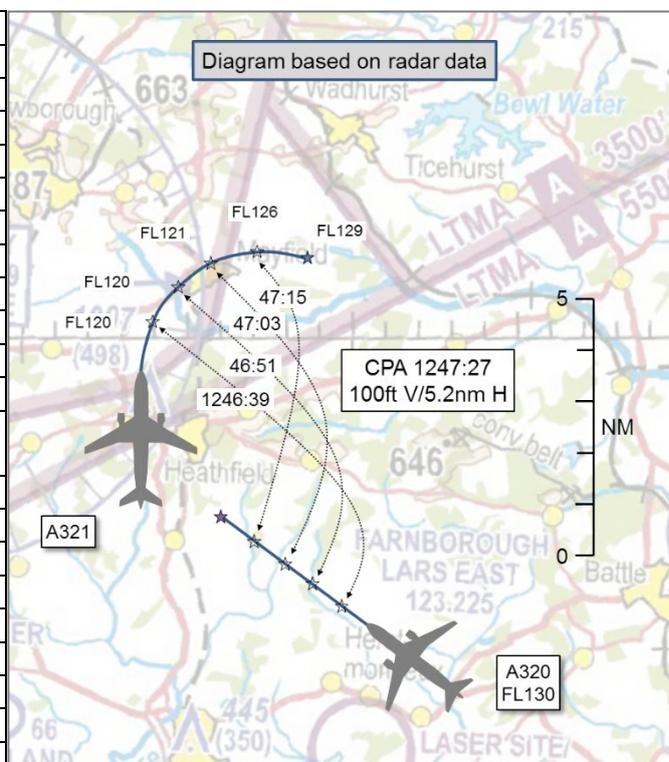


AIRPROX REPORT No 2019144

Date: 08 Jun 2019 Time: 1247Z Position: 5059N 00018E Location: 1-2nm NE TIMBA

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	A321	A320
Operator	CAT	CAT
Airspace	London TMA	London TMA
Class	A	A
Rules	IFR	IFR
Service	Radar Control	Radar Control
Provider	Gatwick INT DIR	Swanwick TIMBA
Altitude/FL	FL130	FL130
Transponder	A,C,S	A,C,S
Reported		
Colours	Company	Company
Lighting	Beacon, strobes, nav	NK
Conditions	VMC	NK
Visibility	>10km	NK
Altitude/FL	FL120	FL130
Heading	130°	308°
Speed	220kt	220kt
ACAS/TAS	TCAS II	TCAS II
Alert	None	None
Separation		
Reported	Not seen	NK
Recorded	0ft V/5.1nm H	



THE AIRBUS A321 FIRST OFFICER (FO) reports that they were inbound to Gatwick, in the TIMBA hold level at FL120, green dot speed (220kt). The cabin had been secured 10-15min earlier and seatbelt signs were on. A medium cumuliform cell around 5-6000ft in height, tops around FL135-140 was positioned around and just north of waypoint TIMBA. On turning onto the inbound leg of hold, a cell painted red on the Captain's weather radar but its edge appeared clear of the hold circuit. The FO's weather radar display was set to Elevation and FL130 due to earlier monitoring of weather on approach to the TMA, so the cell was not seen; he was also head in using the FMGC to request alternate airfield weather. The Captain selected HDG in order to increase bank angle in the hope of avoiding the cell on turning outbound from TIMBA. The aircraft entered cloud, and medium to possibly severe turbulence was felt, through heavy rain. The aircraft climbed uncontrollably to FL128 with pitch of around 7-10° nose-up. Auto-thrust was on, but the speed decreased around 10-15kt below VLS and close to if not into $V_{\alpha Prot}$. He was unsure whether normal flight control law protections had activated, but suspected not. However the AP1 automatically disconnected, and the Captain manually arrested the rate of climb and initiated a descent back down to FL120. The FO told ATC of their uncommanded 800ft climb due turbulence. ATC instructed them to fly heading 060° due to another aircraft nearby; however, they could not see or identify it, and no TCAS warning triggered. The other aircraft was believed to have been vectored westwards. The FO advised ATC of their return to FL120 and inability to hold at TIMBA due weather. They were cleared to hold at LARCK briefly, before a normal, uneventful radar vectored approach and ILS on RW26L.

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

THE AIRBUS A321 CAPTAIN reports that they entered the TIMBA hold with CB showing 3nm outside the holding pattern. When turning outbound they seemed very close to the CB so he increased bank angle using autopilot to avoid the CB. They clipped the CB and the autopilot disconnected. The turbulence raised the nose and, as the auto-thrust increased power, the pitch-power couple raised the

nose even more, which caused the level bust. He took manual control and pitched the nose down to regain the cleared FL. ATC called them and they told them it was weather induced. They were placed on heading 120° and cleared to hold at LARCK, due the weather at TIMBA. ATC informed them that there was another aircraft in the hold but they did not see it and there was nothing on their TCAS and there were no alerts.

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

THE AIRBUS A320 PILOT reports that due to receiving late notification of the Airprox he was not able to supply the full details of the incident. He was inbound to Gatwick, in the TIMBA hold at FL130 flying straight-and-level. ATC gave them a left turn to leave the holding pattern. He was aware of traffic below [presumably on TCAS]. He reported the minimum separation as 2-300ft vertical and 3-4nm horizontal [again believed to be from TCAS].

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

THE GATWICK INTERMEDIATE (INT) DIRECTOR (DIR) reports that the pilot of the A321 reported that he had experienced some turbulence in the TIMBA hold, had climbed, but was now descending to his previously assigned level. The Mode C showed blue FL128 and he was established on the outbound leg of the hold. Also in the hold, but behind, was another aircraft at FL130 working TMA South. The TMA South controller and he coordinated the subsequent action and, although separation was lost because the aircraft were in the same holding facility, fortunately they were at different positions.

The weather at Gatwick was recorded as follows:

METAR EGKK 081220Z 24018KT 9999 SCT021 14/11/Q1014=

Analysis and Investigation

UKAB Secretariat

The A321 and A320 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard¹.

Occurrence Investigation

NATS Unit Report

The A321 and the A320 were established in the TIMBA hold for London Gatwick at FL120 and FL130 respectively. The A321 pilot vacated FL120 and began to climb. The pilot reported that due to turbulence the aircraft had climbed by 800ft. The Mode C of the aircraft increased to FL130 and separation was lost with the A320 which was at FL130. The Gatwick Support controller issued a heading to the pilot of the A321 and the TC TIMBA controller issued a heading to the A320 pilot for the aircraft to vacate the TIMBA hold to restore lateral separation.

The incident occurred on the Gatwick INT/Support (SPT) position. The A321 pilot was under control of the Gatwick INT/SPT position maintaining FL120 in the TIMBA hold. The A320 pilot was maintaining FL130 and was also established in the TIMBA hold, although the aircraft was under control of TC TIMBA.

At 1246:47 (all times UTC), the two aircraft were positioned as illustrated in Figure 1.

¹ SERA.3205 Proximity.

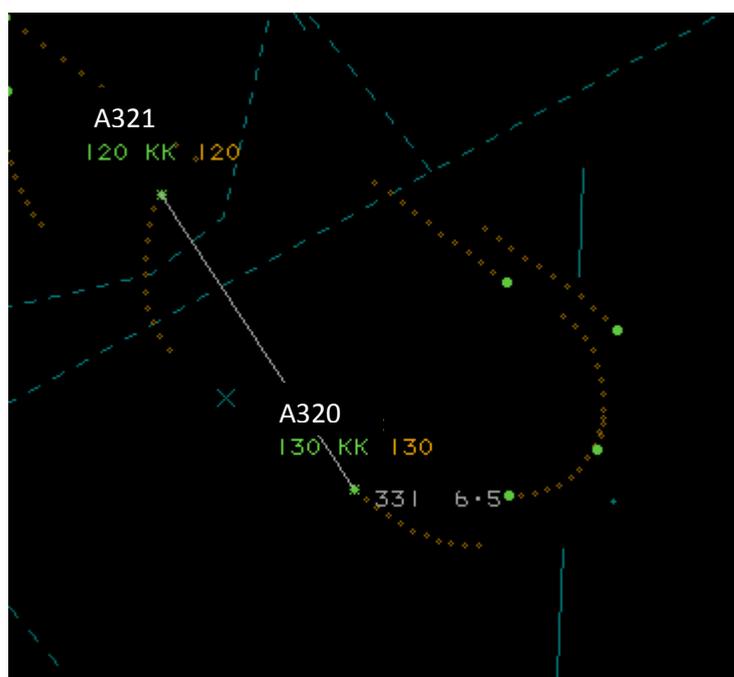


Figure 1 1246:47.

At 1247:02 (Figure 2), the Mode C of the A321 increased to FL121, at which point separation was lost with the A320 that was maintaining FL130.



Figure 2: Point of loss of separation at 1247:02.

At 1247:10, the A321 Mode C turned blue as the Vertical Displacement Advisory Tool (VDAT) activated and the Mode C readout of the A321 increased to FL123. The Gatwick SPT controller reported that this alert was observed but interpreted as the aircraft being in a slow descent (which can also cause an alert) rather than the aircraft climbing. The Gatwick SPT controller reported that next time the radar was observed the Mode C of the A321 had increased to FL128. The climb rate of the aircraft during this event had been a maximum of 3100fpm. Co-incident with this observation was the report from the pilot that the aircraft had deviated from its cleared level and also the controller's colleagues on the TC South sectors who alerted them to the level bust.

[UKAB note: VDAT activates when aircraft have passed through the Selected Flight Level (SFL) by 300ft or more. With a slow rate of descent, an aircraft has to have vacated SFL by 400ft or more before becoming eligible for an alert. Its vertical rate is then monitored, if a rate of 380fpm or less is detected and sustained for 12secs then an alert will be generated.]

The A321 pilot reported, at 1247:16, *“we’ve just experienced quite a bit of turbulence here through a tower and we’ve just climbed up 800 feet.”* The Gatwick INT DIR responded *“Roger”* at which point another pilot unrelated to the incident requested a weather avoidance heading.

At 1247:30, the TC TIMBA controller instructed the pilot of the A320 to fly a heading of 270° to vacate the TIMBA hold.

Minimum separation also occurred at 1247:30 (Figure 3), and was recorded on the LTCC Multi-Track Radar as 0ft and 5.1nm in the TIMBA hold.

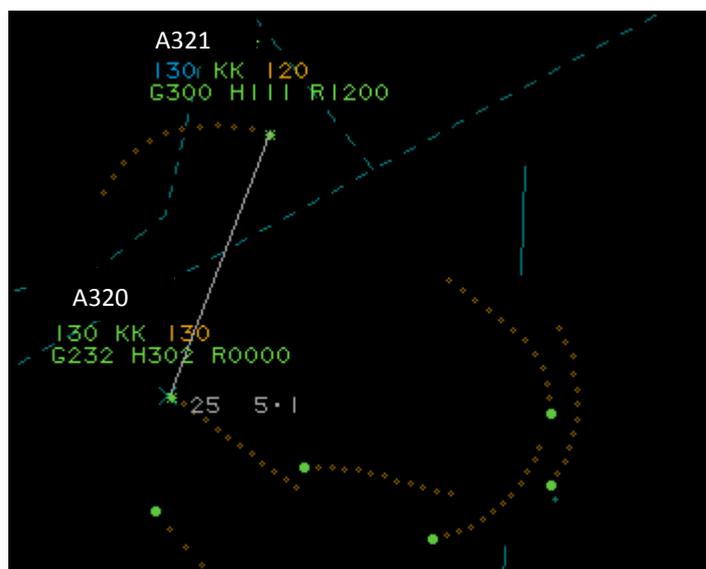


Figure 3: Minimum separation 1247:30.

At 1247:31, the Gatwick SPT controller instructed: *“[A321 C/S] there is also traffic in the TIMBA hold at FL130 I need you to fly a heading of about one two zero degrees now”*.

The A321 pilot reported at 1247:40 *“that was caused by weather at TIMBA”*.

The A321 pilot began to establish onto heading 120° at 1247:43, at which point lateral separation could be applied and separation was restored.

At 1247:44, the Gatwick INT controller informed the A321 pilot that there was traffic in the holding pattern one thousand feet above.

The A321 pilot transmitted, at 1248:08, *“[A321 C/S] just continuing to descend now to flight level 120 staying on the heading of 120 degrees. The weather is at TIMBA so we can’t hold there”*.

The A321 pilot was subsequently issued radar vectors to then hold at LARCK and the A320 pilot was vectored towards the hold at WILLO.

The incident occurred on Gatwick Approach. The Watch Management Report stated that the position was split with Final Director, Intermediate Director and Support positions all open. This was due to the volume of inbound traffic and cumulonimbus activity resulting in numerous requests for weather avoidance headings.

As soon as the aircraft began to establish on the assigned headings they could be considered to have vacated the hold and therefore lateral as well as vertical separation standards could be applied. As the aircraft were 5.1nm apart at the point at which the headings were issued, as soon as the aircraft began to establish on their assigned headings greater than 3nm lateral separation existed and the loss of separation was resolved.

A321 Operating notes

A UKAB Civil Airline Pilot member familiar with the Airbus provided an explanation of the A321's operation during the Airprox.

One of the pilots mentioned holding near 'green dot' speed. This was effectively the minimum drag speed indicated on the airspeed indicator below which drag increases the slower you go until the low speed protection takes effect. He believed that the system went straight into the full low-speed regime (illustrated in Figure 4) due to the sudden turbulence which could cause large and sudden changes in airspeed and increase in load factor (increase in positive 'g') through tightening the turn and turbulence.

Increasing load factor causes the system to operate at a higher indicated airspeed than at 1 'g'. At a few kts above stalling speed, full power is automatically applied (A.FLOOR) and the system sets the pitch attitude to maintain the speed. This is where he believed the A321 crew found themselves but, once the speed had increased above the top of the yellow barbers pole, everything returns to normal except that full power (A.FLOOR) is still being applied and the autopilot remains dis-engaged (which probably occurred as they emerged from the cloud with wings level). The 'A.FLOOR' mode needs to be disconnected promptly for 'normal' auto thrust to be re engaged, otherwise it could lead to the significant height excursion as seen in this event.

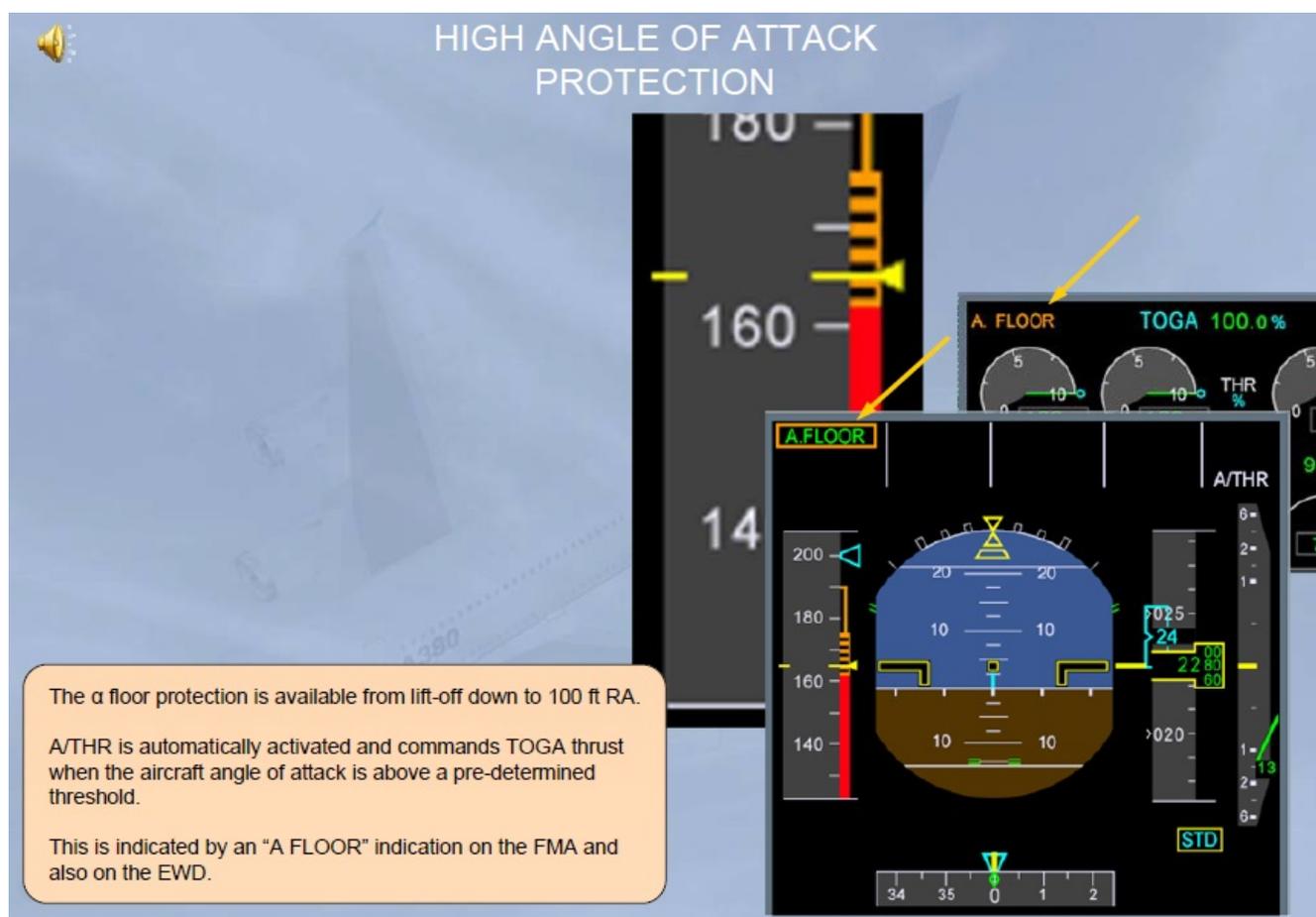


Figure 4.

Generic pilot information about avoiding CBs.

Ops Manual A for 99% of EASA companies contains the information at Figure 5.

- t
- b) Do not take off if a **thunderstorm** is overhead or approaching.
 - c) At destination hold clear if a **thunderstorm** is overhead or approaching. Divert if necessary.
 - d) Avoid **thunderstorms** even at the cost of diversion. If avoidance is impossible, follow the recommendations in the preceding paragraphs. Additionally consider the lower aircraft limitations when flaps are extended.

8.3.8.3 Use of Weather Radar - Guidance to Pilots

Flight Altitude (1000s of feet)	Echo Characteristics			
	Shape	Intensity	Gradient	Rate
0-20	Avoid by 10 miles echoes with hooks, fingers, scalloped edges or other protrusions	Avoid by 5 miles echoes with sharp edges or strong intensities	Avoid by 5 miles echoes with strong gradients of intensity	Avoid by 10 miles echoes showing rapid change of shape, height or intensity
20-25		Avoid all echoes by 10 miles		
25-30		Avoid all echoes by 15 miles		
Above 30		Avoid all echoes by 20 miles		

NOTE:

- (1) If storm clouds have to be overflown, always maintain at least 5000ft vertical separation from cloud tops. It is difficult to estimate this separation but ATC or meteorological information on the altitude of the tops may be available for guidance.
- (2) If the radar has become inoperative, avoid by 10 miles any storm that by visual inspection is tall, growing rapidly or has an anvil top.
- (3) When operating at night or in areas of possible Cb activity, normal airmanship and procedure would suggest that both weather radars are selected on unless one ND is required for Terrain warning purposes in accordance with Fleet SOPs.
- (4) Avoid flying under a cumulo-nimbus overhang. If such flight cannot be avoided, tilt the antenna full up occasionally to determine, if possible, whether precipitation (which may be hail) exists in or is falling from the overhang.
- (5) When operating into or out of airfields where terrain and weather are both factors, it is recommended that one pilot selects his ND to weather radar while the other pilot selects terrain.

Figure 5.

Summary

An Airprox was reported when an A321 and an A320 flew into proximity in the TIMBA hold at 1247hrs on Saturday 8th June 2019. Both pilots were operating under IFR in VMC, the A321 pilot in receipt of a Radar Control Service Gatwick Approach and the A320 pilot in receipt of a Radar Control Service from the Timba Sector.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots, the Gatwick Intermediate (INT) Director (DIR), area radar and RTF recordings and reports from the appropriate ATC and 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 turned their attention to the actions of the A321 pilot. The crew reported that they were aware of a medium cumuliform cell around 5-6000ft in height with tops around FL135-FL140, positioned around and just north of TIMBA. Initially they thought that the edge appeared clear of the holding pattern but, when turning outbound they seemed very close to the CB so the captain increased the bank angle using autopilot to avoid the CB. The Board wondered why the pilot had not asked the controller either to enter the hold with a left turn rather than the published right turn or to leave the holding area completely to avoid the possibility of entering the CB (**CF1**). A Civil Controller member commented that this type of request was not unusual in these weather conditions and this is reinforced by the guidance given in the Ops Manual (Figure 5). As the A321 entered the CB, it experienced severe turbulence which also resulted in the aircraft's flight control logic causing it to climb above its cleared level to FL130 (**CF2**). The A321's FO reported that approaching TIMBA he had been 'heads-in' using the Flight Management Guidance Control to request alternate airfield weather in case it was necessary to divert, and members with civil airline experience commented that, in their opinion, this should have been done much earlier such that he should not have allowed himself to be distracted by this task at a critical period (**CF4**).

Fortuitously, as the A321 reached FL130, the level of the A320, the 2 aircraft were 5.1nm apart. Notwithstanding, this was a loss of standard separation because aircraft in the hold are only deemed to be separated vertically; as soon as the A321 climbed above FL120, separation was lost. However, once both controllers had instructed their respective pilots to take up deconflicting headings to leave the TIMBA hold, they could then be deemed as re-establishing separation which was then greater than the required 3nm. Although there had been a *de facto* level bust, this had occurred largely outside the control of the A321 pilots as the aircraft automatically responded to the turbulence conditions.

Turning to the risk, the Board agreed that although this situation was highly undesirable and could easily have resulted in a different outcome if the 2 aircraft had been geographically coincident, in the circumstances of this incident there been no risk of a collision because of the horizontal distance between the two aircraft when they were at the same level. Recognising that safety had been reduced and that normal safety standards and procedures had not pertained, the Board assessed the risk as Category C; safety had been degraded, fortuitously with no risk of a collision.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

2019144			
CF	Factor	Description	Amplification
	Flight Elements		
	• Tactical Planning and Execution		
1	Human Factors	• Insufficient Decision/Plan	Inadequate plan adaption
2	Human Factors	• Flight Level/Altitude Deviation (Level Bust)	
	• Situational Awareness of the Conflicting Aircraft and Action		
3	Human Factors	• Distraction - Job Related	Pilot was engaged in other tasks

Degree of Risk:

C

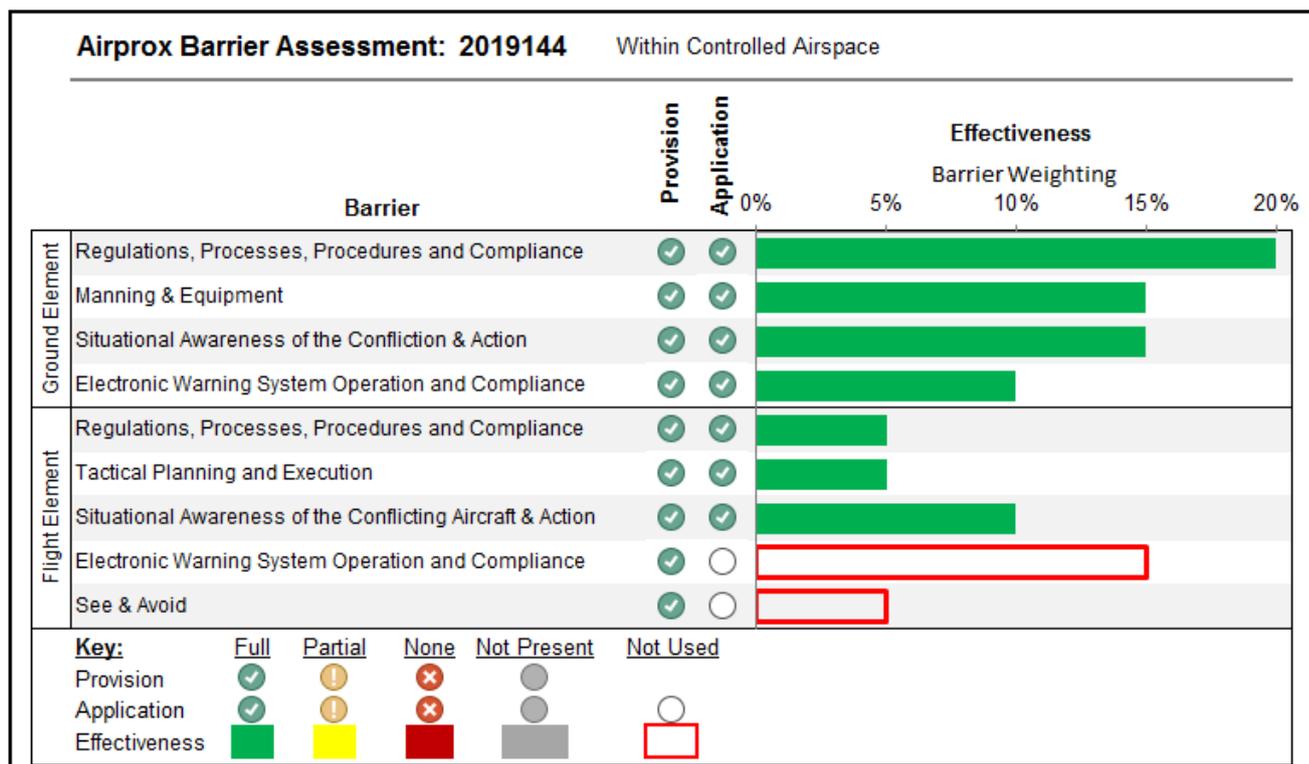
Safety Barrier Assessment²

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

Flight Elements:

Electronic Warning System Operation and Compliance were assessed as **not used** because the two aircraft were not proximate to each other horizontally in the TIMBA holding pattern.

See and Avoid was assessed as **not used** because the two aircraft were not proximate and the situation was subsequently resolved without the need for visual acquisition.



² The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the [UKAB Website](#).