EMB145] was unable to get the clearance to land and was told to go around at circuit height. [Typhoon #1] had the clearance to land and [the EMB145 pilot] once again asked for clearance to land, and again was told to go around circuit height. Once established in the circuit, [the EMB145] extended far downwind at 1500ft. There was confusion from the pilot in relation to the visual circuit, which caused a delay getting [the EMB145] and the Typhoons in.

The controller perceived the severity of the incident as ‘Low’.

THE OJTI CONINGSBY TOWER CONTROLLER reports they had been on a break and the visual circuit had 3 Typhoons in. [The EMB145 pilot] then called for a left-base join. They were surprised by this as they had not seen [the EMB145] join left-base before with 3 already established in the circuit. With knowledge of this, they were going to instruct the trainee to tell all Typhoons in the visual circuit to orbit [at] 1000ft while [the EMB145 pilot] completed their landing. However, [Typhoon #1] downwind then declared min fuel and [the EMB145 pilot] was told to go around and join deadside. The min fuel [Typhoon #1] was then cleared to land with [the EMB145 pilot] believed to be going around. [The EMB145 pilot] then asked if they were on a continue and they were again told negative go-around circuit height. [The EMB145 pilot] then positioned downwind and was told to climb to height 1500ft to ensure vertical separation with the other visual circuit traffic.

THE CONINGSBY SUPERVISOR reports that due to a full visual circuit, they made their way to the VCR. Furthermore, the EMB145 was on a radar approach to land. The EMB145 pilot elected to switch to a visual approach. Initially, this would have put the EMB145 No1 to use the runway but the first Typhoon downwind declared minimum fuel. Due to the priority list, the Typhoon was instructed to land ahead of the EMB145, who was instructed to go around.

Factual Background

The weather at Coningsby was recorded as follows:

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METAR EGXC 031420Z 10010KT 9999 SCT030 11/04 Q1030 NOSIG RMK BLU BLU=
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Analysis and Investigation

Military ATM

An Airprox occurred on 3 Apr 23 at approximately 1415Z, in the RAF Coningsby visual circuit. The EMB145 [pilot] was conducting a visual left-base recovery in receipt of an Aerodrome Service from the Coningsby Tower controller. The Typhoon was one of several within the Coningsby visual circuit also in receipt of an Aerodrome Service from the Coningsby Tower 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 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 Coningsby Tower controller was providing an Aerodrome Service to three Typhoons at the point the EMB145 [pilot] was transferred from Coningsby Approach for a visual left-base join. The Typhoons within the visual circuit are referred to as Typhoon #1, #2 and #3 iaw the order they interacted with the EMB145. It was Typhoon #3 that was the aircraft involved in the Airprox, whilst Typhoons #1 and #2 remained in the visual circuit. The EMB145, along with Typhoons #1 and #2, were displayed throughout on the NATS radar, Typhoon #3 was only displayed on the unit radar. The approximate position of Typhoon #3 has been illustrated on all NATS radar images.

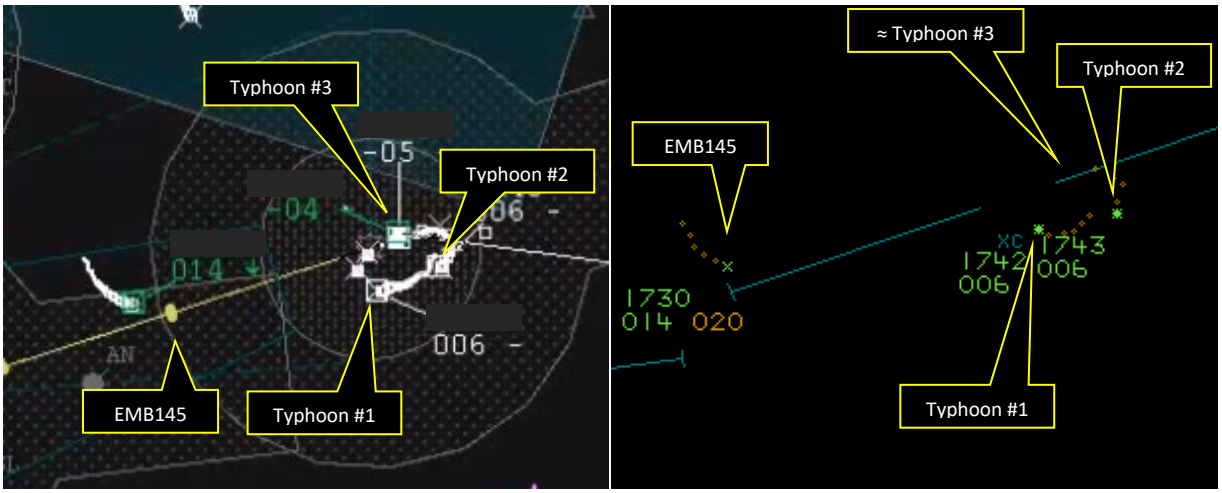

Figure 1 (1413:31): Coningsby tower controller approved the EMB145 to join (unit radar left, NATS radar right)

At 1413:31, the Coningsby Tower controller acknowledged EMB145 check-in and approved their visual join for RW07, informing them of the three Typhoons in the visual circuit.

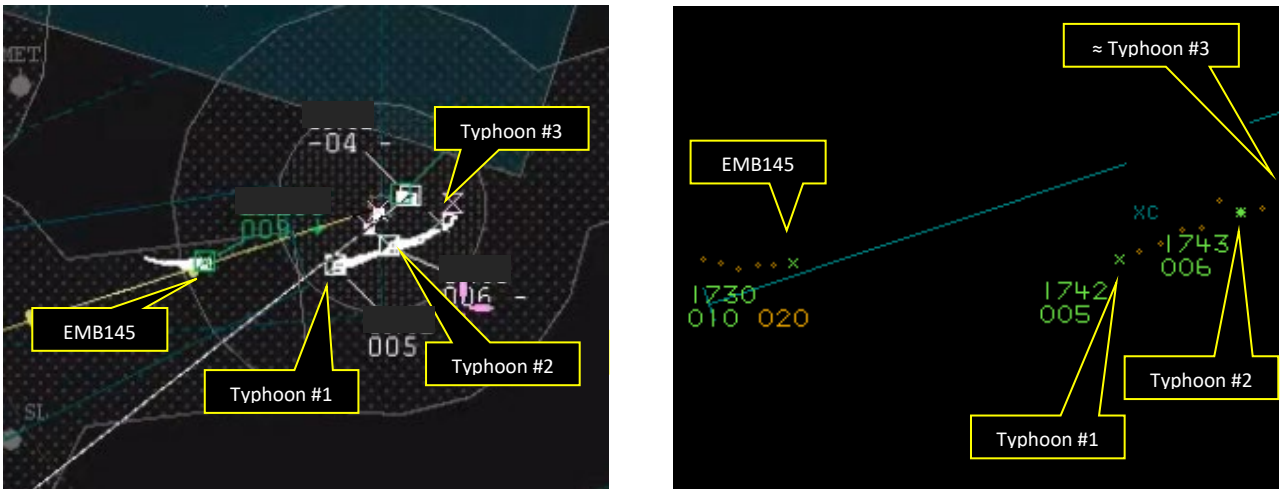

Figure 2 (1413:53): Coningsby tower controller approved the EMB145 to join (unit radar left, NATS radar right)

At 1413:53, Typhoon #2 reported downwind to touch-and-go, which was acknowledged and informed by the Coningsby Tower controller of "*2 ahead*". The two ahead consisted of Typhoon #1 to touch-and-go, and the EMB145 to land. At 1414:02, Typhoon #1 reported "*final, gear down*" but was instructed by the Coningsby Tower controller to "*go around, circuit height*". At 1414:07, Typhoon #3 reported downwind to land with minimum fuel, which was acknowledged and informed by the Coningsby Tower controller of "*2 ahead*". The two ahead now consisted of the EMB145 to land and Typhoon #1 to touch-and-go. At 1414:20, Typhoon #2 reported going around at circuit height.

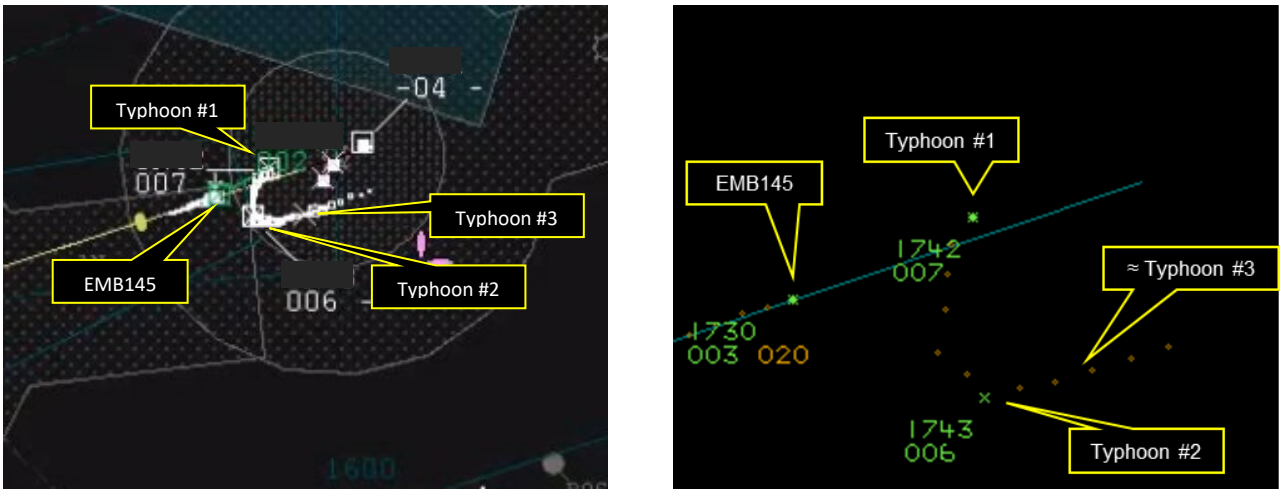

Figure 3 (1414:31): Coningsby Tower controller informed the EMB145 of Typhoon #3 (unit radar left, NATS radar right)

At 1414:31, the Coningsby Tower controller informed the EMB145 of Typhoon #3 and the change of priority order "*you have one ahead, with minimum fuel, join or go around dead side*". The EMB145 [pilot] responded with the intention to join.

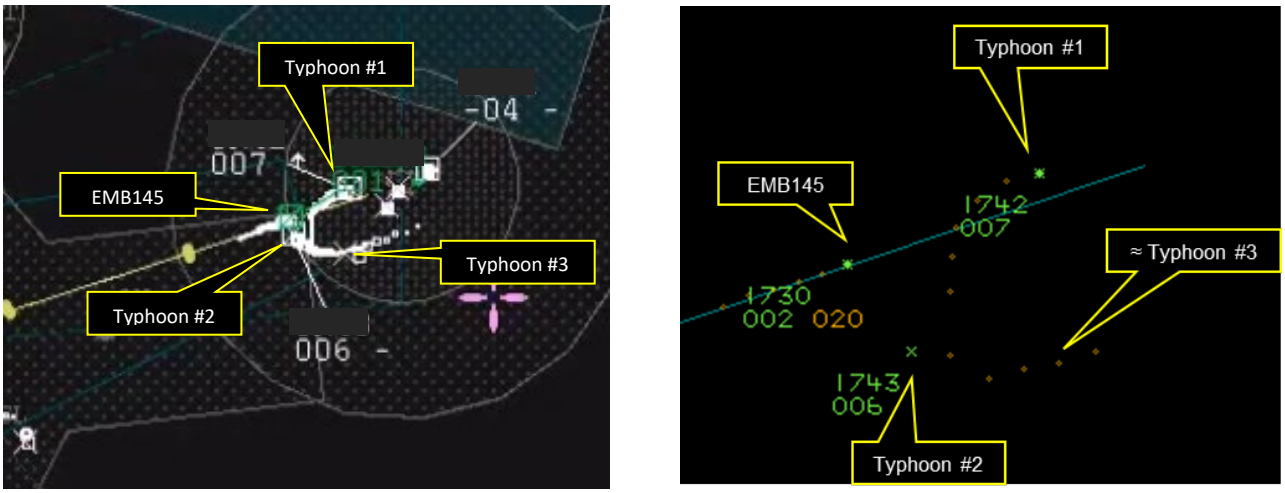

Figure 4 (1414:41): Coningsby Tower controller cleared Typhoon #3 to land (unit radar left, NATS radar right)

At 1414:41, Typhoon #3 reported "*final, gear down*" and was cleared by the Coningsby Tower controller to land. At 1414:49, the EMB145 [pilot] who was still established on the approach, requested "*confirm we are continue approach?"*. The Coningsby Tower controller responded with *"negative, go around circuit height"* which was acknowledged by the EMB145 [pilot].

CPA was judged to have occurred during the final turn of Typhoon #3 with the EMB145 still established on the approach. CPA was unmeasured as Typhoon #3 did not display on NATS radar but was estimated by the EMB145 [pilot] as 1.0NM and 0ft separation and Typhoon #3 as 0.6NM and 0ft separation. Typhoon #2 subsequently extended upwind to provide sufficient spacing for the EMB145 to conduct the go-around procedure before joining the visual circuit for a further approach.

The local investigation conducted by RAF Coningsby identified the cause of the Airprox as a loss of safe separation between co-operating aircraft due to nonadherence with the Letter of Agreement by both Coningsby ATC and the EMB145. Several BM-related causal/aggravating factors were then identified that were believed to have contributed to the Airprox:

1. The request by the EMB145 [pilot] to conduct a visual join whilst the visual circuit was active with Typhoon traffic was incorrectly approved by Coningsby ATC.
2. The trainee Coningsby Tower controller was unfamiliar with both the scenario and queries from the EMB145 [pilot].
3. A breakdown in communication occurred between the EMB145 [pilot] and Coningsby Tower controller resulting in confusion regarding the go around instruction.

As a result of the causal factors identified, the following mitigations for local action were proposed by RAF Coningsby:

1. Introduction of a restriction that prevents the approval of visual approaches for the regular EMB145 when the visual circuit is active with Typhoon traffic.
2. A tabletop review with observation of the scenario recordings to enable education of Coningsby ATC VCR personnel.
3. Establishment of a new local training objective to ensure personnel are aware of the EMB145 recovery profile and associated restrictions.

Mil ATM Analysis

As the local investigation identified, the combination of the EMB145 left-base visual join and routine military visual circuits introduced a significant degree of confusion where the EMB145 [pilot] was unable to land and was required to break off. The changing priority, whilst communicated to the EMB145 [pilot], was not communicated in a clear and concise manner by the Coningsby Tower controller when considering the unfamiliarity of the EMB145 [pilot] with military go-around

procedures. The introduction of the restriction regarding EMB145 visual approaches whilst the visual circuit is active provides a sensible mitigation and will prevent re-occurrence of such an event. No further BM related causal/aggravating factors were identified.

UKAB Secretariat

The EMB145 and Typhoon pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard.[2] 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.[3]

EMB145 Operator Occurrence Investigation

Coningsby is a military (RAF) base operating mainly Typhoon jet aircraft. Through discussions with Coningsby ATC the procedure for non-circuit aircraft arriving to land when there are aircraft in the circuit is that a straight-in approach will be carried out (ILS RW25 or PAR RW07). A dedicated approach monitoring frequency is used to monitor the ILS or on which to carry out the PAR or SRA. This frequency is operated by the Approach Radar controller and is also used to sequence the aircraft carrying out the approach with the aircraft in the circuit carrying out visual circuits.

The ATC Tower controller is advised of the position of the arriving aircraft and when controller capacity allows the arriving aircraft is transferred to the Tower frequency. If the Tower controller does not have capacity to take the arriving aircraft then a clearance to land is given by the Radar controller in co-ordination with the Tower controller. The aircraft under Radar Control has priority unless another aircraft in the circuit develops a need to land as a priority (e.g. declares minimum fuel state), in which case the aircraft under Radar Control will be instructed to execute a missed approach. This procedure is known as an Integrated Approach.

Military aircraft in the circuit will be in contact with the Tower controller and will report in visual contact with the aircraft on approach and will carry out visual sequencing against it.

When visual contact with the aircraft on straight-in approach is lost then the military aircraft will break off its approach. If the military aircraft is unable to complete a visual approach ahead of the arriving aircraft then it will maintain circuit altitude and carry out a missed approach or go-around at circuit altitude (height). Typhoon circuit height is 1000ft aal.

The [pilot of the] Typhoon ahead of the Embraer was instructed to break off the approach as a following Typhoon [pilot] had declared ‘minimum fuel’ and thus was given priority. As the second Typhoon had been given priority, the Embraer [pilot] was instructed to also break off the approach. Some uncertainty as to what the Embraer crew was being instructed to do arose due to different terminology between military and civilian ATC. The term ‘break-off’ the approach is used when the aircraft is instructed to execute a go-around and enter the visual circuit. However mixed speed/type circuits at Coningsby are not approved and on being instructed to fly ‘deadside’ put the Embraer into conflict with the Typhoon already on the deadside and 100ft above the Embraer.

There are differences between a fast-jet military circuit and a circuit flown by a civilian passenger aircraft which requires to fly to stabilized approach criteria. The result is the time taken to fly the circuit which, for a civilian aircraft, would be much longer. This time difference can cause issues with fuel calculations for the military aircraft where the pilot is attempting to judge fuel burn so as to land at the minimum fuel on the ground (FOG) quantity. When the pilot of the fast-jet aircraft determines that this FOG quantity will be breached then ‘Minimum Fuel’ will be announced and that aircraft will be given priority to land.

[2] (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.
[3] (UK) SERA.3225 Operation on and in the Vicinity of an Aerodrome. MAA RA 2307 paragraph 17.

The ATC Radar controller radar vectored civilian instrument traffic to a position from which a visual approach could be made with Typhoon aircraft operating in the visual circuit with low fuel levels.

The controller reported the position of the airfield to the Embraer crew who visually acquired the airfield and requested a visual approach which would result in turning finals at about 5NM. The Embraer joined the visual circuit in a non-standard position off a radar feed. This contributed to the Typhoon [pilot] being unaware of the Embraer's position in the circuit.

Typhoons operate to a low fuel level which removes their flexibility to extend the circuit to follow a civilian aircraft flying a longer time duration approach resulting in a minimum fuel call being transmitted at short notice but requiring that the minimum fuel aircraft is given immediate priority.

Use of ATC terminology which implied a course of required action from the civilian aircraft crew which put them in conflict with other aircraft.

Root Cause:

TCAS Alerts Due to Reduced Separation, the following points are contributing factors:

Non-standard Coningsby Radar ATC radar vectoring the EMB145 instrument traffic into a position from which a visual approach could be made with military aircraft operating in the visual circuit with low fuel levels. The EMB145 joined the visual circuit in a non-standard position off a radar feed, this contributed to the Typhoon [pilot] being unaware of the Embraer's position in the circuit.

Military aircraft operate to a low fuel level which removes their flexibility to extend the circuit to follow a civilian aircraft flying a longer time duration approach resulting in a minimum fuel call being transmitted at short notice but requiring that the aircraft on minimum fuel is given immediate priority.

Misunderstanding of ATC Phraseology; during radar vectoring use of unfamiliar ATC terminology which implied a course of required action from the civilian aircraft crew which put them in conflict with other aircraft. For each missed approach carried out, as described in the [safety reports], the crews commenced the missed approach with initial doubt over the required ATC instruction due to the unfamiliarity of the phraseology used. The investigator is to seek confirmation as part of the analysis.

Corrective Actions:

Safety Reports (SRFs), MOR's and Airprox report were submitted.

Meetings held with Coningsby ATC initially to discuss the previous TCAS RA but also then to discuss the previous day's events.

RAF Coningsby Airfield Operations briefing circulated to CAT pilots.

LOA agreement between Coningsby and CAT reviewed and amended.

Coningsby ATC and Typhoon pilots have been re-briefed on operations when the CAT aircraft is on approach.

Hazard Log entry raised.

Further Comprehensive Risk Assessment carried out.

Comprehensive military circuit procedures briefing given to Embraer pilots by [Company] Test Pilot.

Preventative Actions:

CAT aircraft MUST always be in radio contact with an ATC unit so that it can be 'deconflicted' with the military traffic. CAT crew should always ask for a Deconfliction Service or at least a Traffic Service if the Deconfliction Service is not available due to controller workload or radar serviceability.

Crews MUST familiarise themselves with the various UK Flight Information Services, with respect to responsibilities regarding other aircraft and terrain or obstacle avoidance.

CAT aircraft MUST only operate into military airbases with a serviceable TCAS if military aircraft are expected to be operational in the area.

When military aircraft are operating in the visual circuit the CAT aircraft MUST always fly an Instrument Approach in accordance with the Integrated Approach procedure.

It is not permitted to fly a visual circuit when there are other aircraft in the circuit (mixed circuit/mixed speed/aircraft visual circuits are not approved at Coningsby).

If crews are intending to fly a visual approach, they MUST have received confirmation from ATC that there is no known military traffic in the circuit to affect.

In the LOA under section 4 (f), it states, "in the event of a break off from any approach, the [Company] Embraer 145 AS is to execute the published Missed Approach Procedure".

CAP 413 the CAA manual of Radiotelephony contains a section of military phraseology in chapters at the rear of the manual. This should be understood by all CAT crew.

Coningsby ATC controllers have been briefed to pass to the CAT aircraft, any non-standard missed approach procedures as early as possible.

Circuit traffic will receive regular broadcasts of the CAT aircraft's position on an instrument approach. This information is intended to assist [the pilots of] Typhoon traffic in their fuel management and their subsequent early notification to ATC of their intentions.

LOA between RAF Coningsby and CAT has been updated, [which] promotes flight safety by defining the co-ordinating procedures to be applied between the Lincolnshire Terminal Air Traffic Control Centre (Lincs TATCC) (located at Royal Air Force (RAF) Coningsby) and [the EMB145 operating company].

Completed actions:

POC at RAF Coningsby actioned to brief all Coningsby aircrew face-to-face to increase their awareness of Embraer operations to ensure on-going understanding.

The following actions have been raised in the safety action tracker:

Hold quarterly on-going face to face meetings with RAF Coningsby ATC to build a robust understanding of expectation of CAT flight operational practices.

Source additional evidence to support RAF Coningsby's use of R/T phraseology, which does not appear in CAP 413.

Source the latest version of RAF Coningsby's Flying Order Book

Typhoon Occurrence Investigation

The Typhoon Occurrence Investigation established the following Outcome, Cause, Causal Factors Recommendation and Observation:

Outcome: Loss of safe separation between military visual circuit traffic and civilian aircraft conducting visual join.

Cause: The Letter of Agreement (LoA) between [EMB145 Operator] and TATCC was not adhered to by either [EMB145] pilot or TATCC Sup.
Action: To prevent recurrence before the LoA could be reviewed ATC imposed the following restriction. "EMB145 inbound. Following a recent hazard observation, the EMB145 is not to be granted a visual approach unless the circuit is clear. The aircraft is to remain on an IFR recovery with the visual circuit active."

Casual Factors:

1. No one party seems to have been fully cognisant of detail of the LoA, leading to inappropriate request and approval to conduct a visual join whilst the 07RH visual circuit was active with Typhoon traffic. Action: As per Cause.

2. U/T ADC controller trying to respond to unfamiliar scenario and queries from civilian pilot. Action: A Table Top Review conducted with the VCR personnel present, using recordings of incident, to talk through best practice in the event a similar incident should occur. This was the best way to highlight the training points for both UT, Screen and VCR Supervisor.

3. Appeared to be a breakdown in communication between ATC and EMB145 as both appeared not to be fully cognisant of what was being asked of them.

Recommendation: Consideration to be given to adding [a local instruction], whereby U/T controllers are to demonstrate satisfactory understanding of [the] LoA prior to endorsement, if it is not already.

Observation: The Typhoon pilots operating in the vis circuit at the time demonstrated cognisance of the air situation throughout and it is evident that safety was very much at the forefront of their actions, altering their circuit to try and assist the EMB145 to fit in, resulting in a PAN for fuel being declared.

Comments

HQ Air Command

Mixed fast jet and multi-engine circuits are incompatible due to differing speeds and pattern sizes. CAP 413 states that military circuits are oval and tighter than civilian circuits, which further underlines the reasons for the restriction in the Coningsby Flying Order Book and letter of agreement. Once it was clear that the EMB145 was lower priority than the Typhoon due to fuel, the EMB145 pilot should have been instructed to “execute the missed approach procedure” as defined in CAP 413. Much of this should be standard, as identified by the safety investigations into this event, and use of non-standard terminology is likely to have caused confusion for all involved. It’s encouraging to see that the letter of agreement between operators has been revised to make this clearer. It’s also positive that all groups involved have been re-briefed on local procedures.

Summary

An Airprox was reported when an EMB145 and a Typhoon flew into proximity at RAF Coningsby at 1415Z on Monday 3rd April 2023. Both pilots were operating under VFR in VMC, both in receipt of an ACS from Coningsby Tower.

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.

Members agreed that this Airprox occurred due to a series of errors, culminating in the Typhoon #3 pilot being 'very surprised' at the proximity of the EMB145 as it had passed in front of them during their finals turn. In essence, the Airprox was attributed to the EMB145 pilot going around later than had been anticipated by the U/T Coningsby Tower controller and therefore being in closer proximity to Typhoon #3 than had been planned. This situation had been preceded by a number of links in the 'causal chain'. The EMB145 pilot had requested a visual approach but this was not permitted with Typhoon aircraft in the visual circuit, iaw the relevant LoA (**CF6**), in effect a plan adaption (**CF8**) that had resulted in an incorrect approach being flown (**CF7**). The relevance of the incorrect approach was that the EMB145 pilot had been transferred to the Tower frequency at an earlier stage than would otherwise have been the case and the normal integration of radar traffic with visual circuit traffic then had not taken place. The U/T controller, OJTI controller (**CF2**) and Supervisor (**CF3**) had not identified that a visual approach was not permitted under the terms of the LoA (**CF1**) and had been faced with the approaching EMB145 as the pilot of Typhoon #3 declared 'minimum fuel', which had changed the order of priority of landing aircraft. Further confusion had then been sown by a combination of the EMB145 and Typhoon #3 having similar callsigns and the use of military R/T phraseology. The EMB145 pilot had no doubt been confused by the call of '*join or go around dead side*', which Board members also thought ambiguous, and seemed to have been confused by the call of '*go-around circuit height*' (which they had perceived as a call of '*go-around deadside*'), reporting that they would not have expected this on an instrument approach, when they had in fact been on a visual approach. A Board advisor noted that military ATM provision is directed to be in accordance with, amongst other regulation, the CAP413 Radiotelephony Manual[4] and that differences with military R/T phraseology are contained in Chapter 10, Military Specific Phraseology. This chapter further directs that:

> 'Within the visual circuit, the phraseology defined within Chapter 4 is to be used. On being instructed to go around, the aircraft is to break off the approach and climb to circuit height, normally on the deadside (or as briefed, if different, at specific aerodromes).'

Chapter 4 Missed Approach states that the R/T phraseology shall be:

> '[Callsign] go around I say again go around, acknowledge'

Members noted that the terminology listed in Chapter 4 had not been used (**CF1**) and that this had contributed to the EMB145 pilot's confusion, consequent delayed go-around and subsequent proximity to Typhoon #3 (**CF4**, **CF5**). Members discussed the issue of military R/T phraseology and agreed that in this case it appeared not to have conformed with the requirements of MAA RA 3201 and CAP 413. The military ATM advisor briefed the Board that this issue had been identified previously and that work was ongoing to include the relevant R/T phraseology in CAP 413. Members discussed events immediately prior to CPA and agreed that the Typhoon #3 pilot had had incorrect situational awareness (**CF9**) that the EMB145 had been 'on a join and therefore no factor for their final turn' and that this had been generated by the R/T phraseology used. The EMB145 pilot had received a TCAS TA (**CF10**), which the Board thought was only not an RA because the EMB145 had been below 1000ft at the time. Of more concern was that the Typhoon #3 pilot had been 'very surprised' at the proximity of the EMB145 as it had passed in front of them during their finals turn and that they 'considered it luck rather than judgement that they did not pass closer, because they were 'belly up' for a large part of the final turn'. Additionally, although the EMB145 pilot had reported being visual with Typhoon #3 (described as Typhoon No.2 in their report) when it had been downwind, they had not reported being visual with it as it approached CPA, which the Board considered a non-sighting (**CF11**), and the Typhoon #3 pilot reported seeing the EMB145 as it 'passed through their Head-up Display', effectively a non-sighting (**CF11**). Turning to risk, the Board members agreed that this Airprox highlighted what could have happened if circumstances had been slightly different, but that in the event, and despite the confusion and lack of situational awareness, separation at CPA had been such that risk of collision had been averted.

[4] MAA RA 3201 Military Air Traffic Management, para 1. ATS

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2023050			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Ground Elements			
	• Regulations, Processes, Procedures and Compliance			
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
	• Manning and Equipment			
2	Human Factors	• ATM Leadership and Supervision	An event related to the leadership and supervision of ATM activities.	
3	Human Factors	• Recurrent/OJT Instruction or Training	Events involving on the job training of individuals/ personnel	
	• Situational Awareness and Action			
4	Human Factors	• Conflict Resolution-Inadequate	An event involving the inadequate provision of conflict resolution	
5	Human Factors	• Traffic Management Information Provision	An event involving traffic management information provision	The ANS instructions contributed to the Airprox
	Flight Elements			
	• Regulations, Processes, Procedures and Compliance			
6	Human Factors	• Use of policy/Procedures	Events involving the use of the relevant policy or procedures by flight crew	Regulations and/or procedures not complied with
	• Tactical Planning and Execution			
7	Human Factors	• Action Performed Incorrectly	Events involving flight crew performing the selected action incorrectly	Incorrect or ineffective execution
8	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			
9	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late, inaccurate or only generic, Situational Awareness
	• Electronic Warning System Operation and Compliance			
10	Contextual	• ACAS/TCAS TA	An event involving a genuine airborne collision avoidance system/traffic alert and collision avoidance system traffic advisory warning triggered	
	• See and Avoid			
11	Human Factors	• Monitoring of Other Aircraft	Events involving flight crew not fully monitoring another aircraft	Non-sighting or effectively a non-sighting by one or both pilots

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:

Ground Elements:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because the provisions of the LoA regarding the requirement for an instrument approach with traffic in the Coningsby visual circuit were not complied with.

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

Manning and Equipment were assessed as **partially effective** because the OJTI and Supervisor did not intervene when the terms of the LoA were not complied with.

Situational Awareness of the Confliction and Action were assessed as **ineffective** because the Coningsby U/T controller instruction caused the EMB145 pilot to become confused, which delayed their go-around.

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because the provisions of the LoA regarding the requirement for an instrument approach with traffic in the Coningsby visual circuit were not complied with.

Tactical Planning and Execution was assessed as **ineffective** because the EMB145 pilot adapted their plan to make a visual approach that was not permitted under the terms of the LoA.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because, although the Typhoon #3 pilot had incorrect situational awareness on the position of the EMB145, the EMB145 pilot was aware of Typhoon #3 in the visual circuit.

See and Avoid were assessed as **ineffective** because the EMB145 pilot was not visual with Typhoon #3 at CPA and the Typhoon #3 pilot saw the EMB145 at about CPA, effectively a non-sighting.