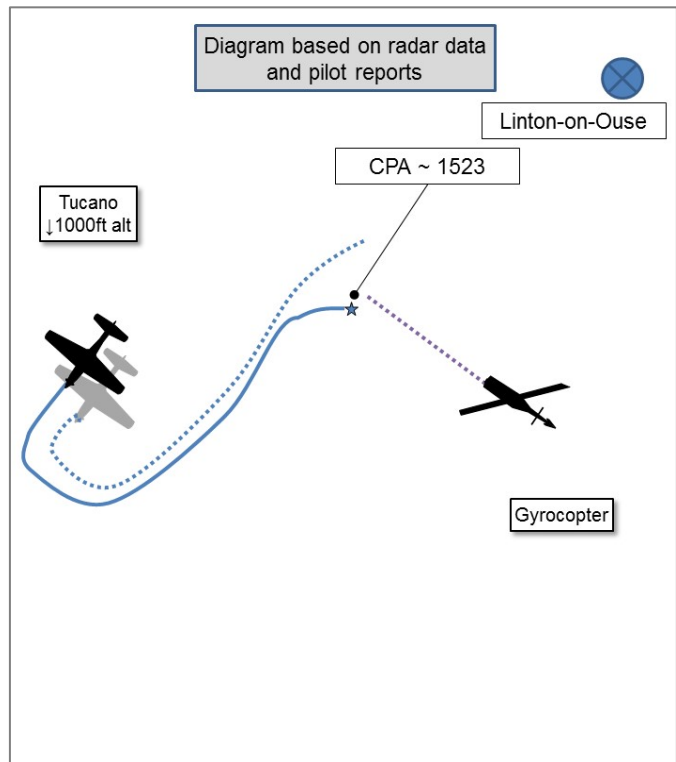


AIRPROX REPORT No 2017120

Date: 20 Jun 2017 Time: 1523Z Position: 5359N 00121W Location: 5nm SW Linton-on-Ouse

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	Tucano	Gyrocopter
Operator	HQ Air (Trg)	Civ Club
Airspace	London FIR	London FIR
Class	G	G
Rules	VFR	VFR
Service	Basic	None
Provider	Linton	N/A
Altitude/FL	1000ft	NK
Transponder	A, C, S	Not fitted
Reported		
Colours	Black	Not reported
Lighting	Not Reported	
Conditions	VMC	
Visibility	Not reported	
Altitude/FL	1000ft	1000ft
Altimeter	QFE (1019hPa)	Not reported
Heading	060°	
Speed	Not reported	
ACAS/TAS	TCAS II	Unknown
Alert	None	Unknown
Separation		
Reported	0ft V/50m H	Not reported
Recorded	NK	



THE TUCANO PILOT reports that he was No2 of a pair recovering from 7000ft. The cloud structure was overcast 1800-3000ft. The formation leader requested a radar-to-visual on a Deconfliction Service. The formation was descended to 2000ft and the leader asked for further descent as they were intermittently visual with the surface. Once at 1800ft, a Traffic Service was requested with further descent as they were visual with the ground. During this time ATC had informed them that there was non-squawking traffic 'On PAR' at 1000ft. Once they were VMC below cloud, the formation leader elected to descend to 1000ft and proceed towards the field. ATC were still calling the non-squawking traffic 'reported at 1000ft on PAR'. The formation leader asked for a vector and was informed that ATC were unable to provide vectors due to their altitude. The formation leader turned through 30° to the right in the belief that the non-squawking traffic was on the nose. As they turned, he saw the Autogyro level in the right 1 o'clock. He called the traffic to the leader but this transmission was blocked by another call. As he thought, the leader was possibly going to hit the Autogyro he broke formation, increasing his turn and crossing behind the leader to keep the autogyro and the leader in sight. The Autogyro passed between the formation, 180° out level. At this point he changed to the Tower frequency because he thought the call he had missed was the leader going to the Tower frequency. Once the traffic had passed, he rejoined on the leader and they flew a standard visual join.

He assessed the risk of collision as 'High'.

THE GYROCOPTER PILOT reports that he had contact with two aircraft passing in front of him, left to right, at a safe distance. The aircraft were at such a distance that he couldn't identify the aircraft type. The aircraft then passed just to the right of his track when they turned towards him and separated. The aircraft were higher than him but he descended from 1200ft to 1000ft. The aircraft passed him on either side at a safe horizontal and vertical distance that he did not consider was a risk to safety. This was the only contact he had with other aircraft in that vicinity, he was in radio contact

with Linton who transferred him over to Leeds. [UKAB Note: the gyrocopter pilot was not in contact with Linton until after CPA].

THE LINTON CONTROLLER reports that he was the bandboxed App and Dir controller at the time of the incident. The Tucano formation called for Radar-to-Initials recovery. All aircraft recovering had required a Deconfliction Service (DS) inbound during the afternoon. On identification, the Tucano formation were given a TS and turned away from the radar overhead; they were approximately 6nm W of Linton at that time. On the initial descent instruction to 4000ft they requested a DS. A further descent to 2000ft was offered iaw the Radar Vector Chart (RVC) at Figure 1. On projecting the intended track of the formation on recovery, he

noticed a slow moving non-squawking contact operating approximately 5nm SE of Linton, tracking west. As this conflictor was within 5nm of the intended track of the radar-to-visual recovery, he realised at this point he would be unable to vector the formation inbound under a DS in an expeditious manner. His initial plan was to keep vectoring the Tucano formation for a wider feed in; he ascertained that with the conflicting traffic moving west, albeit slowly, it would clear the inbound lane to RW03RH. He quickly assimilated this plan would not work, again passing TI, and a suggested plan for recovery. He asked the Tucano formation "I am unable to recover you radar-to-visual under DS against that traffic, are you happy to accept a PAR recovery? As its then collision avoidance". This allows ATC to recover

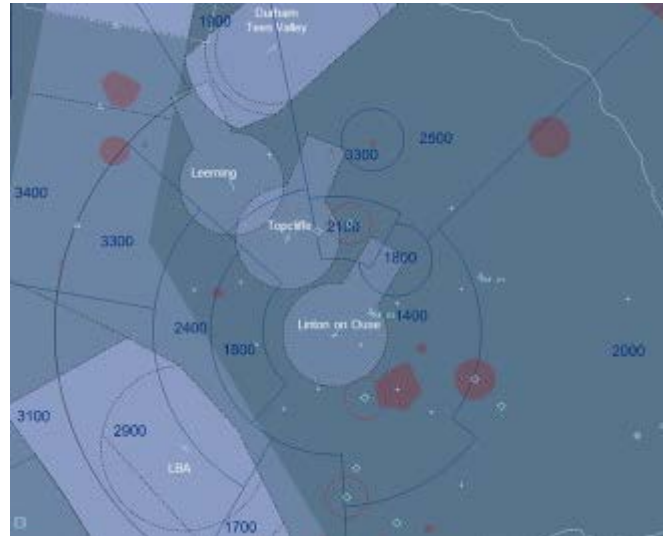


Figure 1: Linton RVC

aircraft on an instrument approach whilst offering precision collision avoidance against unknown traffic as it would appear in both elements of the PAR display, rather than the required 5nm lateral separation required under a DS he thought. The Supervisor was present in the ACR throughout, and had first checked to see if LARS were working the non-squawking aircraft; they were not. The supervisor also checked the FLARM display for any height information; there was none present. The Talkdown position was now manned and passed information that he had a contact at 5nm, correlated to be the non-squawking traffic indicating approximately 1200ft on PAR. The Tucano formation requested a heading of 060° inbound and further descent when able, presumably due to cloud, and intended to continue inbound radar-to-visual. He issued the turn as per their request, and a descent to 1800ft QFE, the lowest he could approve due to the RVC when aircraft were under a DS. He again passed Traffic Information on the non-squawking aircraft, this time also adding "indicating 1200ft on the PAR" as their requested turn and descent would take them closer to the conflicting traffic. The Tucano formation requested further descent; he explained that he was unable to offer further descent under a DS. The Tucano formation requested a TS, which was applied, though he did not offer a further descent at this point. The Tucano formation again requested updated TI, which was passed, and they also requested a vector for "Radar-to-Initial", the Mode C indicated the Tucano formation to be at 1000ft QFE, so he asked them to confirm height, which was passed as 1000ft QFE. He was now unable to offer a turn, even under a TS, because they were 800ft below the RVC. The Tucano formation replied, "switching to tower". Concerned still about the traffic, he asked the Tucano formation if they were visual with the traffic before the formation elements had all acknowledged [the change to Tower frequency]; this was garbled, presumably as he and they both attempted to transmit at the same time. One of the elements responded that they were turning away from the traffic, shortly fuel priority, changing to Tower. At no time on frequency was an Airprox called, it was only once the aircrew had landed that the Supervisor received a telephone call to discuss ASIMS administration. After the event, approximately 8nm SSW of Linton, an autogyro called Linton LARS VHF requesting a Basic Service, but made no reference to the Tucano formation. He believes this may have been the non-squawking aircraft referred to in the incident.

He perceived the severity of the incident as 'High'.

THE LINTON SUPERVISOR reports that he was monitoring the Radar Approach Controller's frequency and witnessed the entire occurrence. The tape-transcript was not available at the time of writing. The Tucano formation freecalled Linton Approach for Radar to Visual recovery approximately 7nm NW of the overhead at 7000ft. The controller issued a squawk and by the time it appeared and he was able to identify and apply a Radar Service, the formation was approximately 4.5nm NW of the aerodrome. He had noticed a non-squawking aircraft slowly tracking west, now approximately 4nm south of Linton. Glidernet provided no FLARM information about the aircraft. He suggested to the controller a left turn onto downwind in order to help the formation lose height. The formation queried this and left was reiterated. At this point he recalls that the Approach controller, the PAR controller and he discussed the problem of bringing a DS recovery in against a slow-moving non-squawker, which appeared as if it would track through the approach lane. He suggested the controller tell the Tucano formation that he would be unable to bring them in under a DS (deconfliction minima of 5nm would be unlikely to be achieved) and suggest a PAR recovery, which he duly did. The rationale for this is that the extended pattern, cockpit checks and a slower inbound speed would allow the conflicting aircraft to pass west through the approach lane [before the Tucano formation approached]. He does not recall whether the Tucano formation declined this suggestion, but he thinks they requested further descent. Approach descended them to 1800ft in accordance with the RVC. He believes that at this stage the controller turned the Tucano formation onto a heading of 140° and it was then that the Tucano formation stated VMC requesting further descent. He reminded the controller to issue a TS, which he did; however, he does not believe he followed this with the statement "taking your own terrain separation, descent approved". From here, the controller called the position of the conflicting traffic on a number of occasions relative to Linton. He recalls the Tucano formation requesting the position of the conflicting aircraft relative to them as they were in a turn. He believes the controller stated, "when steady traffic twelve o'clock, 6nm, crossing right-left, no height information, indicating 1200ft on PAR". He would consider this standard practice - if a conflicting aircraft crosses into the PAR's field then they will often supplement SRE derived TI with level information of broadly correlating tracks appearing in PAR elevation in order to provide aircrew with more information. When the Tucano formation steadied, he recalls thinking "right one o'clock" would have been more accurate but he thinks it was at this point that the Tucano formation requested vectors. He immediately instructed the controller to check the Tucano formation's level because their Mode C indicated 009 which placed [Tucano C/S] 800ft below the RVC. The Tucano formation reported 1000ft, and the controller correctly stated he could not provide vectors; however, "taking your own terrain separation, suggest heading.." was not offered. He believes the controller now called the aircraft again at "right one o'clock, 3nm, crossing right-left, no height information, indicating 1200ft on PAR". He thinks the controller called the aircraft again and the Tucano formation then called "visual going to Tower". The controller asked if they were visual with the conflicting aircraft, which was then indicating very close on radar. He does not recall the Tucano formation's response but the controller called the traffic a final time before instructing the Tucano formation to change to Tower. A few moments later one of the formation stated "splitting formation", and "fuel minimum" was also said at some stage. Perhaps 20 minutes later, during a telcon, the Duty Authorising Officer asked if he knew about the gyro-copter and said that the formation might file an Airprox. He said he had already started the process of getting the controller to write a statement, and that ATE would be instructed to impound the tapes. It was not until the following morning that he was made aware that the Zone controller established communication with the Gyrocopter moments after the Airprox.

Factual Background

The weather at Linton was recorded as follows:

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METAR EGXU 201450Z 11010KT 9999 BKN018 BKN035 19/14 Q1021 WHT NOSIG
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Analysis and Investigation

Military ATM

The radar replay data identified the Tucanos but was not able to identify the Gyrocopter.

The Linton Approach controller was operating bandboxed as Approach and Director, which was normal practice with relatively few aircraft left to recover based on the flying programme information. Traffic intensity had been light throughout the afternoon, but with added complexity due to operating runway 03RH, (approaches affected by complex Radar Vector Chart and the proximity of Leeds Bradford Airport) and a cloud layer 2000-6000ft, leading to requests for Deconfliction Service (DS).

When the pair of Tucanos called Linton Approach for radar-to-visual recovery, they were requesting TS; however, after a vector for positioning downwind, and a descent instruction to 4000ft QFE, the Tucanos requested an upgrade to DS. The Linton Approach and Zone controllers carried out coordination that agreed the Tucanos would avoid Zone traffic by 3nm until 1000ft below, facilitating further descent to height 2000ft. This coordination was then updated to state that the Tucanos would avoid by 5nm rather than 3nm due to them being a pair (3nm criteria for singleton aircraft only).

It was reported that a radar return then appeared 7.5nm south-southeast of Linton on Ouse, tracking west, slow-moving and primary-only. Although not in contact with Linton ATC and not identified, a correlating track appeared on the PAR display at approximately 1200ft QFE. The Linton Approach controller passed Traffic Information to the pair of Tucanos as, "a non-squawking aircraft due south of Linton, 5 miles, tracking west this time, believed to be a motor-glider, no height information. Unable to vector you inbound DS, Radar to Initial, suggest a PAR. If..and...err, collision avoidance on PAR tube against you on that traffic". Offering a conversion to PAR was intended to aid in two ways. First, the Tucanos would be vectored wider in positioning for a PAR approach, allowing time for the conflicting traffic to clear the approach lane and achieve deconfliction minima of 5nm. Second, the Linton Approach controller believed that the Tucanos would require only collision avoidance against the contact on PAR rather than the 5nm lateral separation required on surveillance radar. This was a misunderstanding of the application of service; use of this collision avoidance rule is only applicable to 'pop up' traffic on PAR, and has been reviewed separately to the Airprox.

The Tucanos did not acknowledge the suggestion of a PAR approach and requested further descent. The Linton Approach controller instructed the pair to descend to 1800ft QFE, the lowest permitted height under DS. When the Tucanos requested further descent, stating that they were VMC below, the Approach controller downgraded the ATS from DS to TS and vectored the aircraft onto heading 140 degrees but did not issue a descent instruction.

The Tucanos asked for an update on the position of the 'glider', to which the Linton Approach controller responded, "southwest by 5 miles, approximately, err, one mile east of the centreline, inbound, tracking west, slow-moving. Hoping the, err, turn of your transit southeast, that will continue westbound. I will keep you advised". The Tucanos requested a vector onto heading 060 degrees, followed by a request for an update of the Traffic Information with reference to the pair. The Linton Approach controller described the traffic as, "when steady will be 12 o'clock, 4 miles, crossing right-left, slow moving, indicating 1200ft on the PAR".

The Tucanos requested a further vector to position for initials, at which time the Approach controller asked what height the pair were at because they were indicating lower than 1800ft QFE (the last instructed descent height). With the Tucanos now at height 1000ft QFE, 800ft below the RVC, the controller was unable to provide vectors (only permitted up to 500ft below RVC for radar-to-visual approaches) but could have given a suggested heading with a reminder that the pair would be taking their own terrain clearance.

Traffic information was updated as, "previously called traffic right, one o'clock, two and half miles, crossing right-left, similar height on PAR" followed by "previously called traffic right, one o'clock, one mile, crossing right-left, similar level on PAR". While the controller was trying to articulate that the height information was being taken from the PAR display, the phraseology used led the Tucano pilots to believe that the conflicting traffic was conducting a PAR approach. After

ascertaining that the Tucanos were visual with the gyrocopter, the Linton Approach controller instructed them to change to the Tower frequency to continue their approach.

Although the traffic intensity was not high, the Linton Approach controller felt under pressure due to the complexity of providing DS for an approach to RW03RH, and was flustered by the coordination and then the appearance of the conflicting, non-squawking traffic. Traffic Information was provided to the pair of Tucanos and was updated several times iaw CAP 774. There was no requirement to provide deconfliction or to ask whether the pilots were visual with the traffic, and their continuing the approach inbound led the controller to believe that they were content with the situation.

An investigation at RAF Linton identified several contributory factors and made five recommendations, including adherence to CAP 413 phraseology when passing Traffic Information and not to make reference to information being taken from the PAR display.

UKAB Secretariat

The Tucano and Gyrocopter 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 Tucano pilot was required to give way to the Gyrocopter².

Comments

HQ Air Command

This incident was the subject of a detailed safety investigation on the unit concerned, which highlighted a number of areas to be addressed. All pilots and controllers involved in this Airprox were operating in accordance with the extant rules and regulations and attempting to do their best in a challenging situation. It is unfortunate that, in trying to increase the SA of the Tucano pilots, the controller inadvertently degraded it by mentioning the Precision Approach Radar (PAR) in his transmissions – whilst meant as an indication of where the gyrocopter's height was derived from, it was taken as meaning that the gyrocopter was on a precision approach to the airfield. Subsequent actions by the Tucano formation on recovery were therefore based on an erroneous mental model.

Recommendations have been made that clarify the phraseology to be used (and to be avoided) by controllers when passing height information, and also regarding continued engagement with regional airspace users. It is regrettable that the gyrocopter pilot chose to transit through the extended centreline of the airfield without talking to ATC as this would have permitted the controllers to work with him rather than around him (immediately post this incident the pilot did contact the Zone frequency). However, it is also noted that the gyrocopter pilot was visual with the Tucanos at a reasonably early stage and was comfortable with the separation distances.

Summary

An Airprox was reported when a Tucano and a Gyrocopter flew into proximity at 1523 on Tuesday 20th June 2017. Both pilots were operating under VFR in VMC, the Tucano pilot in receipt of a Traffic Service from Linton and the Gyrocopter pilot was not in receipt of a Service.

¹ SERA.3205 Proximity.

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

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft, transcripts of the relevant RT frequencies, radar photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board began by hearing from the military member. He explained that although ATC had passed TI to the Tucanos with reference to the gyrocopter's position on the PAR with the best of intentions, this had not been standard phraseology and had unfortunately resulted in a flawed mental model in the Tucano pilots' SA. They had consequently interpreted the TI as the gyrocopter carrying out a PAR, and this resulted in the Tucano pilots believing that their Radar-to-Initials join would provide adequate separation. The Board agreed with his analysis, and also noted that the Tucano pilots were probably working hard to achieve their recovery given the weather conditions, so they had probably not assimilated ATC's calls that the gyrocopter was in fact transiting left-to-right across their track rather than down the PAR. It had simply been unfortunate that the Tucano lead, in trying to increase separation in accordance with his mental model, had unknowingly turned the formation towards the gyrocopter and into conflict.

The Board then looked at the actions of the gyrocopter pilot. They were disappointed that the pilot had chosen not to fill in a CA1094 Airprox form with fuller details rather than provide just a short email describing his experience that day: the CA1094 is intended to provide as much relevant detail as possible in order to allow the Board to make a systematic assessment. Notwithstanding, members agreed that there was enough evidence to form a reasoned opinion, albeit there were questions about the gyrocopter pilot's perceptions and intentions that could not be resolved. The Board went on to discuss the disparity between the separation reported by the Tucano pilots and that of the gyrocopter pilot but, unfortunately, the gyrocopter did not display on the radar recordings available to the Board and so no concrete conclusion could be reached. However, the military ATC advisor confirmed that, although not recorded, the PAR returns had shown that the Tucanos and the gyrocopter had come close enough to cause the controllers concern. Members highlighted that, although the gyrocopter pilot was not required to call Linton ATC as he transited close to their MATZ, it was unfortunate that he not done so as he got airborne from his local strip given the weather conditions pertaining at the time and the fact that military aircraft would be routing to Linton across his track. This would have been best practice, and would have ensured both that ATC could have worked with the gyrocopter pilot to ensure aircraft were deconflicted, and that all concerned obtained the most expeditious routing available.

The Board then considered the cause and risk of the incident. Members agreed that a contributory factor in the incident was the ambiguous phraseology from ATC that had led the Tucano pilots to believe the gyrocopter was conducting a PAR. However, given the see-and-avoid nature of the airspace, it remained for the Tucano formation lead to visually ensure separation and give way to the gyrocopter. Unfortunate as it was, and recognising that he turned with the best of intentions, they agreed that the Tucano lead had inadvertently flown into conflict with the gyrocopter due to incorrect situational awareness. Turning to the risk, members agreed that although the gyrocopter pilot had reported a lack of concern regarding the separation, the No2 Tucano pilot's report and his emergency break out of formation both demonstrated that safety had been much reduced below the norm; accordingly, the Board assessed the risk as Category B.

The Board were heartened to hear that the military investigation recommendations had addressed the misleading phraseology used by ATC, and the use of the PAR for deconfliction purposes, in order to remove any unintentional misunderstanding between ATC and aircrew.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The Tucano lead pilot inadvertently flew into conflict with the Gyrocopter due to incorrect situational awareness.

Contributory Factor: Ambiguous phraseology from ATC led the Tucano pilot to believe the gyrocopter was conducting a PAR.

Degree of Risk: B.

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:

ANSP

Regulations, Processes, Procedures & Compliance was assessed as **partially effective** because the standard CAP413 phraseology was not adhered to by the Approach controller when passing TI.

Situational Awareness & Action was assessed as **partially effective** because the Approach controller’s actions did not resolve the situation; this was exacerbated by the controller’s misunderstanding of the application of PAR separation during a DS.

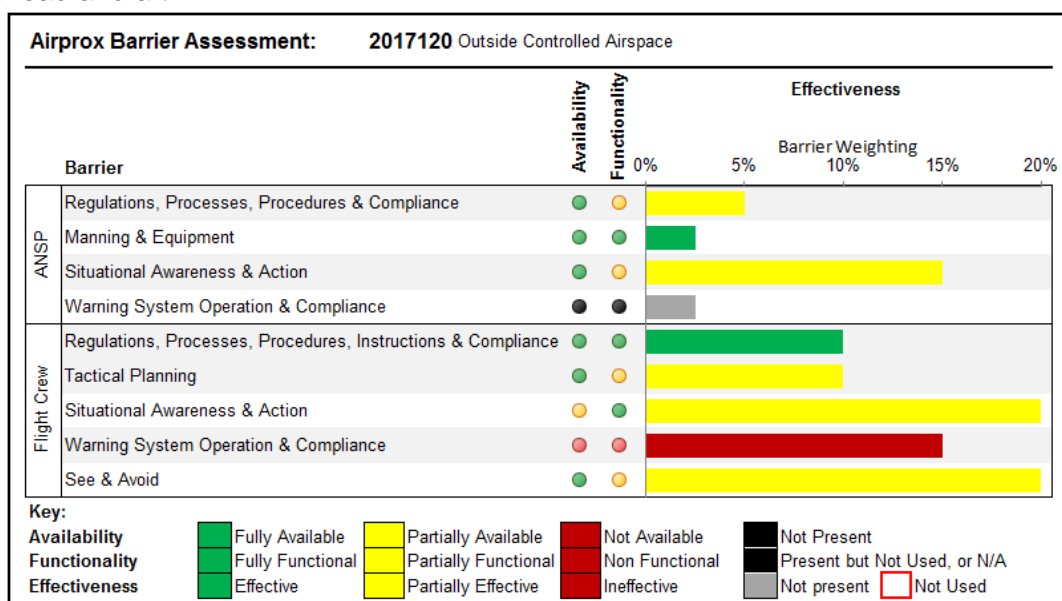
Flight Crew

Tactical Planning was assessed as **partially effective** because the Gyrocopter pilot would have been better served by talking to Linton when transiting through their approach/departure lanes.

Situational Awareness & Action was assessed as **partially effective** because The Tucano pilots had flawed SA through the ambiguous phraseology from ATC; they believed the traffic was carrying out a PAR rather than being a transit aircraft.

Warning System Operation and Compliance was assessed as **ineffective** because although the Tucano aircraft had TCAS it was not able to detect the Gyrocopter due to the lack of a transponder in the Gyrocopter, which he was not required to carry.

See and Avoid was assessed as **partially effective** because the No2 Tucano pilot was able to conduct emergency avoiding action when he saw, at a late stage, that the Gyrocopter was close to the lead aircraft.



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