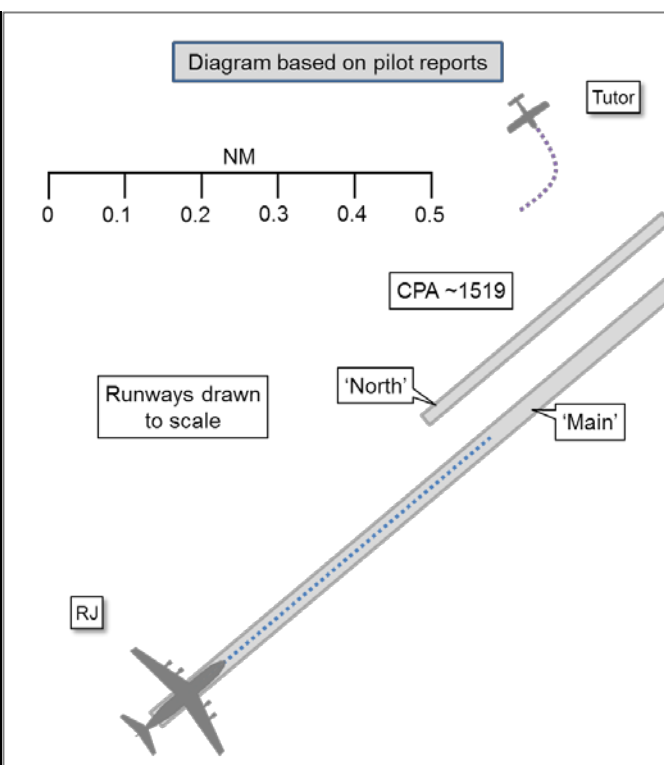


**AIRPROX REPORT No 2019181**

Date: 04 Jul 2019 Time: 1519Z Position: 5109N 00145W Location: MOD Boscombe Down

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

Recorded	Aircraft 1	Aircraft 2
Aircraft	Avro RJ	Grob Tutor
Operator	MoD ATEC	HQ Air (Trg)
Airspace	Boscombe ATZ	Boscombe ATZ
Class	G	G
Rules	VFR	VFR
Service	ACS	Traffic
Provider	Boscombe Tower	Boscombe Director
Altitude/FL	NK	NK
Transponder	A, C, S	A, C, S
<b>Reported</b>		
Colours	White, blue	White
Lighting	NK	NK
Conditions	VMC	VMC
Visibility	8km	NK
Altitude/FL	1000ft	NK
Altimeter	QFE (1013hPa)	QFE (NK hPa)
Heading	052°	230°
Speed	160kt	80kt
ACAS/TAS	TCAS II	TAS
Alert	RA	None
<b>Separation</b>		
Reported	~500ft V/~1000ft H	NK
Recorded	NK	



**THE AVRO RJ70 PILOT** reports that he was the Captain and PF in the left-hand seat. During an overshoot from a radar approach to RW05, having just changed radio frequency from Talkdown to Director, at about 800ft they received a [TCAS] TA of traffic in the left 11 o'clock, 500ft below. He continued the overshoot climb and 5secs later the [TCAS] indication changed to a Climb RA, which he followed. During the manoeuvre he saw a Grob Tutor aircraft visually in the 11 o'clock flying a reciprocal track but much closer to them than the normal downwind position. The event was reported to ATC once the RA had ceased. The RJ pilot noted that the cockpit environment was busy during the overshoot for a further radar approach.

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

**THE TUTOR EXAMINER** reports that, three weeks after the fact, he was made aware that an RJ70 had filed an Airprox report. At the time of the alleged incident he was conducting a CFS Standardisation sortie on an AEF Staff Pilot, the 3<sup>rd</sup> such sortie of the day. Having completed the GH serials in the local area, they had recovered to Boscombe Down to conduct visual circuits. At the time, he was aware of the RJ70 in the Boscombe Down instrument pattern. During the circuits they completed 2 normal circuits at 800ft QFE and a low-level circuit at 500ft QFE. Normally, Tutor aircraft conduct visual circuits to the Northern RWY at Boscombe Down by default. This moves the downwind leg further north, away from the main runway, reducing the risk of conflict between different types. However, circuits to the Main runway can be approved by ATC upon request, which would move the downwind leg back towards the normal Main runway spacing. On this occasion, from what he could recall, circuits to both RW05 North and RW05 Main were conducted. At no time did the aircraft deviate from standard Tutor visual circuit heights or spacing for the two runways in use. Aware of the RJ70's presence in the instrument pattern, he was in visual contact with that aircraft during its final approach and overshoot, and at no point was he concerned that separation between the two aircraft had become reduced to the point of an Airprox.

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

**THE AEF STAFF PILOT** reports that the CFS Examiner was a former commanding officer of the Boscombe based UAS and, as such, had extensive experience of MOD Boscombe Down. He noted that the Tutor was at the correct height and correct spacing downwind for all circuits, both to the Main and to the North runways.

**THE BOSCOMBE TOWER CONTROLLER** reports that the RJ was being fed-in for a PAR. The liaison call from Director reported the RJ as a low approach for further [radar approach]. The Tutor and another aircraft joined northside at about the same time, the other aircraft for north point and the Tutor for a standard Tutor circuit. Both aircraft were informed of the radar traffic. The Tutor pilot elected to complete a full Tutor circuit via Bulford and reported extending slightly for spacing against the RJ. From the controller's point of view the Tutor pilot appeared to fly a standard circuit which appeared to be no different than normal, apart from the slight extension. The Tutor pilot called [what was assumed to be] downwind but was unreadable. He was instructed to position for the north [runway] due a Tutor departing from the main. In the controller's opinion no confliction existed.

**THE BOSCOMBE SUPERVISOR** reports that he did not witness the event due to resolving a possible drone sighting which was reported in the approach lane and came close to the same aircraft on an earlier approach.

## Factual Background

The weather at Boscombe was recorded as follows:

EGDM 041520Z 29005KT CAVOK 25/11 Q1023 NOSIG RMK BLU BLU

## Analysis and Investigation

### Military ATM

An Airprox occurred on 4 Jul 19 at approximately 1520 UTC, in the Boscombe Down visual circuit between an RJ70 and a Tutor. The RJ was receiving a Traffic Service from Boscombe Talkdown, the Tutor was receiving an Aerodrome Control Service from Boscombe Tower.

Both aircraft were operating at an altitude that was below the base of area radar cover and the airfield radar at Boscombe is not recorded. Based on the reported information and recorded R/T transmissions, the Boscombe Tower Controller informed the Tutor about the RJ70 shortly after the Tutor joined the visual circuit and issued an appropriate clearance to the RJ70 when requested by the Boscombe Talkdown Controller. Therefore, the Boscombe Tower Controller discharged their duties appropriately. The Tutor reported being visual with the RJ70 and extended their circuit to achieve spacing on the RJ70. The RJ70 pilot estimated the separation between the aircraft to be 500ft vertical and 1000ft lateral.

### UKAB Secretariat

The RJ and Tutor 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>1</sup>. 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<sup>2</sup>.

UKAB TCAS modelling indicated that the RJ TCAS would generate an RA at a separation of about 0.8-1nm. An RA will be generated if the TCAS algorithms calculate that the conflicting aircraft will pass within specified vertical and horizontal distances within a specified time, the distances and time

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

<sup>2</sup> MAA RA 2307 paragraph 15.

increasing with each aircraft's increasing height/altitude. In this case, a 'Climb' RA would be generated if the aircraft instantaneous vectors (calculated at 1Hz) were calculated to pass within 300ft vertically and 0.2nm horizontally within 15 secs.

## Comments

### HQ Air Command

Due to the nature of each sortie, the ability of each aircraft to plan to avoid in advance was not possible. The Tutor pilot was informed of the RJ70 by the tower controller, became visual with it, and extended his circuit slightly for spacing. The RJ70 pilot was first aware of the Tutor when it caused a TCAS TA and became visual with it after an RA. Based upon the narrative of the Tutor aircrew and tower controller, it would appear likely that the Tutor was positioned correctly downwind, although one cannot be completely certain due to the lack of radar evidence. Operating at Boscombe Down can present unique challenges due to the diverse range of aircraft types and operations, combined with surrounding airspace constraints. Due to the lack of dead side at Boscombe Down, pilots equipped with TCAS and making instrument approaches when the circuit is busy with VFR traffic should consider it possible, if not likely, that TCAS alerts will be generated.

## Summary

An Airprox was reported when a Avro RJ70 and a Grob Tutor flew into proximity in the Boscombe Down overhead at about 1519Z on Thursday 4<sup>th</sup> July 2019. Both pilots were operating under VFR in VMC, the RJ70 pilot in receipt of a Traffic Service from Boscombe Director and the Tutor pilot in receipt of a military Aerodrome Control Service from Boscombe Tower.

## **PART B: SUMMARY OF THE BOARD'S DISCUSSIONS**

Information available consisted of reports from both pilots, radar photographs/video recordings (which did not show the aircraft at the Airprox position), 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 members discussed the pilot and controller reports and agreed that it appeared the Tutor was at or about the correct spacing in the circuit. Members also noted that the geometry of the Tutor pilot's normal join from the north was such that his flight vector could intersect the flight vector of an aircraft climbing in a go-around. TCAS modelling had indicated that a converging course could generate a TCAS RA at a range of about 0.8-1.0nm and the Board felt that this was the most likely cause of the RJ TCAS TA and RA (**CF2, CF3**), as the Tutor turned downwind. As such, members considered this a TCAS sighting report (**CF1**). This was not to belittle the RJ pilot's concern at his perceived proximity to the Tutor (**CF5**), but rather to highlight that TCAS mechanisation is not designed with VFR interactions in mind and that it can, on occasion, alert inaptly (**CF4**) when safe VFR separation is already being maintained.

The Board therefore considered that normal procedures, safety standards and parameters pertained.

**PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK**Contributory Factors:

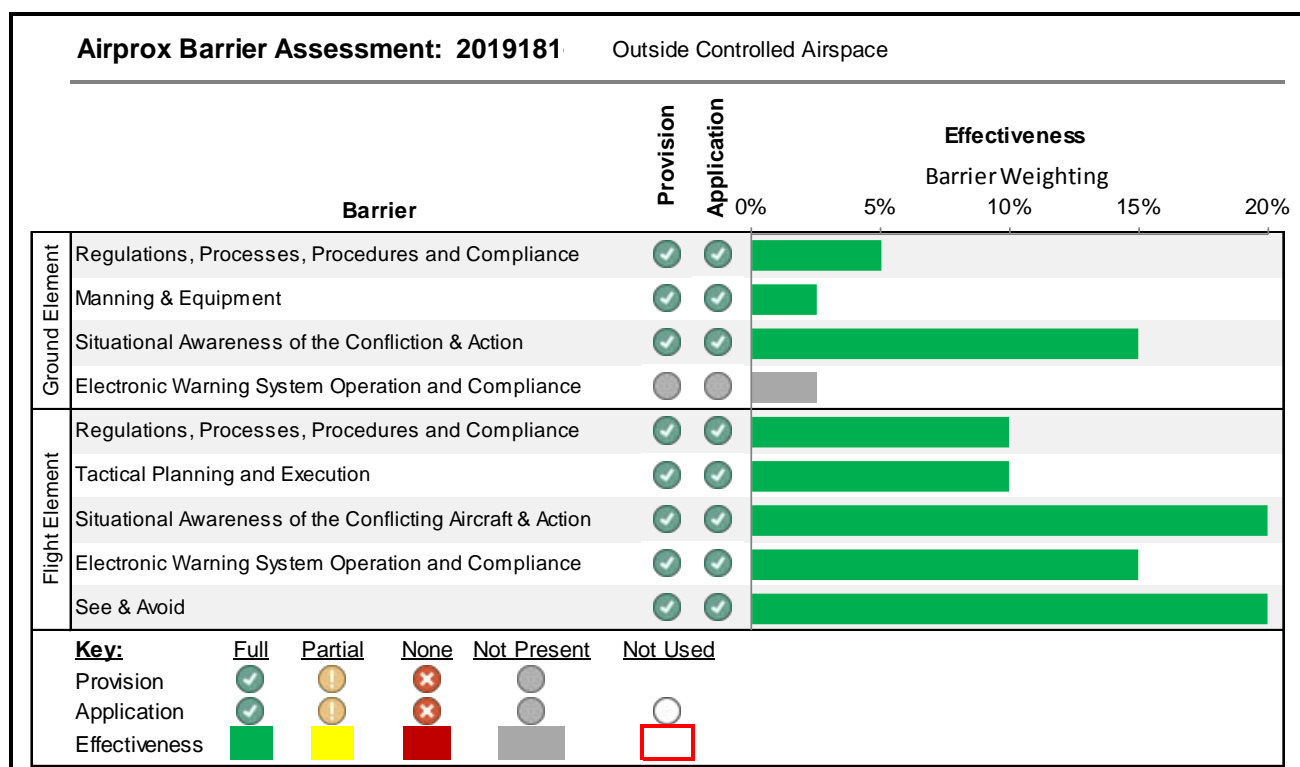
2019181			
CF	Factor	Description	Amplification
<b>Flight Elements</b>			
<b>• Situational Awareness of the Conflicting Aircraft and Action</b>			
1	Human Factors	• Interpretation of Automation or Flight Deck Information	CWS sighting report
<b>• Electronic Warning System Operation and Compliance</b>			
2	Contextual	• ACAS/TCAS RA	TCAS RA event
3	Contextual	• ACAS/TCAS TA	TCAS TA / CWS indication
4	Technical	• ACAS/TCAS Nuisance Alarm	CWS alerted inaptly for VFR flight
<b>• See and Avoid</b>			
5	Human Factors	• Perception of Visual Information	Pilot was concerned by the proximity of the other aircraft

Degree of Risk: E.

Recommendation: Nil.

Safety Barrier Assessment<sup>3</sup>

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



<sup>3</sup> The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).