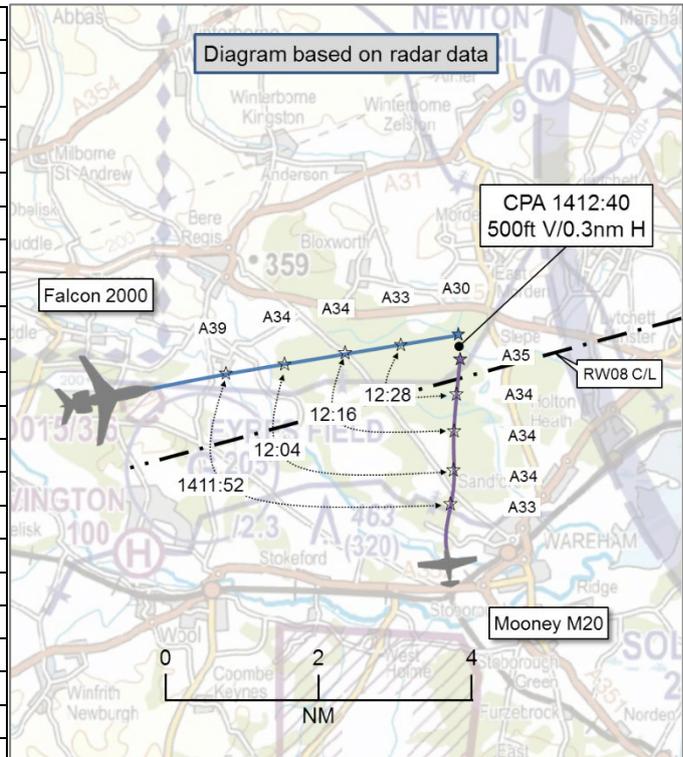


AIRPROX REPORT No 2019036

Date: 25 Feb 2019 Time: 1413Z Position: 5044N 00208W Location: 11nm WSW Bournemouth

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Falcon 2000	Mooney M20
Operator	Civ FW	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	VFR
Service	Traffic	Listening Out
Provider	Bournemouth	Solent Radar
Altitude/FL	3600ft	4100ft
Transponder	A, C, S	A, C, S
Reported		
Colours	White, gold	Grey
Lighting	Strobe, nav	NK
Conditions	VMC	VMC
Visibility	>10km	'CAVOK'
Altitude/FL	4000ft	4000ft
Altimeter	NK (1033hPa)	QNH (1035hPa)
Heading	075°	NK
Speed	240kt	145kt
ACAS/TAS	TCAS II	TAS
Alert	RA	'Alert'
Separation		
Reported	'slightly above' V NK H	500ft V/0m H
Recorded	500ft V/0.3nm H	



THE FALCON PILOT reports that they were descending towards the BIA NDB when the controller warned of traffic closing from the right, which was confirmed on TCAS. The controller called the other traffic and warned it of 'Jet in 11 o'clock left/right' but had no response. The Falcon pilot monitored the closing traffic; the controller continued to warn him of its proximity and cleared them to continue descent to 2500ft to alleviate the problem. Whilst resetting for further descent, a TCAS RA occurred which was followed until clear of conflict. The other traffic was seen close in by the Training Captain (RHS) whilst the RA descent was in progress. An Airprox was called by the Training Captain, followed by a follow up call to ATC when on the ground.

He assessed the risk of collision as 'Medium'.

THE MOONEY PILOT reports conducting a day VFR flight, initially routing west along the coast and around the Solent CTA. On departure the radio was tuned to Solent Radar for a listening watch. No service was sought and the aircraft squawked 7000 with Mode S. The flight was outside CAS and remained below the Solent CTA until clear of the airspace, climbing to a final cruising altitude of 4000ft on the local QNH. During the flight the pilot used a SkyDemon equipped tablet connected to a PilotAware traffic receiver which presented graphical traffic information onto a moving map display. Whilst to the west of the Bournemouth CTR the tablet alerted to another aircraft approximately 3nm to the west. The tablet reported the other aircraft as being a few hundred feet below, flying straight and descending. The other aircraft appeared to be tracking the descent into Bournemouth on the ILS. The pilot noted that it was probable that PilotAware detected the other aircraft earlier than identified, but the tablet did not provide audible warnings so alerts are dependent upon the pilot seeing them on the screen. The other aircraft was then visually identified and the Mooney pilot confirmed that it was maintaining a straight descending course, and that the flight paths would horizontally overlap. It was judged that there was sufficient vertical separation because the other aircraft was already below the

Mooney's level and continuing to descend. Having visually identified the other aircraft the Mooney pilot considered three options for taking avoiding action and maintaining separation from wake turbulence:

1. Commence a right turn. This was discounted as the other aircraft would have been approaching at 150kt or greater and such a deviation would continue to put the two aircraft in conflict until the Mooney had turned through more than 90°. Operating a low-wing aircraft would have also removed the other aircraft from sight preventing any further corrective action being taken, and put the Mooney into CAS without clearance. Whilst the latter was a decision-making factor, it would not have prohibited a turn to the right if the risk of collision was greater.
2. Commence a left turn. This would have brought the approaching aircraft closer together and reduced the vertical clearance compared to maintaining the current course and so was discounted.
3. Maintain straight and level flight. Given the aircraft was already below the Mooney's level and was continuing to descend it was decided that there was more than sufficient vertical clearance to avoid a collision or wake turbulence.

In summary; it was assessed that the risk of collision was very low as the other aircraft had been visually identified and was at a lower level and descending to provide a safe vertical separation. The other aircraft passed about 500ft below.

He assessed the risk of collision as 'Low'.

THE BOURNEMOUTH RADAR APPROACH CONTROLLER reports that the Falcon was inbound to Bournemouth, initially outside CAS to the west of Bournemouth at FL105. He was given a Traffic Service and initially given a descent to altitude 5000ft as the controller had seen other aircraft at around 3000ft that might affect him, the Mooney being one of those aircraft. The Falcon pilot elected to make a self-positioned straight-in approach for RW08. The controller passed Traffic Information to the Falcon pilot concerning the Mooney to the southeast of him, that the controller considered may come into conflict. The Mooney pilot was not on frequency (wearing a 7000 squawk) and was observed to pass around the south of the Bournemouth zone towards the Wareham area going north at around 3600ft. The controller then made a blind call to the Mooney pilot advising him of conflicting jet traffic with its level and direction and advising it was about to pass ahead, left to right. The aircraft were about 3 miles apart at that point, on conflicting headings. The controller then advised the Falcon pilot about the traffic and that at his discretion he may wish to descend to altitude 2500ft to avoid it. The Mooney then passed very close behind the Falcon as it was in the descent. The controller thought that there may have been around 400ft vertical separation as the blips almost merged. The Falcon pilot advised him that he was responding to a TCAS RA and the radar also showed a TCAS RA alert during the event.

Factual Background

The weather at Bournemouth was recorded as follows:

METAR EGHM 251350Z VRB04KT CAVOK 16/M01 Q1035=

Analysis and Investigation

CAA ATSI

ATSI had access to the Area Radar replay, the Bournemouth R/T recordings, reports from the pilots of both aircraft and from the Bournemouth Radar Controller. The screenshots in this report are taken from the Area Radar replay and are not necessarily indicative of what the Bournemouth Radar Controller could see on the Bournemouth radar display at the time of the event.

An Airprox was reported by the Falcon 2000 pilot when it came into proximity with a Mooney M20 in Class G airspace, while the Falcon pilot was self-positioning for an ILS to RW08 at Bournemouth

Airport. The Falcon was descending inbound to Bournemouth from the west, with the pilot in receipt of a Traffic Service from Bournemouth Radar. The Mooney was on a VFR flight routing west of Bournemouth Controlled Airspace and tracking south to north at the time of the Airprox. The pilot was listening to the Solent Radar frequency but was not in receipt of an ATC service.

At 1409:00, the Bournemouth Radar Controller had established that the Falcon pilot wished to self-position for a straight-in approach for the ILS RW08 at Bournemouth. A Traffic Service was agreed. The controller issued an instruction for the pilot to descend to altitude 5000ft, QNH 1035, and self-position for the ILS. At 1410:20, the controller passed Traffic Information on an unrelated contact and instructed the Falcon pilot to descend to altitude 4000ft.

At 1411:00 (Figure 1), the controller passed Traffic Information to the Falcon pilot on the Mooney, advising them that there was traffic that may possibly cross their track, in their one o'clock, range of 5 miles, at 3600ft, northbound and fairly slow moving. The pilot responded that they had the traffic on TCAS and were looking.

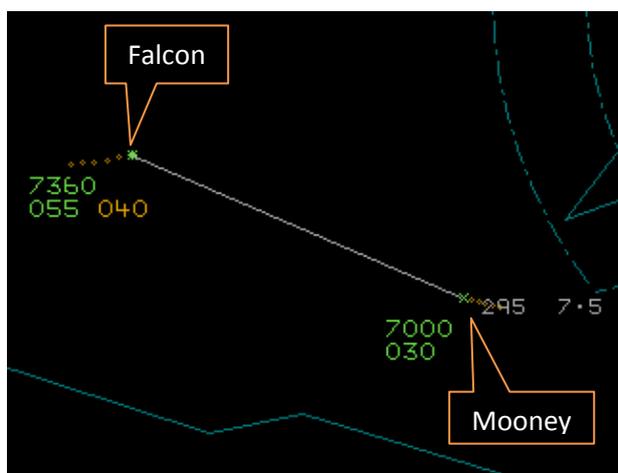


Figure 1 - 1411:00

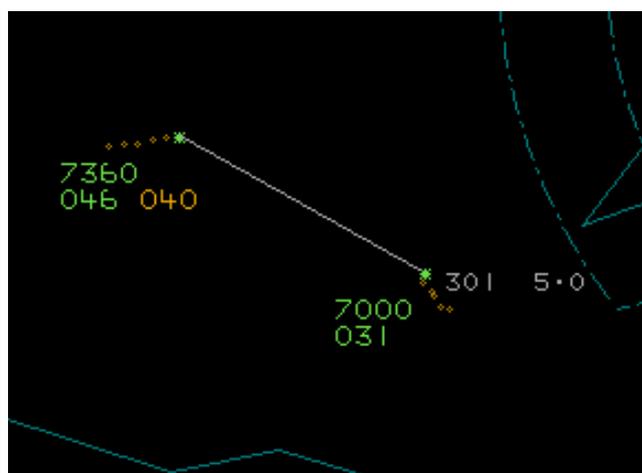


Figure 2 - 1411:30

At 1411:30 (Figure 2), the controller made a blind R/T broadcast addressed to the callsign of the Mooney, warning the pilot that there was jet traffic in their 10 o'clock, 3 miles, 4900ft, routing straight into Bournemouth RW08 from the west, going to descend through their level and cross ahead. The controller then repeated that there was jet traffic to cross ahead left to right. There was no response.

At 1412:00 (Figure 3), the controller updated the Traffic Information to the Falcon pilot, advising him that the traffic was now 1 o'clock, 2 miles, 3900ft northbound. The pilot responded with "Roger". The controller then advised the pilot that if they wished to descend further they could descend to altitude 2500ft, at their discretion, and that the traffic was at 4000ft. The Falcon pilot responded that he would descend to altitude 2500ft.

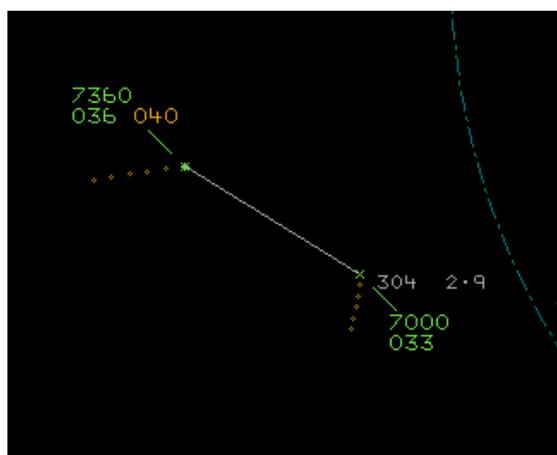


Figure 3 - 1412:00

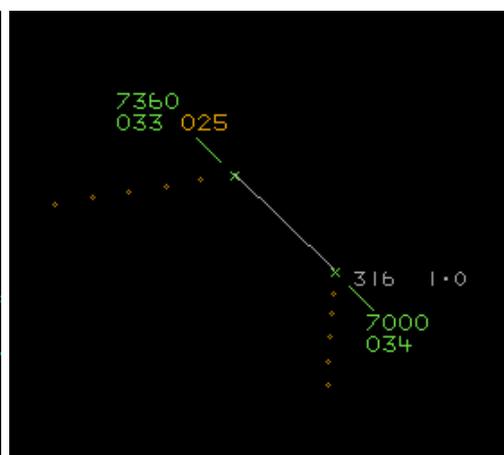


Figure 4 - 1412:30

At 1412:30 (Figure 4), the Falcon pilot advised the controller that they had received a TCAS RA. The controller responded by updating the Traffic Information to 1 o'clock, half a mile, 4000ft. The pilot responded that they were visual and following the TCAS RA.

CPA occurred at 1412:39 (Figure 5), with the aircraft separated by 0.3nm laterally and 500ft vertically.

CAP 493 (Manual of Air Traffic Services Part 1) states as follows:

'3. Traffic Service

3A. Definition

3A.1 Traffic Service is a surveillance-based type of UK FIS where, in addition to the provisions of Basic Service, the controller provides specific surveillance-derived traffic information to assist the pilot in avoiding other traffic. Controllers may provide headings and/or levels for the purposes of positioning and/or sequencing; however, the controller is not required to achieve deconfliction minima, and the pilot remains responsible for collision avoidance.

3E. Traffic Information

3E.1 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.

Note 1: Traffic is normally considered to be relevant when, in the judgement of the controller, the conflicting aircraft's observed trajectory indicates that it will pass within 3 NM and, where level information is available, 3,000 ft 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 5 NM, in order to help the pilot meet his collision avoidance responsibilities and to allow time for an update in traffic information if considered necessary.

Note 2: Good judgement is essential to ensure that traffic information is relevant and timely. Controllers should take account of the aircraft's relative speeds, lateral and vertical closure rates, and track histories.

Note 3: Distances displayed on ATS surveillance systems can be at variance to the actual distances between aircraft due to limitations inherent to surveillance systems. Some aircraft may not be displayed at all.'

The Controller passed timely and accurate Traffic Information on the Mooney to the Falcon pilot, updated the Traffic Information as the situation progressed and offered the pilot further descent in an attempt to assist them in resolving the confliction. The Controller also attempted to contact the Mooney pilot to warn them of the impending confliction. The Controller discharged their responsibilities in the provision of a Traffic Service to the Falcon Pilot and should be commended for their use of defensive controlling techniques. In Class G Airspace under a Traffic Service the pilot remains responsible for collision avoidance.

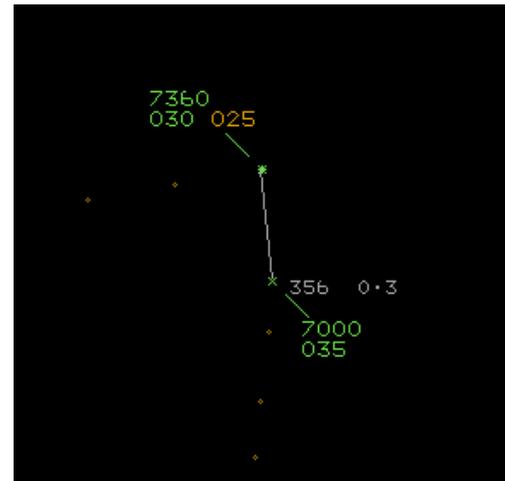


Figure 5 - 1412:39

Bournemouth Full Investigation report

The investigation concluded the following:

Causal Factor

- The pilot of [the Mooney] did not monitor the Bournemouth radar frequency despite flying in close proximity to the Solent CTA (class D airspace designated to the Bournemouth). The controller was unable therefore to provide the pilot with the traffic information which would have prevented the AIRPROX occurring.

Contributory Factor

- The pilot of [the Mooney] flew through the extended centreline of runway 08 at an altitude and range which would bring the aircraft into conflict with any aircraft which was establishing onto the ILS or NDB approach from outside controlled airspace.

Mitigating Actions

- The controller passed appropriate traffic information to the crew of [the Falcon].

UKAB Secretariat

The Falcon and Mooney pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard¹. If the incident geometry is considered as converging then the Falcon pilot was required to give way to the Mooney².

Summary

An Airprox was reported when a Falcon 2000 and a Mooney M20 flew into proximity near Bournemouth airport at 1413Z on Monday 25th February 2019. Both pilots were in VMC, the Falcon pilot operating under IFR in receipt of a Traffic Service from Bournemouth Approach and the Mooney pilot operating under VFR, listening out on the Solent Radar frequency.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, a report from the air traffic controller involved and a report from the appropriate operating authority. 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 Mooney pilot's actions and noted that he was transiting above the Bournemouth CTR and past the Solent CTA, remaining outside CAS in Class G airspace. Although he reported listening out on the Solent frequency, he did not have the Solent 'listening squawk' selected and this meant that the Bournemouth controller was denied valuable information as to how he could be contacted (**CF2**). Members also commented that even though he was above the Bournemouth CTR and adjacent to the Solent CTA, the Mooney pilot would have been better placed by listening out on the Bournemouth frequency with the Bournemouth listening squawk selected. Notwithstanding, the Mooney pilot did receive Traffic Information from his TAS, had seen the Falcon, and had assessed that there was sufficient vertical separation as to fulfil his responsibility to avoid collision or flight in such proximity as to create a collision hazard. Members noted that the Mooney pilot had considered various courses of action and that his last option could have included a climb in order to increase vertical separation.

¹ SERA.3205 Proximity.

² SERA.3210 Right-of-way (c)(2) Converging.

The Board went on to discuss the responsibilities of each pilot and members agreed that, with the Mooney converging from the right, it was for the Falcon pilot to give way and for the Mooney pilot to maintain course and speed. Members also agreed that the Falcon pilot had not done so (**CF1**) but had closed to the point that a TCAS RA was generated (**CF4**). The Falcon pilot was given Traffic Information at 5nm and 1nm and had heard the Traffic Information passed in the blind to the Mooney pilot, all of which the Board surmised was sufficient information for him to take action (**CF3**). Some members wondered whether there had been an assumption that the Falcon, operating under IFR and self-positioning for the ILS, had 'right of way' in some way. As it was, the Falcon pilot saw the Mooney at a late stage, during the TCAS RA (**CF5**).

Members then discussed the controller's actions, noting that the pilot was being provided with a Traffic Service in Class G airspace. The controller had passed sufficient Traffic Information to the Falcon pilot to allow him to 'meet his collision avoidance responsibilities' although the controller had not asked the Falcon pilot whether he was visual with the Mooney or was content to continue. It was also noted that the lateral separation at CPA was 0.3nm and that there was no change in the relative bearing reported by the controller; members wondered whether the controller could therefore more accurately have described the Mooney as 'converging' rather than crossing, thereby further assisting the Falcon pilot to make a decision to give way. Additionally, the controller's blind call to the Mooney pilot, that traffic in the left 10 o'clock would cross ahead left to right, may have helped to form an incorrect mindset in the Falcon pilot that he was 'ahead' and that he did not need to give way to the Mooney, especially as he was not visual with the Mooney at that time.

The Board did not agree with the Bournemouth Investigation report Contributory factor: Although it was a statement of fact that the Mooney pilot had been in the vicinity of the extended ILS glidepath, in this instance the Falcon pilot had levelled at 3400ft and, more importantly, it was for pilots to give way to traffic converging from the right, whether or not they were operating under IFR or flying a procedure, unless they were in 'the final stages of an approach to land'. The Board did not consider 11nm to touchdown as 'the final stages of an approach to land'.

Ultimately, the Falcon pilot had followed the TCAS RA and the Mooney pilot had been visual with the converging Falcon and assessed that vertical separation was such that avoiding action was not required; it was agreed that risk of collision had been averted. Members commented that much could have been done by all involved to resolve this situation before it occurred.

PART C: ASSESSMENT OF CAUSE AND RISK

Contributory Factors:

CF	Factor	Description	Amplification
	Flight Elements		
	• Regulations, Processes, Procedures and Compliance		
1	Human Factors	• Flight Crew ATM Procedure Deviation	Regulations/procedures not complied with
	• Tactical Planning and Execution		
2	Human Factors	• Transponder Selection and Usage	Not correctly selected
	• Situational Awareness of the Conflicting Aircraft and Action		
3	Human Factors	• Lack of Action	Pilot flew into conflict despite Situational Awareness
	• Electronic Warning System Operation and Compliance		
4	Contextual	• ACAS/TCAS RA	TCAS RA event
	• See and Avoid		
5	Human Factors	• Monitoring of Other Aircraft	Late-sighting by one or both pilots

Degree of Risk: C.

Recommendation: Nil.

Safety Barrier Assessment³

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

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **ineffective** because the Falcon pilot did not give way to the Mooney, converging on his right.

Tactical Planning and Execution was assessed as **partially effective** because the Mooney pilot was not in communication with Bournemouth and had not selected an appropriate listening squawk.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because the Falcon pilot continued to the point at which he was presented with a TCAS RA, despite being in possession of sufficient SA to enable him to give way to the Mooney.

Airprox Barrier Assessment: 2019036		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 Confliction & 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	✓	✓					
Key:			Full	Partial	None	Not Present	Not Used	
Provision	✓	⚠	✗	○	○			
Application	✓	⚠	✗	○	○			
Effectiveness								

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