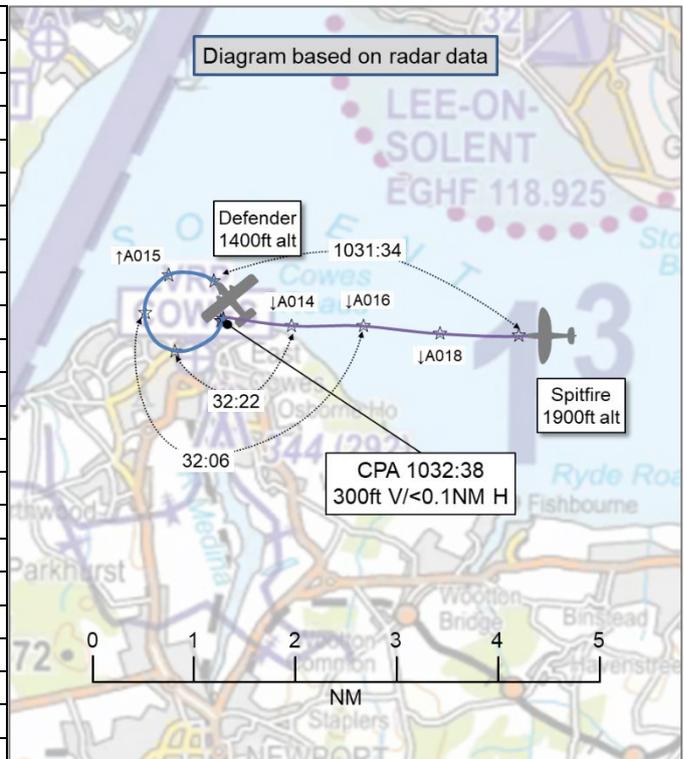


AIRPROX REPORT No 2021132

Date: 08 Jul 2021 Time: 1033Z Position: 5046N 00117W Location: Cowes

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Defender	Spitfire
Operator	HQ Air (Ops)	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	AFIS	None
Provider	Lee Information	N/A
Altitude/FL	1500ft	1200ft
Transponder	A, C, S	A, C, S
Reported		
Colours	Grey	Camouflage
Lighting	Strobes, anti-col	None
Conditions	VMC	VMC
Visibility	NR	>10km
Altitude/FL	1300ft	1000ft
Altimeter	NK (NR hPa)	QNH (NR hPa)
Heading	NR	280°
Speed	NR	180kt
ACAS/TAS	TAS	Not fitted
Alert	TA	N/A
Separation at CPA		
Reported	300ft V/0m H	200ft V/0m H
Recorded	300ft V/<0.1NM H	



THE DEFENDER PILOT reports that, on visual approach to Daedalus Airfield [Lee-on-Solent], there was a high amount of GA traffic in the RH circuit to RW23. Due to this, they elected to hold over VRP Cowes in order to await the circuit becoming less congested, which was reported to Lee-on-Solent Radio. Whilst conducting a routine lookout, a 2-ship formation of low-winged aircraft was spotted, later confirmed to be GA Spitfires departing Daedalus. At the time of the event, they believed that the traffic might be converging and they received a TAS TA. As a result, they began a climb and observed the formation passing underneath and behind them. Upon landing, they contacted the Spitfire formation lead pilot who confirmed that they could also see [the Defender] throughout the event. All [pilots] were visual with each other's aircraft. However, from the Defender crew's perspective, a TA is undesirable as their holding location was reported on the radio and therefore good airmanship should have resulted in greater separation, they thought.

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

THE SPITFIRE PILOT reports they were flying the lead aircraft of a pair of Spitfires from Lee-on-Solent (EGHF) on a 20min local flight, anticlockwise around the Isle of Wight. Prior to their departure, [they heard] the 'Islander' pilot transmit their position, orbiting over Cowes, while waiting for circuit traffic to land. The formation departed the airfield as briefed and, once outside the ATZ, the pilot of the lead aircraft called the pair over to a company frequency. They crossed the Solent while joining into close formation and conducted a gentle descending right-hand turn to set course along the coast of the island at 230mph. Both Spitfire pilots became visual with the Defender at a range of around 3NM and descended to 1000ft, the minimum permitted for their activity, to allow them to pass safely under it with around 200-300ft vertical separation. However, due to the Defender's orbital path, lateral separation was not possible to achieve without compromising ability to glide back to land in the event of an engine failure, or without positioning over a congested area - which is prohibited under the conditions of the [aircraft's] Permits to Fly. Furthermore, the formation lead pilot was conscious of keeping their

manoeuvring as gentle as possible with their wingman in close formation. The [lead] formation pilot was visually avoiding throughout; they considered that at no point was safety of flight compromised. No further avoiding action was required, however they recognise that more separation would have been preferable.

The pilot assessed the risk of collision as 'None'.

THE LEE-ON-SOLENT AFISO reports they have no recollection of any Airprox occurring or being mentioned that day and all flights were handled safely and appropriately. The pilot of [the Defender] was reluctant to join the circuit with other aircraft operating in it, so chose to hold outside the ATZ. An AFISO is not able to instruct them when to join downwind but did give, and subsequently updated, relevant Traffic Information in real time as per their AFISO role, including the departure of two Spitfires to the south, who were aware of the position of the Defender. [At the time] there were no concerns raised by anyone of any conflict.

Factual Background

The weather at Southampton Airport was recorded as follows:

METAR EGHI 081020Z 27003KT 9999 SCT021 SCT035 18/14 Q1020=
 METAR EGHI 081050Z 20007KT 160V240 9999 SCT020 SCT028 18/14 Q1020=

The relevant radio exchanges between the AFISO and the aircraft involved are reproduced below:

The circuit was active (RW23RH) with 2 aircraft in and 1 joining from the south when [the Defender pilot] called inbound approaching Cowes. Traffic Information was passed to [the Defender pilot] by the AFISO. 'Spitfire Formation' was on frequency but on the ground conducting power checks at this point.

1027:50 – [Defender c/s] - *"[Defender c/s] holding at Cowes initially until we are visual with circuit traffic"*

1028:05 – AFISO – *"[Defender c/s] roger we have 1 about to turn final, 1 on right base and 1 joining from the south"*

1028:15 – [Defender pilot] – *"Roger yeah we will hold at Cowes"*

Circuit traffic continued, 'Spitfire Formation' called ready for departure.

1029:15 – AFISO – *"Spitfire Formation, aircraft ahead in climb out is remaining in the circuit, RW23 Take-off at discretion, surface wind 250/11 kts"*

1029:27 – Spitfires – *"Roger, taking off"*

1030:25 – [Defender pilot] – *"[Defender c/s] we are having a hard time spotting circuit traffic, we will just sort of let your discretion go when you think is good for us to join downwind and then adjust as required"*

1030:35 – AFISO – *"Roger, there's 2 Spitfires just in the climb-out heading towards the south"*

1030:41 – [Defender pilot] – *"[Defender c/s] looking"*

1031:06 – AFISO – *"[Defender c/s], Traffic Information, we have 1 crosswind, 1 downwind and 1 base"*

1031:10 – [Defender pilot] – *"[Defender c/s]"*

1031:49 – Spitfires – *"Spitfire Formation clear of your ATZ and to company"* (changed to company frequency)

The next call from [the Defender pilot] was at 1033:47 stating they were downwind and visual with one aircraft ahead turning final and one on the runway.

Analysis and Investigation

CAA ATSI

The Defender pilot was asking too much of the Lee AFISO by asking them to tell them when to join, (which they did not). ATSU actions were correct and appropriate with good Traffic Information and good RTF.

UKAB Secretariat

At 1027:50 the pilot of the Defender was holding in the vicinity of Cowes VRP at 1300ft waiting for the amount of traffic in the circuit in Lee-on-Solent to reduce to a level at which they were happy to continue to the airfield. The Spitfire formation departed from RW23 at 1029:27 for a flight around the Isle of Wight in an anti-clockwise direction. At this time both the Defender and the Spitfire were in contact with Lee Information.

The Lee AFISO passed Traffic Information relating to the departing Spitfires to the Defender pilot at 1030:35 and this was acknowledged. The Spitfire was first detected by the NATS radars at 1031 passing altitude 1000ft and the pilot left the Lee Information frequency at 1031:49. At this point the Defender was still in the orbit in the vicinity of Cowes VRP.

The Spitfire pilot reported they had visual contact with the Defender at a range of 3NM (Figure 1) and they elected to descend to provide vertical separation. At 1032.38 (Figure 2) the Spitfire passed 300ft below the Defender with a lateral separation of less than 0.1NM.

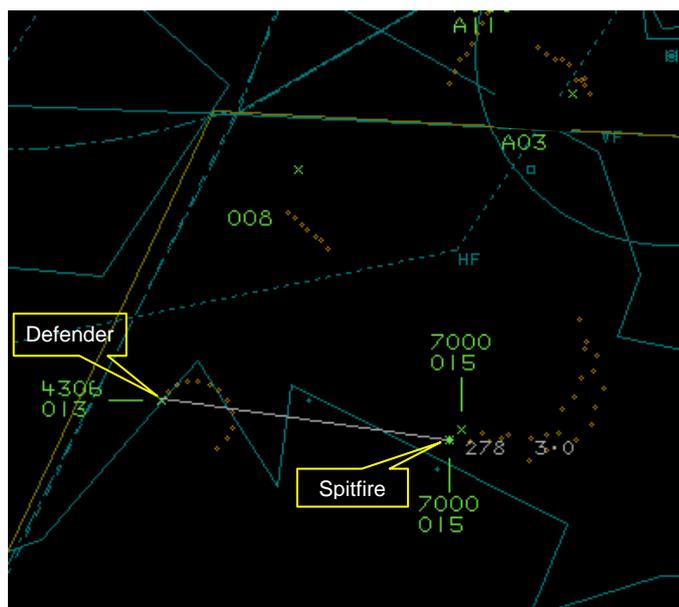


Figure 1 – 3NM separation

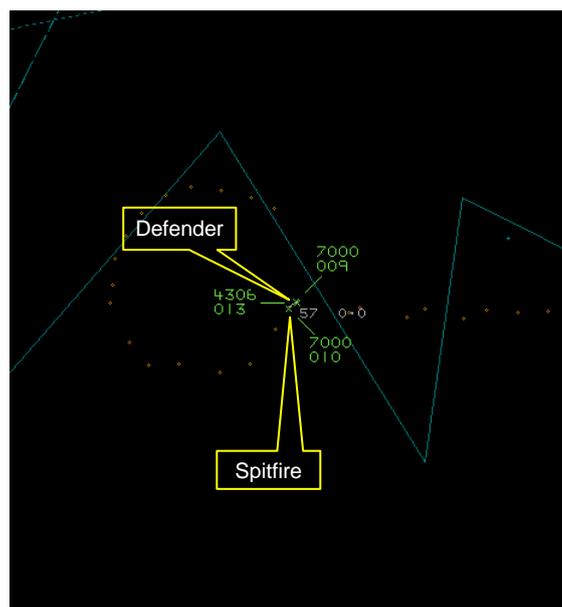


Figure 2 – Radar CPA

The Defender and Spitfire 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 If the incident geometry is considered as converging then the Defender pilot was required to give way to the Spitfire.³

¹ (UK) SERA.3205 Proximity. MAA RA 2307 paragraphs 1 and 2.

² (UK) SERA.3210 Right-of-way (c)(1) Approaching head-on. MAA RA 2307 paragraph 13.

³ (UK) SERA.3210 Right-of-way (c)(2) Converging. MAA RA 2307 paragraph 12.

Occurrence Investigation

[The Defender] took off from [departure airfield] at 0800 for a medium level transit at FL100 through airways. They conducted a descent and SRA to Middle Wallop [then a] zone transit between 2000-2500ft was conducted with Solent Radar towards Lee-on-Solent. [The Defender] captain was in contact with Solent Radar while the handling pilot established communications with Lee-on-Solent and was informed of 4 aircraft in the circuit at Lee-on-Solent. Once clear of airspace, the crew left the Solent Radar frequency, maintained contact with Lee-on-Solent, and decided to fly VFR to hold at VRP Cowes until the circuit at Lee-on-Solent was quieter. VRP Cowes below 2000ft is Class G airspace. The crew heard the pair of Spitfires starting up and taxiing over the RT and maintained their holding position at VRP Cowes. They made an RT call to inform other aircraft of their position and were visual with the pair of Spitfires taking-off. The Spitfire [pilots] made no further information calls thereafter. Coming around a turn in the hold, at approximately 1030, the crew received a TAS TA⁴ of a threat in their 3 o'clock and began to climb from their height of 1200ft. The crew became visual with the pair of Spitfires in their 3 o'clock which passed below and behind the Defender as the Defender climbed through 1500ft. The crew was unsure about the separation between the Defender and the Spitfires but was surprised to see the Spitfire formation fly so close to them, particularly as they had transmitted their holding position over the Lee-on-Solent frequency.

Once clear of Spitfires and with only 2 aircraft in the Lee-on-Solent circuit, the Defender crew proceeded towards the airfield, joining downwind for a visual recovery. After both crews had landed, the Defender captain spoke with the lead Spitfire pilot over the phone. The Spitfire pilot confirmed that they were visual with the Defender throughout.

Comments

HQ Air Command

This occurrence was subject to a Local investigation. On arrival at Lee-on-Solent, the Defender crew elected to hold at Cowes VRP to assess circuit traffic [to enable them] to integrate more safely into the circuit. The crew therefore had good situational awareness of circuit and departing traffic. They were aware of the departing Spitfires and had observed them taking off, although [were not aware of] their specific routing. On receiving the TAS TA, they responded accordingly and visually acquired the Spitfire formation flying beneath them. With the benefit of hindsight, and given the flight profile limitations faced by the Spitfires, a verbal brief on frequency of the routing by the Spitfires may have influenced the Defender crew to increase height for separation. It is worth noting that early visual acquisition by both parties allowed the situation to be monitored. The perceived severity of this incident was low.

Summary

An Airprox was reported when a Defender and a Spitfire formation flew into proximity over Cowes at 1033Z on Thursday 8th July 2021. Both pilots were operating under VFR in VMC, the Defender pilot was in receipt of an AFIS from Lee Information whilst the Spitfire pilot was not in receipt of a service.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings, a report from the AFISO 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 first considered the actions of the Spitfire formation lead pilot who had departed Lee-on-Solent for an anti-clockwise flight around the Isle of Wight. Members noted that, after becoming visual

⁴ From the Defender Aircrew Manual, the TA warning is generated (when own ac below 2000ft agl) when the "TCAS calculates that if current closing rate is maintained, separation of less than 600ft in altitude between own aircraft and intruder will occur in 20 seconds".

with the Defender, there may have been other options for the Spitfires to achieve separation and they debated whether the Spitfire pilot had considered other options to achieve this (CF1). They opined that one simple option could have been to establish a lateral separation by routing to the south of the Cowes built up area which would still have allowed them to meet the conditions of their permit to fly. There then followed a discussion regarding level of manoeuvrability of such a formation and it was stated that early, and therefore more gentle, manoeuvring would perhaps have been preferable. The Spitfire pilot had actually visually acquired the Defender early enough to be able to manoeuvre to achieve sufficient separation and, whilst this had been achieved by descending, the Board agreed with the Spitfire pilot's statement that, in hindsight, "more separation would have been preferable" (CF2, CF5).

The Board then discussed the actions of the Defender pilot and members wondered in general, what level of familiarity military pilots had with operations at civilian airfields, in particular, the varying types of service that can be provided by different air traffic service units – in this case the discussion concerned the responsibilities of an AFISO. The Lee-on-Solent AFISO had operated in accordance with their licence, which included passing relevant Traffic Information, but they had not been able to issue a joining clearance. Concerning the positioning of the hold being flown by the Defender pilot; the Board commented that, although it is not regulation, the CAA recommends that "Pilots should as far as practicable avoid direct overflight of a VRP"⁵ however, a military advisor to the Board stated military crews might not be familiar with this advice which is used to mitigate the risk of mid-air collision. Whilst holding, the Defender pilot had been given generic Traffic Information relating to the Spitfires stating that they had been routing "south" but that the Defender pilot had not been aware of their intention to route anti-clockwise around the island (CF3). Aided by their TAS (CF4) the Defender pilot had become visual with the Spitfire formation and then climbed. The Spitfire formation had passed below with a recorded separation of 300ft, resulting in the Defender pilot being concerned by their proximity (CF6).

Finally, the Board considered the risk involved in this Airprox. It was noted that the Spitfire pilot had been visual with the Defender at 3NM range and, by virtue of this early sighting, members agreed that there had been no risk of collision. The discussion then focused on whether there had been a degradation of safety (Risk Category C) or if normal safety parameters had pertained (Risk Category E); with a recorded separation of 300ft vertically coupled with the Spitfire pilot's comment stating that more separation would have been preferable, the members agreed there had been a reduction in safety and as such assigned a Risk Category C to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021132			
CF	Factor	Description	ECCAIRS Amplification	UKAB Amplification
Flight Elements				
• Tactical Planning and Execution				
1	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				
2	Human Factors	• Lack of Action	Events involving flight crew not taking any action at all when they should have done so	Pilot flew close enough to cause concern despite Situational Awareness
3	Contextual	• Situational Awareness and Sensory Events	Events involving a flight crew's awareness and perception of situations	Pilot had no, late or only generic, Situational Awareness
• Electronic Warning System Operation and Compliance				
4	Contextual	• Other warning system operation	An event involving a genuine warning from an airborne system other than TCAS.	
• See and Avoid				

⁵ The Skyway code: The route or area of operation, page 37.

5	Human Factors	• Lack of Individual Risk Perception	Events involving flight crew not fully appreciating the risk of a particular course of action	Pilot flew close enough to cause concern
6	Human Factors	• Perception of Visual Information	Events involving flight crew incorrectly perceiving a situation visually and then taking the wrong course of action or path of movement	Pilot was concerned by the proximity of the other aircraft

Degree of Risk: **C**

Safety Barrier Assessment⁶

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

Flight Elements:

Tactical Planning and Execution was assessed as **ineffective** because the action of the Spitfire pilot (descending) did not provide sufficient separation from the Defender.

Situational Awareness of the Conflicting Aircraft and Action were assessed as **partially effective** because, although the Spitfire pilot had specific situational awareness of the location of the Defender, they still chose to route via the Cowes VRP, and the Defender pilot had only generic situational awareness of the location (and routing) of the Spitfires.

Airprox Barrier Assessment: 2021132		Outside Controlled Airspace					
Barrier	Provision	Application	Effectiveness				
			Barrier Weighting				
			0%	5%	10%	15%	20%
Ground Element	Regulations, Processes, Procedures and Compliance	✓	✓	[Green bar to 50%]			
	Manning & Equipment	✓	✓	[Green bar to 25%]			
	Situational Awareness of the Confliction & Action	✓	✓	[Green bar to 15%]			
	Electronic Warning System Operation and Compliance	○	○	[Grey bar to 5%]			
Flight Element	Regulations, Processes, Procedures and Compliance	✓	✓	[Green bar to 10%]			
	Tactical Planning and Execution	✓	!	[Yellow bar to 10%]			
	Situational Awareness of the Conflicting Aircraft & Action	✓	!	[Yellow bar to 20%]			
	Electronic Warning System Operation and Compliance	!	✓	[Green bar to 15%]			
	See & Avoid	✓	✓	[Green bar to 20%]			
Key:							
	Full	Partial	None	Not Present/Not Assessable	Not Used		
Provision	✓	!	✗	○			
Application	✓	!	✗	○			
Effectiveness	■	■	■	■	□		

⁶ The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).