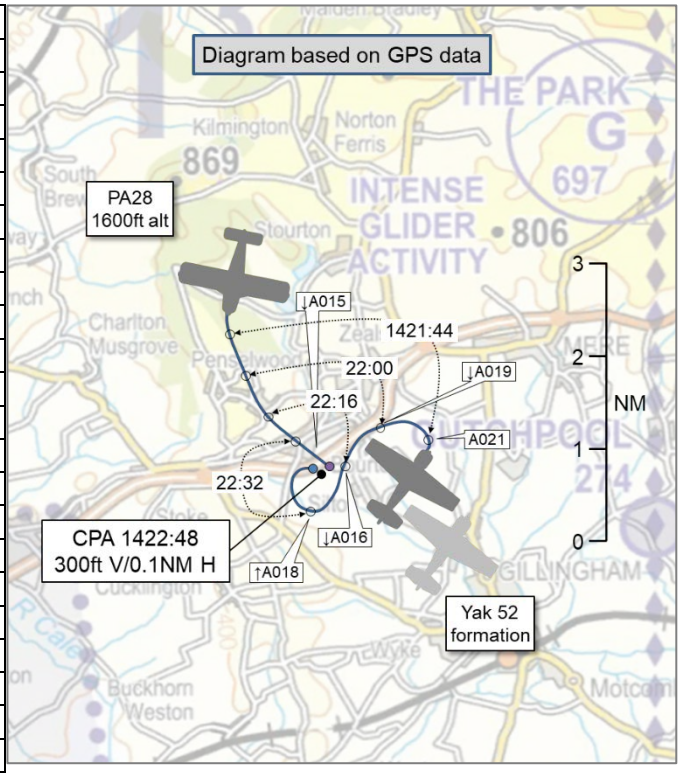
AIRPROX REPORT No 2021126

Date: 20 Jul 2021 Time: 1423Z Position: 5104N 00219W Location: 2NM NW of Gillingham

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Yak 52	PA28
Operator	Civ FW	Civ FW
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	None	Listening Out
Provider		Compton Radio
Altitude/FL	1800ft	1500ft
Transponder	A, C, S	A, C
Reported		
Colours	Silver, red	White, yellow
Lighting	None	Strobe, nav lights
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	1800-2300ft	1800ft
Altimeter	QFE (1012hPa)	QNH (1021hPa)
Heading	090-110°	135°
Speed	210-230kph	95kt
ACAS/TAS	Not fitted	Not fitted
Separation at CPA		
Reported	0ft V/5-10m H	50ft V/0m H
Recorded	300ft V/0.1NM H	



THE YAK 52 PILOT reports flying in a 2-ship formation. They were operating on 1012hPa between 1300ft and 2500ft in echelon right [formation]. South of Bourton, Wiltshire, in a climbing right turn between approximately 1800ft and 2100ft, their wingman saw a contact in their left 9 o'clock at a range of around 300-400m on a constant relative bearing. The instructor in the second Yak 52 immediately initiated a hard dive and descent to avoid [see Figures 1 and 2]. The crew had no time to announce the contact and the formation leader did not see the contact. The contact aircraft looked as though there was a very high risk that it could have hit the second Yak in the formation had they not taken avoiding action. The formation sortie was continued and the contact aircraft was not seen again.

Figure 1 – Yak 52 formation prior to sighting PA28

Figure 2 – PA28 passing below/behind lead Yak 52

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

THE PA28 PILOT reports flying from a waypoint at Zeals towards [their destination]. They saw two aircraft in formation pass from left-to-right at a safe distance in front of them. They then saw them bank and initially thought they were turning left to run parallel and in front of them. It then became clear they were turning right towards them. It appeared they would pass behind but the lead aircraft passed overhead and the following aircraft passed low and behind. They reduced altitude and saw them some distance to the east and resumed flight to [their destination].

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

Factual Background

The weather at RNAS Yeovilton was recorded as follows:

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METAR EGDY 201418Z 20004KT 9999 FEW045 29/15 Q1019 NOSIG RMK BLU BLU=
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Analysis and Investigation

UKAB Secretariat

An analysis of the NATS radar replay and the GPS log files provided by both pilots was undertaken. The NATS radars detected the SSR responses of the PA28 and the subordinate element of the formation of Yak 52s, but the track of the Yak 52 was unstable and intermittent. The radar return of the PA28 faded at 1421:10 (see Figure 1) and the aircraft was not detected again by the NATS radars. From the GPS data provided by the pilots, the PA28 crossed in front of the Yak 52 formation at 1422:45, while the formation was in a right-hand turn, at a distance of 0.25NM and with a vertical separation of 300ft (PA28 low). CPA occurred some 3sec later, at 1422:48, with the aircraft separated by 0.1NM horizontally and 300ft vertically.

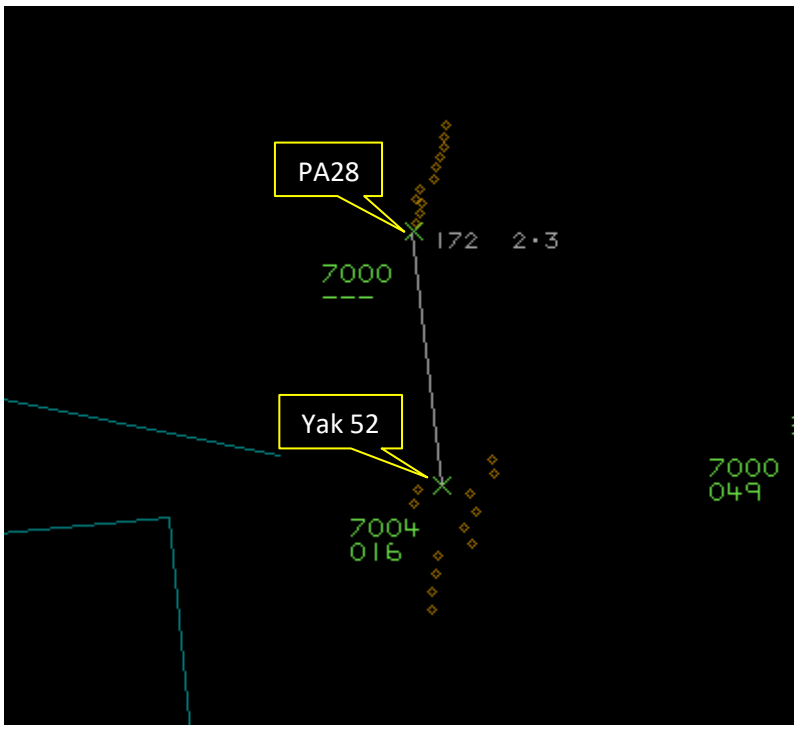


Figure 1 – 1421:10 – PA28 fades from radar

The Yak 52 and PA28 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 converging then the PA28 pilot was required to give way to the Yak 52.[2]

Summary

An Airprox was reported when a Yak 52 and a PA28 flew into proximity 2NM NW of Gillingham, Dorset at 1423Z on Tuesday 20th July 2021. Both pilots were operating under VFR in VMC; the Yak 52 pilot was not in receipt of an ATS and the PA28 pilot was listening out on the Compton Abbas Air/Ground frequency.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from both pilots, radar photographs/video recordings and GPS data for both aircraft. 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 Yak 52 pilots and noted that they had been conducting formation training at the time of the Airprox. The Board then heard from a GA pilot member with experience of formation flying that lookout can be quite challenging during a formation sortie, particularly during turns, so a surveillance-based air traffic service (ATS) can be extremely useful. However, the member stated that, to the best of their knowledge, these Yak aircraft are only fitted with one radio and so any kind of ATS would require them to forego a formation frequency which would clearly be unfeasible. Therefore, the Board agreed that the Yak pilots had had no choice but to operate on a formation frequency and, without any further form of electronic conspicuity equipment to assist in the detection of other aircraft, had not had any situational awareness of the approaching PA28 (**CF1**). This had left them relying upon the see and avoid barrier and members noted that the pilot of the No2 aircraft had sighted the PA28 on the far side of the lead aircraft whilst the formation had been in a right-hand

[1] (UK) SERA.3205 Proximity.
[2] (UK) SERA.3210 Right-of-way (c)(2) Converging.

turn. The Board concluded that, due to the PA28 having been spotted at close range (**CF2**), the Yak 52 pilot had assessed that an immediate avoidance manoeuvre had been necessary.

Turning to the actions of the PA28 pilot, the Board noted that they had also not been in receipt of an ATS en-route to their destination and some members wondered if they may have been better served by requesting a surveillance-based FIS from Yeovilton as they transited south-eastbound. Whilst under no requirement to have done so, the Board considered that this may have presented an opportunity for the PA28 pilot to have gained early situational awareness of the presence of the Yak 52s and so perhaps adjust their routing to have given them a wider berth. The Board agreed that, in the event, the PA28 pilot had not had any situational awareness of the presence of the Yak 52s until they had sighted them (**CF1**). That said, members noted that the PA28 pilot had reported sighting them as they passed left-to-right in front, which would have given adequate time for the PA28 pilot to take action to increase separation had they deemed it necessary at the time. The Board noted that the PA28 pilot had initially assessed the Yak 52s to be turning left to parallel their own track. This was unfortunately not the case as the Yak 52 formation had been manoeuvring dynamically. By the time the PA28 pilot had assimilated that the formation had reversed their turn it was too late for the PA28 pilot to manoeuvre to increase separation. The Board concluded, therefore, that this mis-perception of the turn direction by the PA28 pilot had been contributory to the Airprox (**CF3**).

Finally, the Board considered the risk involved in this Airprox. Members were grateful to both pilots for their respective GPS log files because the low-level coverage of the NATS radars in the vicinity of the Airprox had been found to be quite poor. The Board took into account the measured separation according to the GPS positions and also both pilots' estimation of separation and risk of collision. Members agreed that the difference between the recorded GPS separation and reported separation was most likely due to the GPS position of the Yak 52 formation being that of the lead aircraft and that it had been likely that the No2 aircraft had come closest to the PA28. Therefore, members agreed that safety had been much reduced and that a risk of collision had existed (**CF4**), but that the actions of the No2 Yak 52 pilot had averted a possible collision. Accordingly, the Board assigned a Risk Category B to this event.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2021126			
CF	**Factor**	**Description**	**ECCAIRS Amplification**	**UKAB Amplification**
	Flight Elements			
	• Situational Awareness of the Conflicting Aircraft and Action			
1	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
	• See and Avoid			
2	Human Factors	• Identification/Recognition	Events involving flight crew not fully identifying or recognising the reality of a situation	Late sighting by one or both pilots
3	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	
	• Outcome Events			
4	Contextual	• Near Airborne Collision with Aircraft	An event involving a near collision by an aircraft with an aircraft, balloon, dirigible or other piloted air vehicles	

Degree of Risk: B

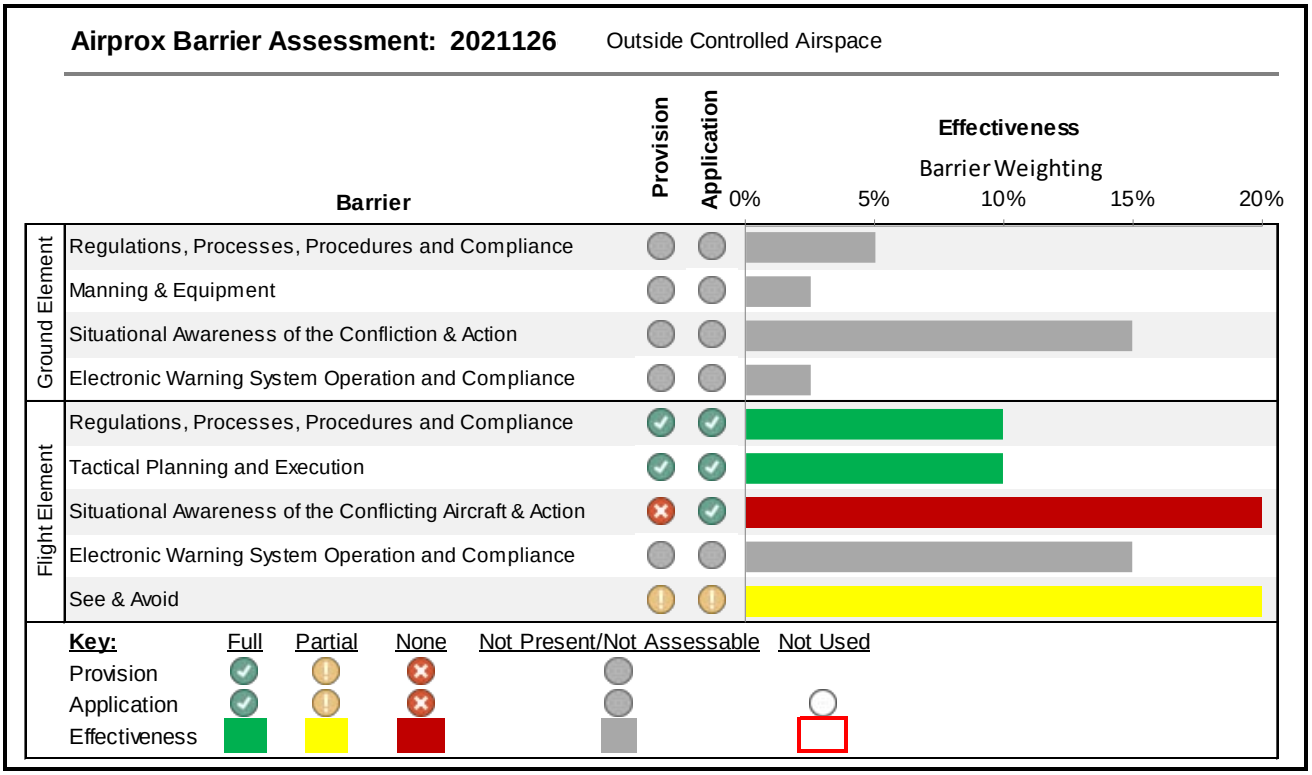
Safety Barrier Assessment[3]

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

Flight Elements:

Situational Awareness of the Conflicting Aircraft and Action were assessed as **ineffective** because neither pilot had any situational awareness of the presence of the other aircraft.

See and Avoid were assessed as **partially effective** because, although the PA28 pilot had sighted the Yak 52 formation at a relatively early stage, by the time they had assimilated the formation's direction of turn, late avoiding action was required by the pilot of the subordinate element of the formation.



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