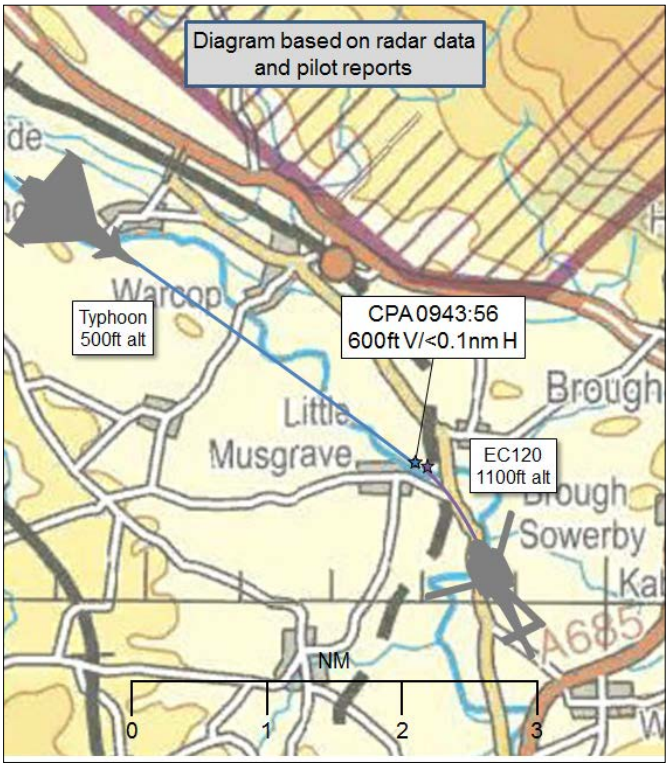
AIRPROX REPORT No 2016159

Date: 03 Aug 2016 Time: 0945Z Position: 5430N 00222W Location: NW Kirkby Stephen

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Typhoon	EC120
Operator	HQ Air (Ops)	Civ Pte
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	None	Basic
Provider	LL Common	London Information
Altitude/FL	500ft agl	1100ft agl
Transponder	C	C
Reported		
Colours	Grey	Silver, Green
Lighting	Nav, Anti Col	Nav, Anti Col, Landing
Conditions	VMC	NK
Visibility	10km	NK
Altitude/FL	400ft	1500ft
Altimeter	NK (1013hPa)	QNH (997hPa)
Heading	100°	330°
Speed	420kt	120kt
ACAS/TAS	Not fitted	Not fitted
Alert	N/A	N/A
Separation		
Reported	500ft V/1000ft H	Not Seen
Recorded	600ft V/<0.1nm H	



THE TYPHOON PILOT reports that he was flying low-level as part of a training sortie when a close pass with a civilian helicopter was observed. The helicopter was not detected by radar and he visually acquired it during a turn as part of the low-level route. At this point, the helicopter was observed approximately 500ft above as it passed down the left-hand side with approximately 1000ft separation. When he sighted the helicopter he was already established in the turn, which was continued and deconflicted him from the helicopter.

He assessed the risk of collision as 'Low'.

THE EC120 PILOT reports that he did not see the Typhoon but his passenger did for a fraction of a second, as it passed below. He had seen a Typhoon pass down his right side about a mile east heading north on a parallel track a few minutes earlier and had put his landing light on to increase his visibility. He presumed that the Typhoon in this incident was the same aircraft returning on a reciprocal track.

Factual Background

The weather at Carlisle was recorded as follows:

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METAR EGNC 030920Z 23017KT 9999 SCT018 SCT033 17/12 Q0999
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Analysis and Investigation

CAA ATSI

After investigation the Airprox was assessed as follows:

The Typhoon was operating VFR on the UHF Low-Level Common frequency. The EC120 was operating VFR and in receipt of a Basic Service from London Flight Information. London Information would not have been aware of the presence of the Typhoon; they do not utilise surveillance equipment in the provision of a Basic Service, and the EC120 did not make reference to an Airprox.

In accordance with CAP774 UK Flight Information Services:

> *A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.*
>
> *Basic Service relies on the pilot avoiding other traffic, unaided by controllers/FISOs. It is essential that a pilot receiving this ATS remains alert to the fact that, unlike a Traffic Service and a Deconfliction Service, the provider of a Basic Service is not required to monitor the flight.*

UKAB Secretariat

The Typhoon and EC120 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[1]. If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right[2].

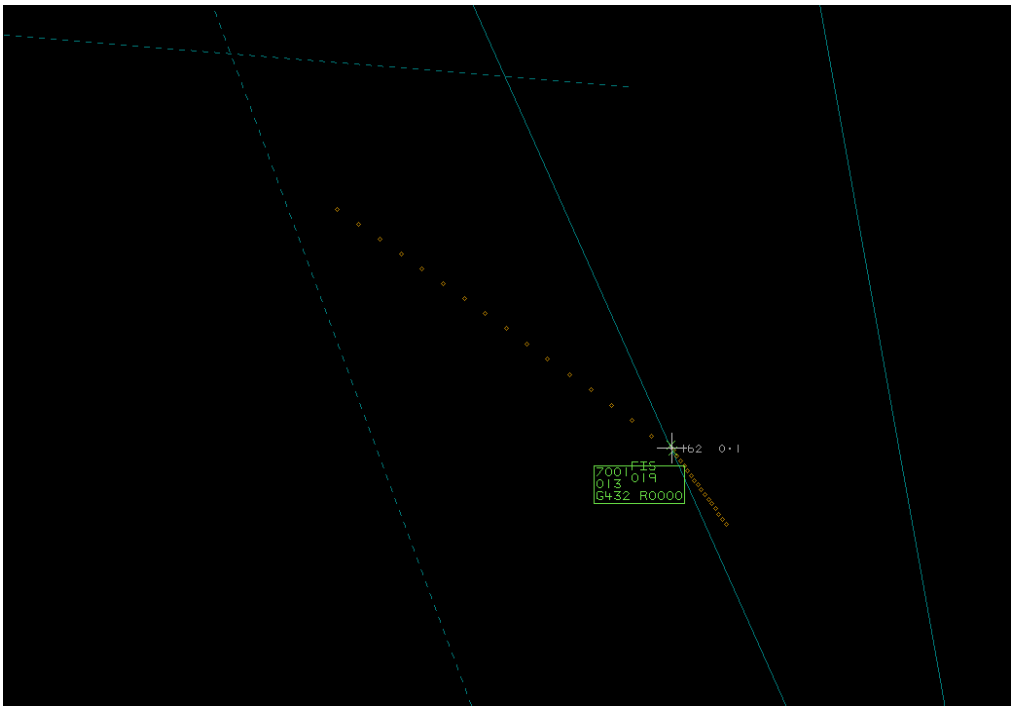


Figure 1: Radar Replay Screen Shot of CPA

Comments

[1] SERA.3205 Proximity.
[2] SERA.3210 Right-of-way (c)(1) Approaching head-on.

HQ Air Command

The Typhoon crew had planned, briefed and authorised their sortie in accordance with all current regulations and instructions. The route had been entered on CADS and de-conflicted from known other routes prior to take-off. Neither aircraft was in receipt of a radar-assisted air traffic service, though at the heights and location of the two aircraft this would not have been available in any case. Both aircraft were equipped with transponders but neither aircraft was fitted with an ACAS; work is ongoing regarding the fitment of a CWS to Typhoon – a number of viable solutions have been identified and are being considered but it is too early to say what the solution is likely to be. The Typhoon crew spotted the helicopter as they entered a turn; they assess that this induced a change in sight-line, thus enabling them to detect the helicopter, suggesting that the initial geometry was on a constant bearing. This indicates that the aircraft would have passed very close to each other had the Typhoon not manoeuvred. Of note, the Typhoon crew were monitoring the low-level UHF common frequency – a low level VHF common frequency is not available in this area but work is ongoing to identify if the trial conducted in Scotland can be expanded to the rest of the UK.

Summary

An Airprox was reported when a Typhoon and a EC120 flew into proximity at 0945 on Wednesday 3rd August 2016. Both pilots were operating under VFR in VMC, the Typhoon pilot was listening out on the UHF LL Common not under a Service, and the EC120 pilot in receipt of a Basic Service from London Information.

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 and reports from the appropriate ATC and operating authorities.

The Board began their deliberations by looking at use of radios for deconfliction and noted that the Typhoon pilot was operating on the UHF Low-Level Common frequency whilst the EC120 was on the VHF London Information frequency. As a result, neither pilot was aware of the other's presence, and members also agreed that London Information would not have been aware of the presence of the Typhoon and therefore could not pass generic information to the EC120 pilot. The Board reflected on the VHF Low-Level Common frequency trial in Scotland, noted that there had been positive feedback regarding its value, and wondered whether it might be brought into service throughout the UK. The military member reported that the next stage was indeed to try to develop a similar system throughout the rest of the UK, and he opined that, if both pilots had had access to the frequency in this incident, then this could have potentially enabled them to greatly enhance their situational awareness of each other's presence and routing.

The Board then turned to the actions of the pilots. They agreed that the Typhoon pilot was conducting normal flying operations for the military low-flying system and had carried out all the required pre-flight actions to notify other users of his presence, (e.g. use of CADS, low-level booking etc). The Board also agreed that the EC120 was flying at a height that general aviation helicopters would normally occupy whilst transiting. Members discussed the type of service that the EC120 pilot was receiving from London Information, and noted that there were no airfields local to the incident who might provide a better service. The Board agreed that although in ideal circumstances, an air traffic service from a local airfield would be prudent, in this situation this was not feasible and therefore the EC120 pilot had endeavoured to obtain the best available service.

In the absence of a CWS, the Chairman asked the military member if the Typhoon's radar could have been set up so that it would have alerted the pilot to the presence of the EC120, and whether it had the capability to detect such aircraft in an autonomous mode that did not require continuous pilot

input. The Military members said that terrain masking and use of the radar for operational tasks could sometimes limit its effectiveness as an alerting tool, and that this would be something the Typhoon pilot would be aware of and make allowances for.

The Board then looked at the barriers that were relevant to this Airprox and decided that the following were key contributory factors:

- **Airspace Design & Procedures** was considered **effective** overall, but was marked down as only being **partially available** because of the lack of a VHF LL Common frequency.

- **Flight Crew Situational Awareness** was considered **partially effective** because the pilots were on different frequencies, whilst this can often be the case, the Board felt that the availability and use of a VHF common frequency for low-level flights and transits in areas where air traffic services are limited would have increased the information available to both pilots regarding the other's presence.

- **Onboard Warning/Collision Avoidance Equipment** was assessed as being **inapplicable** because neither aircraft was fitted with the equipment. However, the Board agreed that, because both aircraft were transponding, if this barrier had been available to at least one of the pilots it could have alerted them to the presence of the other aircraft early enough to carry out actions to increase separation.

- **See and Avoid** was **partially effective** because the Typhoon pilot only saw the EC120 late and when he was in a turn and the EC120 pilot did not see the Typhoon at all. The Typhoon pilot had ascertained that his turn would keep him clear and that no further action was required.

The Board then considered the cause and risk of the incident, they agreed that because the Typhoon pilot saw the EC120 late, and the EC120 pilot did not see the Typhoon before CPA, the incident was best described as a late sighting by the Typhoon pilot and effectively a non-sighting by the EC120 pilot. Turning to the risk, members opined that the height separation achieved represented fairly normal parameters for Class G operations albeit not ideal for a head-on aspect with a fast-jet aircraft. They further noted that the Typhoon pilot had determined that maintaining his turn would continue to ensure separation from the EC120 and so the Board agreed that although safety had been degraded, there had been no risk of collision; they assessed the risk as Category C.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by the Typhoon pilot and effectively a non-sighting by the EC120 pilot.

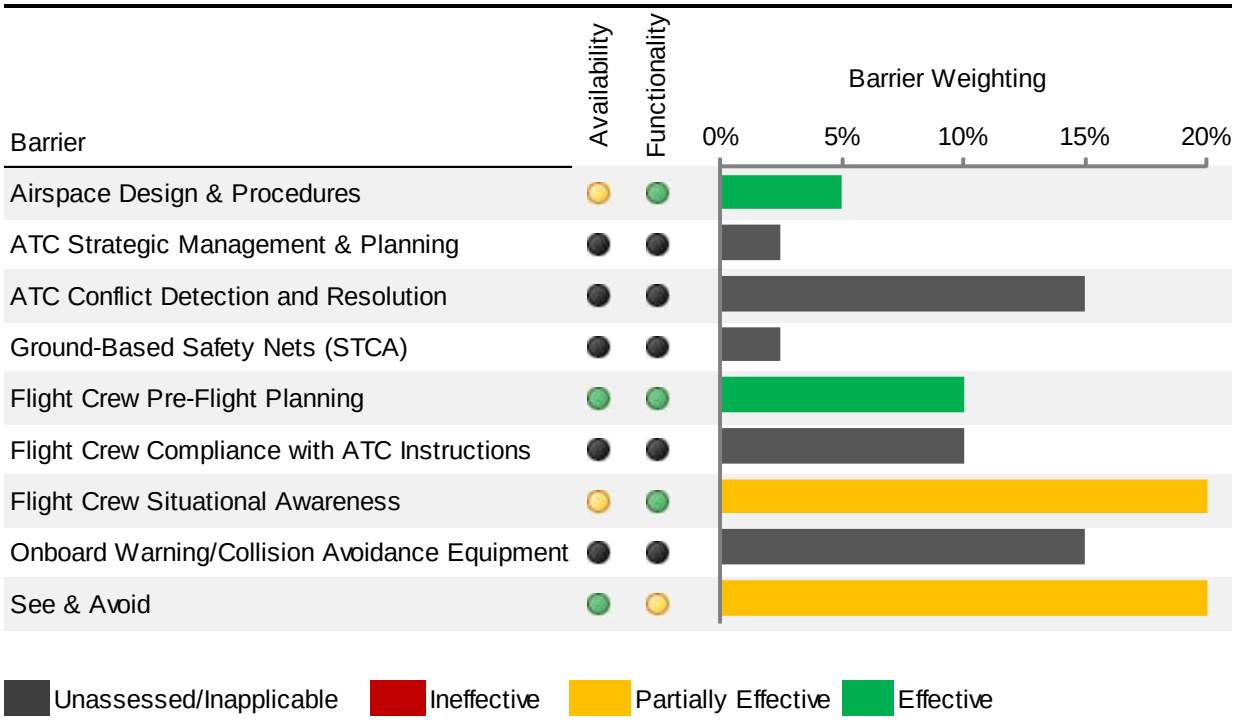
Degree of Risk: C.

Barrier Assessment:

Modern safety management processes employ the concept of safety barriers that prevent contributory factors or human errors from developing into accidents. Based on work by EASA, CAA, MAA and UKAB, the following table depicts the barriers associated with preventing mid-air-collisions. The length of each bar represents the barrier's weighting or importance (out of a total of 100%) for the type of airspace in which the Airprox occurred (i.e. Controlled Airspace or Uncontrolled Airspace).[3] The colour of each bar represents the Board's assessment of the effectiveness of the associated barrier in this incident (either Fully Effective, Partially Effective, Ineffective, or Unassessed/Inapplicable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident.

[3] Barrier weighting is subjective and is based on the judgement of a subject matter expert panel of aviators and air traffic controllers who conducted a workshop for the UKAB and CAA on barrier weighting in each designation of airspace.

Airprox Barrier Assessment: Outside Controlled Airspace



Barrier	Availability			Functionality			Unassessed / Inapplicable
	Fully (3)	Partially (2)	Not Available (1)	Fully (3)	Partially (2)	Non Functional (1)	
Airspace Design and Procedures	Appropriate airspace design and/or procedures were available	Airspace design and/or procedures were lacking in some respects	Airspace design and/or procedures were not appropriate	Airspace design and procedures functioned as intended	Airspace design and/or procedures did not function as intended in some respects	Airspace design and/or procedures did not function as intended	The Board either did not have sufficient information to assess the barrier or the barrier did not apply; e.g. ATC Service not utilised. Note: The Board may comment on the benefits of this barrier if it had been available
ATC Strategic Management and Planning	ATM were able to man and forward plan to fully anticipate the specific scenario	ATM were only able to man or forward plan on a generic basis	ATM were not realistically able to man for or anticipate the scenario	ATM planning and manning functioned as intended	ATM planning and manning resulted in a reduction in overall capacity (e.g. bandboxed sectors during peak times)	ATM planning and manning were not effective	
ATC Conflict Detection and Resolution	ATS had fully serviceable equipment to provide full capability	ATS had a reduction in serviceable equipment that resulted in a minor loss of capability	ATS had a reduction in serviceable equipment that resulted in a major loss of capability	The controller recognised and dealt with the confliction in a timely and effective manner	The controller recognised the conflict but only partially resolved the situation	The controller was not aware of the conflict or his actions did not resolve the situation	
Ground-Based Safety Nets (STCA)	Appropriate electronic warning systems were available	Electronic warning systems is not optimally configured (e.g. too few/many alerts)	No electronic warning systems were available	Electronic warning systems functioned as intended, including outside alerting parameters, and actions were appropriate	Electronic warning systems functioned as intended but actions were not optimal	Electronic warning systems did not function as intended or information was not acted upon	
Flight Crew Pre-Flight Planning	Appropriate pre-flight operational management and planning facilities were deemed available	Limited or rudimentary pre-flight operational management and planning facilities were deemed available	Pre-flight operational management and planning facilities were not deemed available	Pre-flight preparation and planning were deemed comprehensive and appropriate	Pre-flight preparation and/or planning were deemed lacking in some respects	Pre-flight preparation and/or planning were deemed either absent or inadequate	
Flight Crew Compliance with Instructions	Specific instructions and/or procedures pertinent to the scenario were fully available	Instructions and/or procedures pertinent to the scenario were only partially available or were generic only	Instructions and/or procedures pertinent to the scenario were not available	Flight crew complied fully with ATC instructions and procedures in a timely and effective manner	Flight crew complied later than desirable or partially with ATC instructions and/or procedures	Flight crew did not comply with ATC instructions and/or procedures	
Flight Crew Situational Awareness	Specific situational awareness from either external or onboard systems was available	Only generic situational awareness was available to the Flight Crew	No systems were present to provide the Flight Crew with situational awareness relevant to the scenario	Flight Crew had appropriate awareness of specific aircraft and/or airspace in their vicinity	Flight Crew had awareness of general aircraft and/or airspace in their vicinity	Flight Crew were unaware of aircraft and/or airspace in their vicinity	
Onboard Warning/Collision Avoidance Equipment	Both aircraft were equipped with ACAS/TAS systems that were selected and serviceable	One aircraft was equipped with ACAS/TAS that was selected and serviceable and able to detect the other aircraft	Neither aircraft were fitted with ACAS/TAS or their systems were not selected on or unserviceable or systems incompatible	Equipment functioned correctly and at least one Flight Crew acted appropriately in a timely and effective manner	ACAS/TAS alerted late/ambiguously or Flight Crew delayed acting until closer than desirable	ACAS/TAS did not alert as expected, or Flight Crew did not act appropriately or at all	
See and Avoid	Both pilots were able to see the other aircraft (e.g. both clear of cloud)	One pilots visibility was uninhibited, one pilots visibility was impaired (e.g. one in cloud one clear of cloud)	Both aircraft were unable to see the other aircraft (e.g. both in cloud)	At least one pilot takes timely action/inaction	Both pilots or one pilot sees the other late and one or both are only able to take emergency avoiding action	Neither pilot sees each other in time to take action that materially affects the outcome (i.e. the non-sighting scenario)	