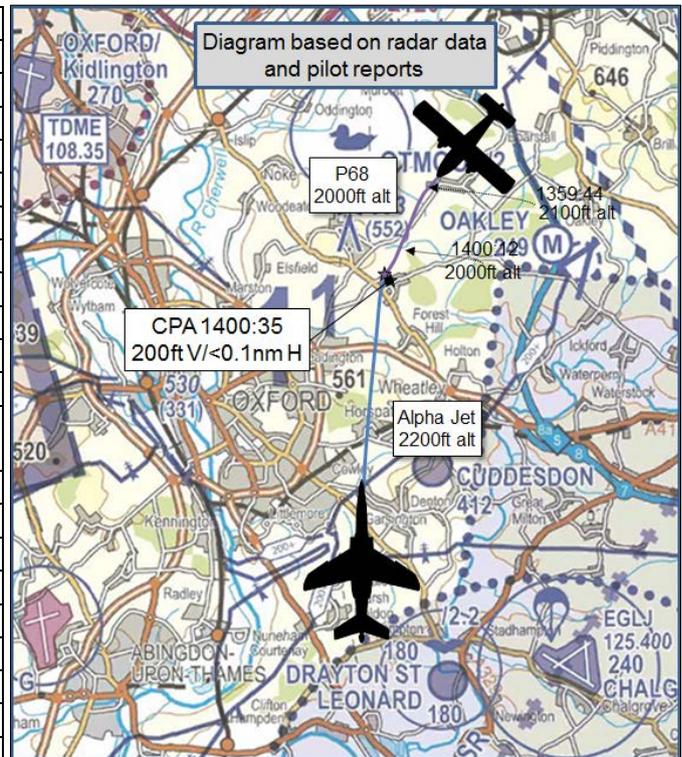


**AIRPROX REPORT No 2016256**

Date: 29 Nov 2016 Time: 1400Z Position: 5146N 00109W Location: 7nm NW Benson

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	Alpha Jet	P68
Operator	MoD ATEC	Civ Comm
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Traffic	Basic
Provider	Benson	Oxford
Altitude/FL	2200ft	2000ft
Transponder	On/C, S	On/C
Reported		
Colours	Black, White	White, Blue
Lighting	HISL	Strobe, Taxi, Landing
Conditions	VMC	VMC
Visibility	>10km	9km
Altitude/FL	1900ft	2000ft
Altimeter	QFE (1026hPa)	QNH (1033hPa)
Heading	340°	200°
Speed	160kt	120kt
ACAS/TAS	TAS	Not fitted
Alert	None	N/A
Separation		
Reported	200ft V/NK H	0-100ft V/1nm H
Recorded	200ft V/<0.1nm H	



**THE ALPHA JET PILOT** reports that he was carrying out multiple radar approaches with a Traffic Service at Benson as part of an Annual Handling check for the front-seat instructor pilot. On the first approach there had been several contacts in the area which had been called by ATC and correlated with TAS returns on the EHSI; radar vectors had resulted in 3nm-plus separation from all traffic. On the second approach, at approximately 160kts with gear and flap, there was an ATC call of traffic in the 12 o'clock 200ft below, and a question as to whether he would accept a turn against this traffic; the front-seat handling pilot confirmed that they would accept this vector. They were then given a right turn but, just as the turn was started, the front-seat pilot sighted a high-winged twin-propeller aircraft at very close range approximately 200ft below and laterally separated to the left side, the rear-seat pilot spotted the aircraft immediately after the call from the front seat; although very close, there was no crossing angle and therefore no evasive action was necessary. Given the near-head-on aspect of the encounter, and the other aircraft being below their altitude, it was not surprising that they did not see it until a late stage as it would have been masked by the instrument coaming and fuselage. At no time did the contact appear on the TAS display or any warning appear, this was despite previously good performance of the TAS. The subsequent approach was performed with a Deconfliction Service. This incident highlights the limitation of TAS/TCAS systems in providing warning and traffic separation.

He assessed the risk of collision as 'High'.

**THE P68 PILOT** reports that he was completing a survey detail, conducting a three-minute straight-and-level leg prior to rejoin at Oxford. The Oxford ATIS was obtained on the approach frequency with a Traffic Service [UKAB Note: ATSI confirmed that the P68 pilot had requested and agreed a Basic Service with Oxford]. The Pilot Flying was conducting the leg, with the aircraft Commander on the R/T and lookout. A small jet was sighted approximately in the 10 o'clock by the aircraft Commander

at the same level and in the opposite direction. They sighted the jet when it conducted a turn right and a slight climb, which appeared to be an avoidance manoeuvre. The manoeuvre performed made the aircraft visible to the P68 crew. The aircraft Commander called the sighting to the Pilot Flying and advised her to maintain heading and altitude - thus passing to the left of the aircraft. The aircraft Commander called clear of traffic when the aircraft had passed the 8 o'clock position.

He assessed the risk of collision as 'Medium'.

**THE BENSON CONTROLLER** reports that the Alpha Jet was in the radar training circuit under the control of a trainee controller. Whilst the Alpha Jet was routing northbound on a heading of 010, traffic was called to him in his 12 o'clock, 4 miles opposite direction indicating 200ft below [UKAB note: in fact the call was "1 o'clock at 3nm, opposite direction, indicating 100ft below"]. Due to both the aircraft's speed and their cockpit workload, (the crew were carrying out cockpit checks and had previously told the trainee controller to standby as he was busy), rather than calling the traffic again, the pilot was asked if he was happy to take a turn. He confirmed he was, and was given a right turn of 090°. The pilot continued the approach and, on climb out, asked if he could upgrade to a DS after being passed further TI. A DS was given, and the pilot informed the controller that he would be submitting an Airprox against the traffic he encountered on the downwind leg. Due to the Airprox report occurring after the approach had been carried out, the conflicting aircraft's squawk had not been recorded but was believed to be an Oxford squawk.

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

**THE BENSON SUPERVISOR** reports that the Approach Control Room workload at the time of the incident saw 7-8 aircraft being controlled by Zone and 3-4 with Approach/Director with congested airspace in the vicinity. He was at the Supervisor's console monitoring 4 separate frequencies. Given that the Approach task was being completed by a trainee with a screen controller, he had focused his attention primarily on the Zone controller, assisting with that task when the incident occurred. His attention was brought back to the Approach console as the Alpha Jet climbed out and traffic was called south by 3 miles with a subsequent request for a DS.

## Factual Background

The weather at Benson was recorded as follows:

METAR EGUB 291350Z 02005KT CAVOK 05/M00 Q1033 BLU NOSIG

## Analysis and Investigation

### CAA ATSI

The P68 was en-route to carry out survey work overhead Oxford city centre. The aircraft was receiving a Basic Service from Oxford Radar and transponding the Oxford Basic Service Conspicuity code (4520). The Alpha Jet reported that they were carrying out an annual handling check and was receiving a Traffic Service from Benson Radar. The aircraft was transponding code 3627.

According to the report from Benson ATC, Traffic Information (on the P68) was passed to the Alpha Jet when the P68 was in the Alpha Jet's 12 o'clock at 4nm, advising that the P68 was indicating 200ft below (Figure 1).

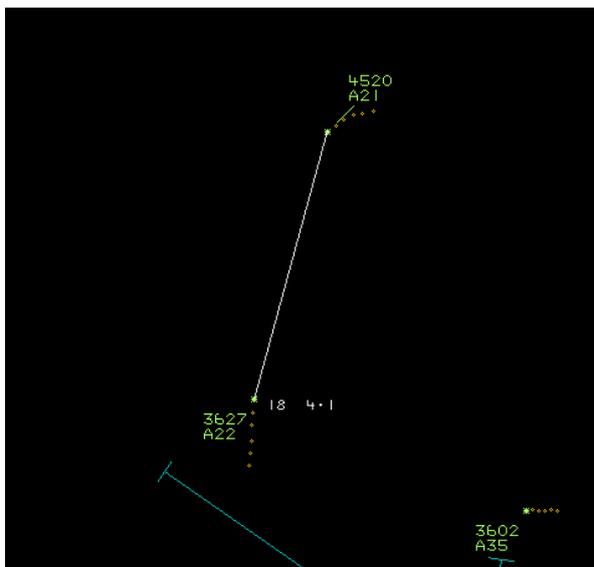


Figure 1 – 1359:45



Figure 2 – 1400:36

A turn onto 090° was offered and subsequently accepted by the Alpha Jet. CPA took place at 1400:36 (Figure 2), with the aircraft separated by 0.1nm laterally and 200ft vertically.

The P68 had not been identified by the Oxford controller and Traffic Information was not passed.

The Alpha Jet reported that the P68 had been unsighted until the turn was commenced, with the P68 possibly hidden behind the instrument coaming and aircraft fuselage. The P68 reported seeing the Alpha Jet as it commenced a turn and climb, which the crew considered to be an avoidance manoeuvre. The P68 did not advise Oxford of the Airprox at the time.

CAP774 UK Flight Information Services states:

*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.*

When providing a Traffic Service:

*The controller shall pass traffic information on relevant traffic, and shall update the traffic information if it continues to constitute a definite hazard, or if requested by the pilot. However, high controller workload and RTF loading may reduce the ability of the controller to pass traffic information, and the timeliness of such information.*

*Traffic is normally considered to be relevant when, in the judgement of the controller, the conflicting aircraft's observed flight profile indicates that it will pass within 3nm and, where level information is available, 3,000ft of the aircraft in receipt of the Traffic Service or its level-band if manoeuvring within a level block. However, controllers may also use their judgment to decide on occasions when such traffic is not relevant, e.g. passing behind or within the parameters but diverging. Controllers shall aim to pass information on relevant traffic before the conflicting aircraft is within 5nm, in order to give the pilot sufficient time to meet his collision avoidance responsibilities and to allow for an update in traffic information if considered necessary.*

## Military ATM

An Airprox occurred on 29 Nov 16, at approximately 1400hrs UTC, 7nm NW of RAF Benson, between an Alpha Jet in the Radar Training Circuit (RTC) at RAF Benson and a P68 general handling. The Alpha Jet was receiving Traffic Service (TS) from Benson Approach and the P68 was receiving a Basic Service (BS) from Oxford Approach.

Portions of the tape transcripts between Benson Approach and the Alpha Jet are below:

To	From	Speech Transcription	Time
[ALPHA JET C/S]	Benson Approach	Erm if possible we would like to do a PAR next and then we'll do a third approach, SRA if that's ok with you.	13:56:32
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] that's great many thanks traffic left eleven o'clock five miles opposite direction indicating four hundred feet below.	13:56:41
[ALPHA JET C/S]	Benson Approach	[Alpha jet C/S]	13:56:50
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] PAR Procedure minima Two One Zero Feet.	13:57:25
[ALPHA JET C/S]	Benson Approach	Err Two One Zero on the previous you called Two Three Zero [Alpha jet C/S].	13:57:32
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] Apologies PAR Procedure minima Two Three Zero Feet	13:57:44
[ALPHA JET C/S]	Benson Approach	Two Three Zero Low Approach for Further err SRA [Alpha jet C/S]	13:57:49
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] after your low approach climb on Runway track to height One thousand Nine Hundred Feet contact approach on Three Seven Six Six Five.	13:58:11
[ALPHA JET C/S]	Benson Approach	Cleared up to One Thousand Nine Hundred Feet Three Seven Six Six Five.	13:58:17
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] cockpit checks report complete	13:58:25
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] traffic right three o'clock four and a half miles crossing right left behind indicating one thousand three hundred feet above.	13:58:37
[ALPHA JET C/S]	Benson Approach	[Alpha jet C/S]	13:58:46
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] cockpit checks report complete	13:58:53
[ALPHA JET C/S]	Benson Approach	Err yep we are busy [Alpha jet C/S]	13:58:55
[Mil Heli 1 C/S]	Benson Approach	Approach [Mil Heli 1 C/S] complete in the vale now routing to Abingdon operating surface to one thousand feet.	13:59:14
Benson Approach	[Mil Heli 1 C/S]	[Mil Heli 1 C/S] that's copied report complete	13:59:21
[Mil Heli 1 C/S]	Benson Approach	Wilco [Mil Heli 1 C/S]	13:59:23
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] traffic right One O'clock, three miles, opposite direction, indicating One Hundred Feet Below.	13:59:32
[ALPHA JET C/S]	Benson Approach	[Alpha jet C/S] is looking.	13:59:37
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] are you happy to turn against that traffic for your checks?	13:59:49
[ALPHA JET C/S]	Benson Approach	Err we are checks complete and err we will take a turn please.	13:59:54
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] turn right heading Zero Nine Zero degrees	13:59:59
[ALPHA JET C/S]	Benson Approach	Zero Nine Zero [Alpha jet C/S]	14:00:02
[ALPHA JET C/S]	Benson Approach	And we are visual with that traffic [Alpha jet C/S]	14:00:17
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S]	14:00:19
Benson Approach	[Mil Heli 1 C/S]	Benson all stations Benson all stations we are now information code Golf New QNH One Zero Three Three [Mil Heli 1 C/S]	14:00:31
[Mil Heli 1 C/S]	Benson Approach	One Zero Three Three [Mil Heli 1 C/S]	14:00:38
Benson Approach	[MIL HELI 2 C/S]	[Mil Heli 2 C/S]	14:00:40
[MIL HELI 2 C/S]	Benson Approach	[Mil Heli 2 C/S] copies One Zero Three Three	14:00:42
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S] turn right heading One Six Zero degrees	14:00:53
[ALPHA JET C/S]	Benson Approach	One Six Zero [Alpha jet C/S]	14:00:57
Benson Approach	[ALPHA JET C/S]	[Alpha jet C/S], Nine miles, contact Benson Talk down Two Eight Three decimal Zero Seven.	14:01:33
[ALPHA JET C/S]	Benson Approach	Two Eight Three Zero Seven [Alpha jet C/S]	14:01:38

The radar analysis in Figures 3-6 shows the position of the Alpha Jet and P68 at times when pertinent instructions were issued. The replays are taken from the 'All Swanwick' radar feed, which was not the feed available to the controller and therefore does not necessarily depict what was on their screen at the time.

At 13:59:32 (Figure 3), the Benson Approach controller passed TI to the Alpha Jet on traffic in its right, 1 o'clock, range 3nm, opposite direction, indicating 100ft below. The Alpha Jet reported that he was looking but did not call visual with the traffic. The Benson Approach controller then asked if the pilot was happy to turn against that traffic (onto base leg) for checks, to which the Alpha Jet responded that checks were complete and they would take a turn.

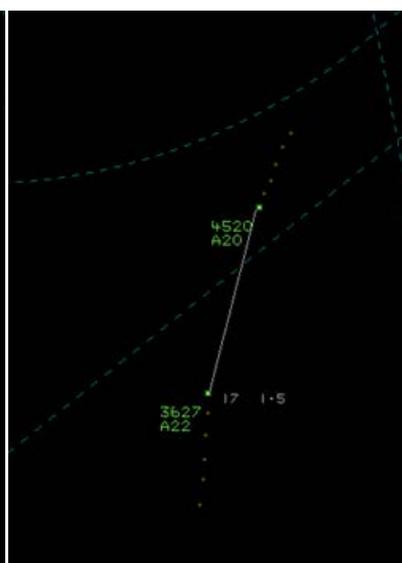
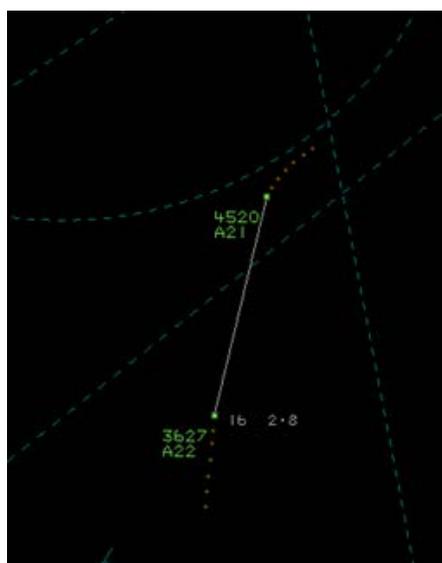
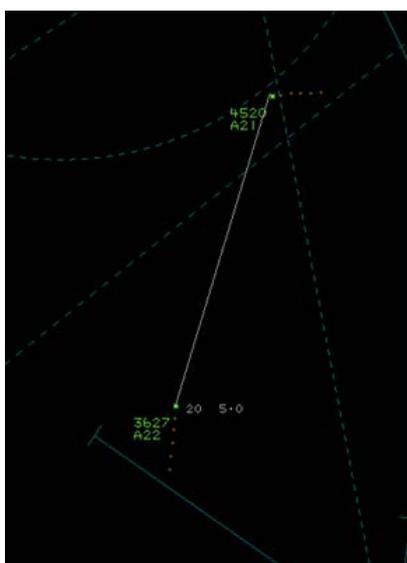


Figure 3: Geometry at 13:59:32    Figure 4: Geometry at 13:59:59    Figure 5: Geometry at 14:00:17 (Alpha Jet (3627); P68 (4620))

At 13:59:59 (Figure 4), the Alpha Jet was instructed to turn right onto heading 090 degree degrees for base leg.

At 14:00:17 (Figure 5), the Alpha Jet reported visual with the previously called traffic.

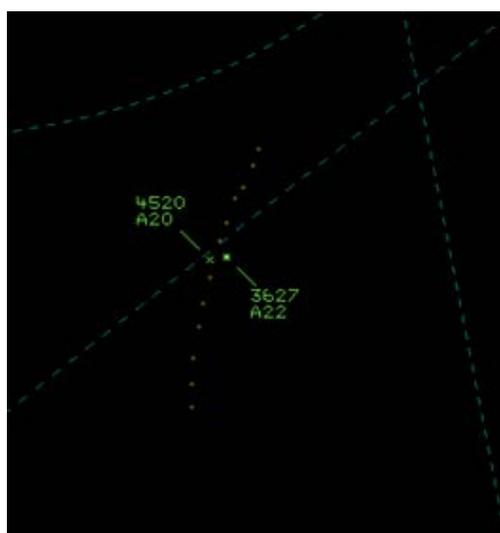


Figure 6: Geometry at 14:00:35 (Alpha Jet (3627); P68 (4620))

At 14:00:35 (Figure 6), the Alpha Jet and P68 passed at their CPA, which was 0.1nm and indicated 200ft separation.

The Benson Approach controller was under training, with perceived low-medium workload and medium task difficulty. They were operating bandboxed in the Approach and Director positions. They reported that the Alpha Jet was downwind in the RTC, heading 010 degrees, when TI was passed on traffic in his 12 o'clock, 4nm, opposite direction, indicating 200ft below [UKAB Note: The R/T recording shows that the TI was passed as 'traffic right one o'clock, three miles, opposite direction, indicating one hundred feet below']. Rather than allowing the Alpha Jet to proceed towards the conflicting traffic, the Approach controller asked the pilot if he would take a turn for checks, which would also serve to deconflict. The Approach controller reported that the pilot requested the turn, and was vectored onto 090 degrees. The Alpha Jet continued the approach and, after levelling off for a TCAS RA on climb out, requested Deconfliction Service (DS) for the next approach and reported the previous Airprox.

The Benson Supervisor reported that the airspace in the vicinity of RAF Benson was congested and that Approach/Director and Zone were working 3-4 and 7-8 speaking units respectively. Given that the Approach/Director task was being completed by a trainee and screen controller<sup>1</sup>, he elected to focus his attention on the Zone controller and was assisting with that task when the Airprox occurred. The Supervisor's attention was brought back to the Approach/Director when the Alpha Jet climbed out requesting DS.

When the Alpha Jet was initially positioned downwind, the P68 was not in the vicinity, therefore the controller did not introduce the conflict. Though marginally late, TI was accurate and passed iaw CAP774. The Approach controller was not aware that the relative aspect of the 2 aircraft would make it difficult for them to visually acquire each other. With 3nm separation, the Approach controller believed that vectoring the Alpha Jet onto a base leg for checks would be both safe and expeditious for the aircraft. Indeed, the Alpha Jet pilot reported visual with the P68 with 1.5nm separation, however the rate of turn and the speed of the aircraft meant that the 2 aircraft passed within 0.1nm and indicated 200ft separation.

The aspect of the 2 aircraft closing, combined with the lack of TAS indication, meant that the Alpha Jet crew were only able to visually acquire the P68 as they commenced their right turn, the same stage as the P68 crew became visual with them. With each aircraft receiving a TS and a BS respectively, responsibility for separation from other aircraft lay with the pilots.

### **UKAB Secretariat**

The Alpha Jet and P68 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>2</sup>. If the incident geometry is considered as head-on or nearly so then both pilots were required to turn to the right<sup>3</sup>.

## **Comments**

### **HQ Air Command**

This incident took place in the busy Class G airspace between Oxford/Kidlington and RAF Benson. Of the available barriers to MAC, it appears that both the ATS and lookout barriers were at least partially effective, whilst the electronic conspicuity barrier was ineffective. Given that the TAS fitted to the Alpha-Jet had apparently been functioning satisfactorily up to this point in the sortie, and that the P68 was clearly transponding, it is uncertain why the presence of the P68 was not displayed on the TAS of the Alpha-Jet. That said, airborne conflict alerting systems should never be considered to be 100% effective and so maximum use should be made of the other available barriers.

<sup>1</sup> A screen controller is utilised during the later stages of training, intervening only if safety may be compromised.

<sup>2</sup> SERA.3205 Proximity.

<sup>3</sup> SERA.3210 Right-of-way (c)(1) Approaching head-on.

The Alpha-Jet crew had selected a Traffic Service, which appears to be appropriate to the prevailing weather conditions; TI on the P68 was issued quite late (at a range of 3nm) which left the crew little time to either become visual with the contact or to take action on the information, particularly when one considers that the crew were conducting checks for the impending approach. However, the pilot of the Alpha-Jet did agree to take a turn against the traffic which ultimately increased the lateral separation. There is no implication in the controllers request for the pilot to take the turn that the pilot will be visual with the traffic if he/she agrees to the turn; given the cockpit workload in the Alpha-Jet at the time it may have been more prudent to request a climbing turn to increase both lateral and vertical separation (the P68's altitude was known), irrespective of the potential impact on the subsequent approach. Had the P68 been slightly to the right of the Alpha-Jet's nose (there will always be a degree of uncertainty in the position of a radar return) then the turn may have actually increased the risk of collision.

Lookout in front and below an Alpha-Jet, particularly at short range, is impeded by the coaming and nose of the aircraft – it was the initiation of the turn that not only permitted the pilot of the Alpha-Jet to see the P68 but also highlighted the presence of the Alpha-Jet to the P-68's pilot who, on seeing the manoeuvring of the Alpha-Jet, considered that no further avoiding action on his/her part was necessary.

This incident once again highlights the importance of a 'layered defence' to the risk of MAC and that constant endeavour in maximising the effectiveness of each barrier is essential in order to mitigate inherent weaknesses in them all.

## Summary

An Airprox was reported when an Alpha Jet and a P68 flew into proximity at 1400 on Tuesday 29<sup>th</sup> November 2016. Both pilots were operating under VFR in VMC, the Alpha Jet pilot in receipt of a Traffic Service from Benson Approach and the P68 pilot in receipt of a Basic Service from Oxford.

## **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.

The Board began by noting that the Military ATM report contained possible errors regarding the time stamps for the radar and voice transcript recordings. A military Board member explained that due to the different sources, the voice transcript is derived from the operating unit whilst the radar recordings are derived from Swanwick; there can sometimes be a differential of up to one minute between the two. Members opined that this may explain why the TI passed to the Alpha Jet pilot on the P68 by the Benson controllers appeared to be at 5 miles separation on the radar picture graphic at the 13:59:32 timestamp but was reported as 3 miles separation in the transcript at that time.

The Board started their discussions by looking at the actions of the Alpha Jet pilot. Members debated at length whether the Alpha Jet pilot had received the TI on the P68 early enough to assimilate the information and formulate a course of action to deconflict from the other aircraft. Acknowledging that the pilot was carrying out checks, coupled with his TAS not indicating any contacts, some members wondered whether the Alpha Jet pilot had been lulled into possible over-reliance on ATC which may have resulted in him not reacting quickly enough on assimilating the TI. He had been given the information at 3nm, about 40secs before CPA, and some members opined that the Alpha Jet pilot had had sufficient time to adjust either his track or altitude in response. Other members wondered if the pilot had understood his collision avoidance responsibilities within a Traffic Service, and was instead relying on ATC to provide deconfliction as they marshalled him for the radar approach. Members were perplexed as to why the Alpha Jet's TAS had not alerted on the P68's SSR and some members wondered if aerial blanking may have been an issue. Whatever was the cause, it was a salutary reminder that electronic conspicuity systems have their limitations and should not be considered a reliable substitute for robust lookout or acting on information from ATC when available.

The Board then looked at the actions of the P68 pilot. They noted that he had reported that he was under a Traffic Service from Oxford but had actually requested and received a Basic Service; members opined that this was probably not the best service to have requested due to the nature of the aircraft task. As a result, being under only a Basic Service meant that the P68 pilot did not receive any TI on the Alpha Jet. Noting the Alpha Jet's small frontal cross-section and relatively high speed, members were not surprised that, without any cues from other sensors, it had not been seen by the P68 pilot until at or near to CPA

The Board then considered the cause and risk of the incident. Members quickly agreed that although the Alpha Jet pilot was undoubtedly focused on conducting internal cockpit checks and positioning for the radar approach, he had been provided with sufficient TI with which to take action to avoid the P68 but had continued to fly into conflict. Turning to the risk, members agreed that safety had been much reduced below the norm and that it had only been the fortuitous turn onto base leg that had prevented the risk of collision; accordingly, the Board assessed the risk as Category B.

### **PART C: ASSESSMENT OF CAUSE, RISK AND SAFETY BARRIERS**

Cause: The Alpha Jet pilot flew into conflict with the P68 despite Traffic Information.

Degree of Risk: B.

Safety Barrier Assessment<sup>4</sup>:

The Board decided that the following key safety barriers were contributory in this Airprox:

**Flight Crew Compliance with ATC Instructions** was considered to be **partially effective** because although the Alpha Jet was passed TI on the P68 he did not utilise the information sufficiently to deconflict himself from the P68.

**Onboard Warning/ Collision Avoidance Equipment** was considered to be **ineffective** because although the Alpha Jet had a TAS that had been functioning previously, on this occasion it failed to alert the Alpha Jet pilot to the conflicting traffic.

**See and Avoid** was considered to be only **partially effective** because neither pilot effectively saw the other aircraft until the Alpha Jet had turned onto base leg, away from the conflict.

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<sup>4</sup> 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 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). 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 Unassessable/Inapplicable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident. The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).

**Airprox Barrier Assessment: 2016256**

Outside Controlled Airspace

