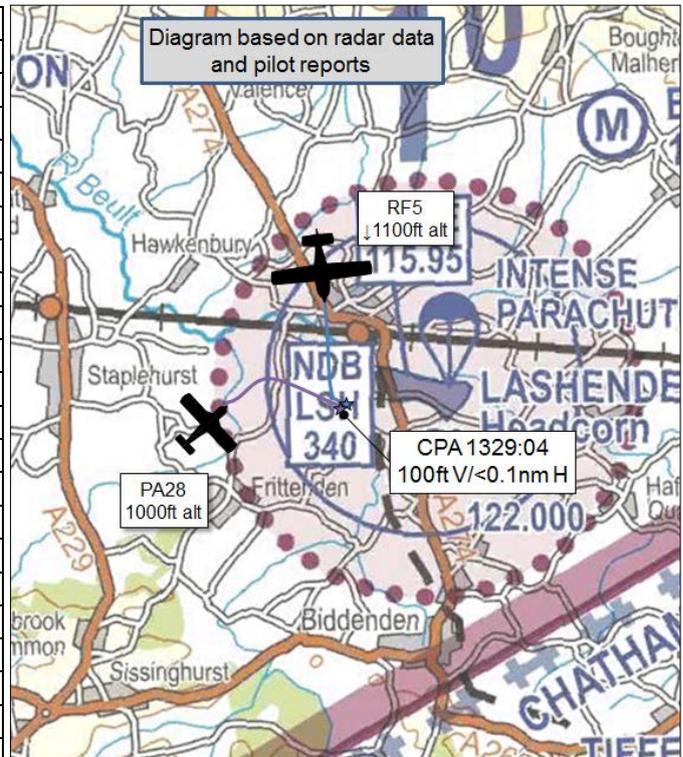


AIRPROX REPORT No 2016196

Date: 01 Sep 2016 Time: 1329Z Position: 5109N 00036E Location: Lashenden/Headcorn Airfield

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	RF5	PA28
Operator	Civ Pte	Civ Trg
Airspace	Headcorn ATZ	Headcorn ATZ
Class	G	G
Rules	VFR	VFR
Service	AGCS	AGCS
Provider	Headcorn	Headcorn
Altitude/FL	1100ft	1000ft
Transponder	On/S	On/C
Reported		
Colours	White, Red	White, Blue
Lighting	Anti Col	Beacon, Strobe
Conditions	VMC	VMC
Visibility	>10km	15km
Altitude/FL	1000ft	1000ft
Altimeter	QFE	QNH (1023hPa)
Heading	107°	100°
Speed	70kt	90kt
ACAS/TAS	Not fitted	Not fitted
Alert	N/A	N/A
Separation		
Reported	50ft V/20m H	100ft V/40m H
Recorded	100ft V/<0.1nm H	



THE RF5 PILOT reports that he had planned to join for RWY28LH. The RF5 requires some form of slowdown manoeuvre to lower the undercarriage, which is mechanical and requires the pilot to look into the cockpit and operate it with his right hand. His preferred join is overhead (not available at Headcorn) lowering the undercarriage before entering the deadside. Given the noise sensitive areas to the south of Headcorn his arrival plan was to fly north of the airfield, around the noise sensitive town of Headcorn and join crosswind. The position of the town of Headcorn means a Crosswind join is not over the runway threshold but about 1nm upwind. From the radio, he was aware of several aircraft in the area, particularly noting another following him cross-channel to Headcorn; he had already prepared for this aircraft, or others, either to overtake him or for him to meet them in the circuit. As he approached about half a mile north of the RWY28 centreline, a Cessna called that it was taking off. He then called that he was approaching the extended runway centreline. In what appeared to be a response to his call the Cessna deviated its course to the right, after passing the threshold, seemingly in a move to integrate behind him. He crossed the extended centreline at approximately 1250ft aal descending, and he considered that at that point he had integrated himself into the established circuit. He and his passenger continued to watch the Cessna as it climbed and passed behind him gaining co-altitude. His presumption was that the Cessna was flying the circuit and his concern was that when he slowed it might run into him so he planned to fly downwind closer to the airfield than the published track; the Cessna then turned Crosswind behind him. He looked forward and to both sides to confirm he was clear of other traffic and turned downwind completing the turn at 1000ft aal. The Cessna also appeared to turn and, in terms of circuit position, was outside and behind him. There was a Downwind call that he took to be the Cessna, as he perceived it to be at the normal downwind point. He followed this with his own call, satisfied that there was little prospect of conflict. Shortly thereafter, either just before or after lowering the undercarriage, a white and blue PA28 appeared underneath crossing left to right (approximately 8 to 2 o'clock); it appeared from under the left wing, went under the nose, emerging on the right. It was approximately 50ft below and between 20 and 40 meters ahead. He shouted "Where did that come from?" and the rear passenger

momentarily saw the roof of the PA28 on the left-hand side from whence it disappeared from her view, under the fuselage and wing, reappearing again on the right hand side. It was so close that he could read the registration, see a badge or logo above the blue fuselage stripe behind the cabin and see the details of the control surfaces. After it passed under him the PA28 turned right (contra circuit) and climbed slightly. His passenger confirmed it continued to climb slightly above his level heading contra Downwind. From first sight to the Closest Point of Approach there was insufficient time to perform any avoidance manoeuvre, he believes there was only a low probability of actual collision due to the short time frame and relative trajectories. After the PA28 passed there was a radio call containing the call-sign [PA28 C/S]. This was the first time he associated this with the PA28, having read its registration as it passed. Either before or after that call from the PA28 he called on the Headcorn frequency, to say that a blue and white PA28 had passed about 50 ft below. His initial perception was that the PA28 had come close in along the Crosswind, at speed, following him and he wondered whether it was the following channel-crosser. On longer reflection, he could not exclude the possibility that, in watching the Cessna, a situation developed where the PA28 approached from the South or West at a lower altitude than him and went into his blind spot below the nose or wing, with his Downwind turn consequently putting it on his left-hand side. He opined that this makes the Airprox he was reporting all the more concerning as it might have been preceded by an earlier encounter of unknown separation. The PA28 landed, and once the pilot had disembarked, he approached the PA28 pilot saying they had a near miss and asking whether he had seen him. The PA28 pilot's response was that he called Downwind and that the RF5 pilot should check with Radio [AGCS]. He replied "I didn't really hear that" (meaning in relation to his aircraft) to which the PA28 pilot responded "You didn't hear my call so that's your problem". The PA28 pilot continued that he had called 30 seconds before him, told him to check with Radio and repeated "It's your problem". The RF5 pilot pointed out that a call doesn't really mean anything regarding position, certainly doesn't establish any priority in the circuit or right of way, and in any case the PA28 pilot was apparently overtaking him and crossed from left to right. The PA28 pilot appeared to be aware that the RF5 came Crosswind but did not, to his [the RF5 pilot's] recollection, say he was visual with the RF5. The RF5 pilot considered that no rational exchange was going to ensue so it ended there. The RF5 pilot then went to fuel and, when finished, the pilot of the PA28 approached to say he had spoken to Radio and they confirmed he called and repeated his stance that since he [the RF5 pilot] hadn't heard him it's his [the RF5 pilot's] problem. He again pointed out that radio calls do not establish any order or rights of way in the circuit, and how did the PA28 pilot explain that he appeared to dive under the RF5 from left to right? The PA28 pilot's answer was "To clear you I dived down underneath you, so what's your problem with that?" He asked the PA28 pilot if he was prepared to file the incident, the PA28 pilot replied "No". He [the RF5 pilot] asked the A/G Operator if he was aware of the near miss, the A/G operator confirmed he did, that he had heard aircraft calling, but noted that he had no visibility of the circuit so they could be anywhere. The RF5 pilot commented that he has pondered for a while as to whether to file this Airprox; if the response of PA28 pilot had been along the lines that he was continuously visual with the RF5 he would probably have thanked him for his vigilance, if not his manoeuvre, and left it there. As it was the PA28 pilot seemed totally unperturbed by the incident, only insisting that he [the PA28 pilot] had called Downwind first. The RF5 pilot believed the PA28 pilot was not visual with him at any time whilst it passed underneath. Given the possibility the PA28 only turned in response to his Downwind call, he was concerned at both the proximity and the nature of the manoeuvre performed.

He assessed the risk of collision as 'High'.

THE PA28 PILOT reports that he called Headcorn Radio and reported that he would join downwind. As he approached Headcorn from the SE he heard another aircraft requesting to cross the downwind end of the runway. Shortly after he saw a red [RF5] aircraft with long wings, travelling in a southerly direction at approximately 1200ft. The RF5 was above and approximately 1nm to his left. He judged that, if the RF5 maintained heading and altitude, he would pass safely below. He then joined the circuit and reported '[PA28 C/S] joining downwind', which was acknowledged by Headcorn Radio. Almost immediately after the call, and to his great surprise, another aircraft called downwind and he immediately noticed that the [RF5] aircraft, which had been heading 180 degrees, was now turning eastwards above and to his left with the apparent intention of joining the circuit directly ahead of him from a crosswind position. As the [RF5] aircraft had turned into his path, but slightly above, only

100m ahead, and it was much slower than his PA28, the two aircraft converged rapidly. He reduced power and lowered the nose of the PA28 and initiated a sharp right turn; he then reported on the radio that he was making a 360 degree turn to ensure separation as the [RF5] aircraft was too close; this call was acknowledged by Headcorn Radio. At this time another aircraft, which he assumes was the [RF5] aircraft, called saying '[RF5 C/S] a PA28 has just appeared from under my nose and I have no idea where it came from'. He completed his 360 degrees turn and, having achieved satisfactory separation from the red aircraft, which was now ahead of him, rejoined the normal circuit pattern. He believes he took all appropriate actions when joining the circuit and avoiding the [RF5] aircraft which was now well ahead of him. He believes it would appear that the [RF5] aircraft did not see the PA28 and did not hear his downwind call. The [RF5] aircraft did not take any avoiding action and landed ahead of him. After he had landed and parked the PA28, he was approached by the pilot of the [RF5] aircraft who seemed agitated and claimed that he [the PA28 pilot] had 'almost killed us both', and claimed that the PA28 pilot had entered the circuit without talking to Headcorn Radio. He informed the [RF5] pilot that he had made the appropriate calls but the [RF5] pilot insisted he had not. He checked with the A/G operator who confirmed he had made the calls and that the RF5 pilot had made the call after the PA28 pilot. He reported this to the RF5 pilot who, again, insisted he had not heard any calls. He then concluded that there was no point in having further discussions with the RF5 pilot.

He assessed the risk of collision as 'Medium'.

Factual Background

The weather at Lydd was recorded as follows:

METAR EGMD 011220Z 22010KT 9999 FEW029 21/14 Q1024

Analysis and Investigation

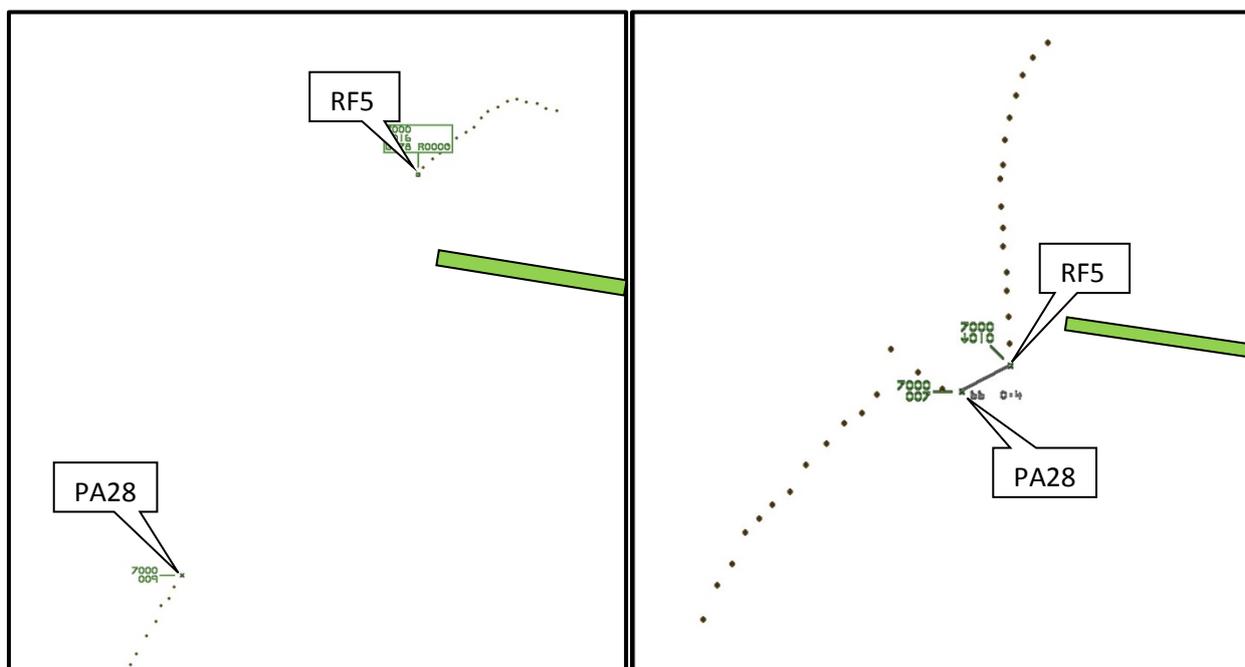
UKAB Secretariat

The RF5 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 hazard¹. An aircraft operated on or in the vicinity of an aerodrome shall conform with or avoid the pattern of traffic formed by other aircraft in operation².

The RF5 joined from the North and the PA28 joined from the South West. At 1327:19 (Figure 1), each aircraft has the other in his 12 o'clock. The RF5 turns crosswind when the aircraft are 3.5nm apart; at this stage the PA28 still has the RF5 in his 12 o'clock whilst the RF5 has the PA28 on his right. The RF5 passes through the PA28's 12 o'clock as the PA28 turns downwind, and at this point the RF5 is still flying crosswind 0.4nm ahead of the PA28 (Figure 2). The radar returns on the radar replay garble at this point; however, when the radar returns separate, the RF5 is downwind and the PA28 is to the South in a right hand orbit as described in both pilots' reports. The RF5 continues downwind with the PA28 turning right to reposition downwind behind the RF5.

¹ SERA.3205 Proximity.

² SERA.3225 Operation on and in the Vicinity of an Aerodrome.

Figure 1: 1327:19³Figure 2: 1328:41³

Summary

An Airprox was reported when a RF5 and a PA28 flew into proximity at 1329 on Thursday 1st September 2016 as they both joined the Headcorn circuit, the RF5 from the north (crosswind join) and the PA28 from the southwest (downwind join). Both pilots were operating under VFR in VMC and in receipt of an Air Ground Service from Headcorn Radio.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available consisted of reports from the pilots of both aircraft and radar photographs/video.

The Board began by discussing circuit joins and the importance, especially at airfields with an AGCS, of maintaining good situational awareness, stating intentions clearly and following procedures. In this respect, GA members commented that Headcorn is a busy uncontrolled airfield and therefore the need for pilots to maintain a good lookout and pay particular attention to radio calls was vital.

The Board then considered the actions of the RF5 pilot. They agreed that he had followed the initial ground track for a crosswind join (which required Headcorn village to be avoided) but, although noting that he stated that he had called when he was just north of the centreline, in the absence of any RTF recording they could not establish whether he had clearly articulated his intention to conduct a join crosswind at an early enough stage that the PA28 pilot might have been aware before he arranged himself for his downwind join. Members also noted that the RF5 pilot had turned early onto the downwind leg in an attempt to stay ahead of the Cessna, and commented that an RTF call to that effect would have been beneficial to the situational awareness of all others in the visual circuit rather than relying on them seeing him do so. Having unwittingly then associated the PA28 pilot's downwind call with the Cessna, it was clear to the Board that this had resulted in the RF5 pilot not realising that the PA28 was in the circuit and therefore not looking out robustly for additional traffic as he turned downwind. In this respect, and having noted himself that there were other aircraft in the area, (and regarding one in particular that 'he had already prepared for this aircraft, or others, either to overtake him or for him to meet them in the circuit'), the Board opined that the RF5 pilot seemed to

³ Note: The green rectangle is an approximate indication of RWY 28/10 at Headcorn, not to scale, to assist in denoting the positions of the RF5 and PA28 when they joined the visual circuit.

have become inadvertently fixated on the Cessna to the detriment of overall lookout and situational awareness, which meant that he did not assimilate or see the PA28 before he turned tight downwind.

The Board then turned to the actions of the PA28 pilot. He had sighted the RF5 crosswind as he commenced his downwind join and had judged that he would be able to pass ahead of it to arrive downwind first. Notwithstanding the unexpected early turn by the RF5 pilot, this was a finely judged decision which required him constantly to monitor the RF5 to ensure that a conflict did not ensue; this resulted in the PA28 pilot crossing under the RF5, from left to right, as he carried out a right hand orbit to increase the spacing between the two aircraft and reposition behind the RF5. GA members were somewhat surprised that he had based his subsequent actions on an assumption of what the RF5 pilot might do rather than either modifying his own join to avoid conflict or actively maintaining sight on the RF5 to ensure separation. A wider join downwind (or an orbit before joining) would have been more sensible, and the PA28 pilot should have been wary that the RF5 pilot may not have seen him and was at liberty to turn downwind at any time to suit his own requirements.

The Board agreed that this incident highlighted important lessons for pilots joining an uncontrolled visual circuit. These include maintaining a good lookout; ensuring radio calls are timely, accurate and understood; complying with standard joining procedures where possible (or making it clear when you are not); ensuring you are fully aware of the intentions and positions of other aircraft in or joining the visual circuit; and flying with foresight, defensively and cautiously, and with courtesy for others at all times.

The Board then looked at the safety barriers that were relevant to this Airprox and decided that the following were key factors:

- **Flight Crew Situational Awareness** was considered **partially effective** because: although the PA28 pilot was aware of the RF5, he had not assimilated its intentions or given it sufficient clearance; and the RF5 pilot was not aware of the PA28 and had inadvertently associated the PA28 pilot's downwind call with the Cessna.
- **See and Avoid** was also considered **partially effective** because: the RF5 pilot did not see the PA28 until it flew beneath his aircraft; the PA28 pilot did not actively maintain sight with the RF5; and the PA28 pilot did not sufficiently avoid the RF5.

The Board then considered the cause and risk of the incident. Members felt that the actions of both pilots could have been improved to prevent this incident from developing. Both were conducting their joins simultaneously, and so both were required to integrate with each other. Unfortunately, the RF5 pilot had become distracted by the Cessna, whilst the PA28 pilot had made assumptions of the RF5's track that were not fulfilled and so a conflict ensued. The incident's cause was therefore assessed as neither pilot integrating effectively into the visual circuit. Turning to the risk, members agreed that safety had been much reduced because the RF5 pilot had not seen the PA28 and the PA28 pilot had only become aware of the conflict at a late stage as the RF5 converged rapidly, therefore the Board assessed the risk as Category B.

PART C: ASSESSMENT OF CAUSE AND RISK

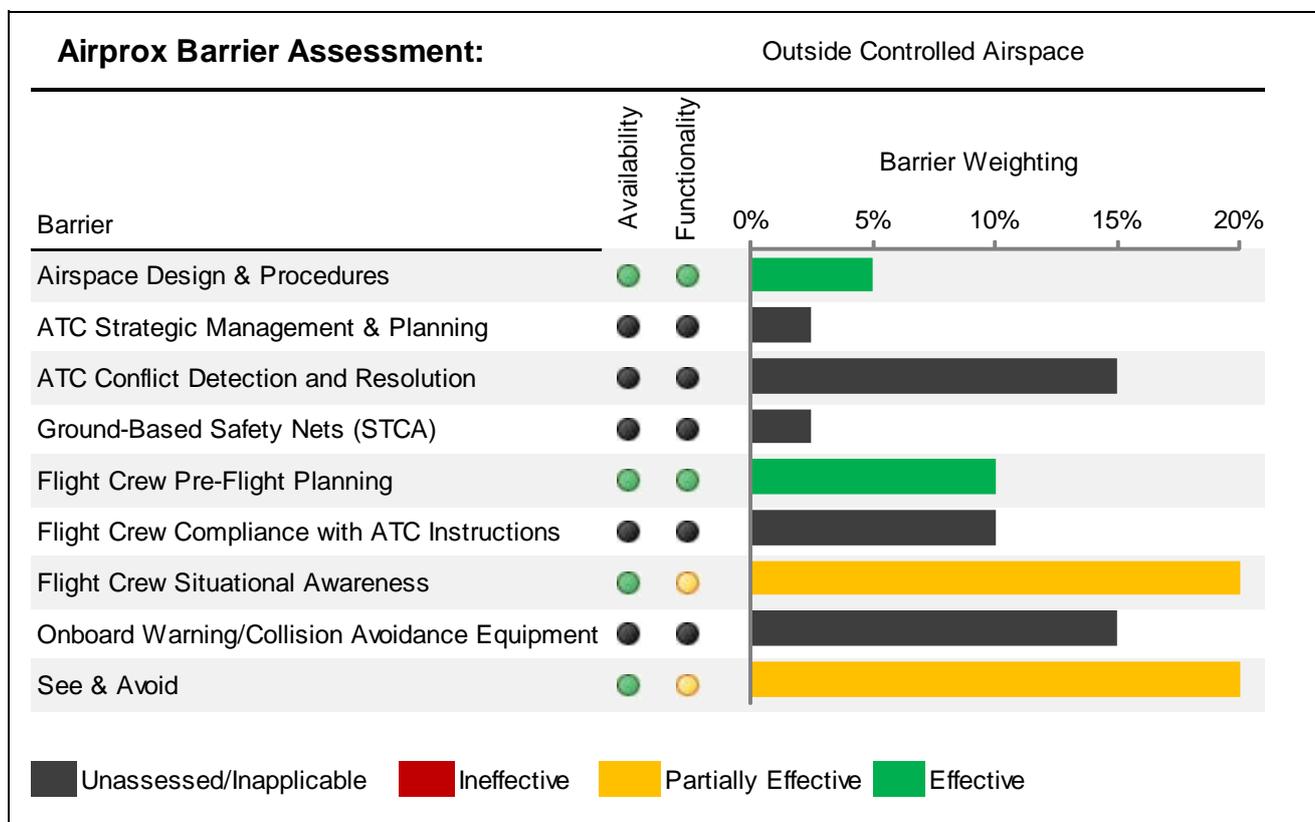
Cause: Neither pilot integrated effectively into the visual circuit.

Degree of Risk: B.

Barrier Assessment:

Modern safety management processes employ the concept of safety barriers that prevent contributory factors or human errors from developing into accidents. Based on work by EASA, CAA, MAA and UKAB, the following table depicts the barriers associated with preventing mid-air-collisions. The length of each bar represents the barrier's weighting or importance (out of a total of 100%) for the

type of airspace in which the Airprox occurred (i.e. Controlled Airspace or Uncontrolled Airspace).⁴ The colour of each bar represents the Board's assessment of the effectiveness of the associated barrier in this incident (either Fully Effective, Partially Effective, Ineffective, or Unassessed/Inapplicable). The chart thus illustrates which barriers were effective and how important they were in contributing to collision avoidance in this incident.



Barrier Effectiveness		Functionality		
		Non-functional	Partially Functional	Functional
Availability		1	2	3
Completely Unavailable	1	1	2	3
Partially Available	2	2	4	6
Available	3	3	6	9

Key:

[Green]	Effective
[Yellow]	Partially Effective (If the system was partially available but fully functional score availability as 2.5)
[Red]	Ineffective
[Grey]	Unassessed/Inapplicable

⁴ Barrier weighting is subjective and is based on the judgement of a subject matter expert panel of aviators and air traffic controllers who conducted a workshop for the UKAB and CAA on barrier weighting in each designation of airspace.

Barrier	Availability			Functionality			Unassessable / Absent
	Fully (3)	Partially (2)	Not Available (1)	Fully (3)	Partially (2)	Non Functional (1)	
Airspace Design and Procedures	Appropriate airspace design and/or procedures were available	Airspace design and/or procedures were lacking in some respects	Airspace design and/or procedures were not appropriate	Airspace design and procedures functioned as intended	Airspace design and/or procedures did not function as intended in some respects	Airspace design and/or procedures did not function as intended	<p>The Board either did not have sufficient information to assess the barrier or the barrier did not apply; e.g. TCAS not fitted to either aircraft or ATC Service not utilised.</p> <p>Note: The Board may comment on the benefits of this barrier if it had been available</p>
ATC Strategic Management and Planning	ATM were able to man and forward plan to fully anticipate the specific scenario	ATM were only able to man or forward plan on a generic basis	ATM were not realistically able to man for or anticipate the scenario	ATM planning and manning functioned as intended	ATM planning and manning resulted in a reduction in overall capacity (e.g. bandboxed sectors during peak times)	ATM planning and manning were not effective	
ATC Conflict Detection and Resolution	ATS had fully serviceable equipment to provide full capability	ATS had a reduction in serviceable equipment that resulted in a minor loss of capability	ATS had a reduction in serviceable equipment that resulted in a major loss of capability	The controller recognised and dealt with the conflict in a timely and effective manner	The controller recognised the conflict but only partially resolved the situation	The controller was not aware of the conflict or his actions did not resolve the situation	
Ground-Based Safety Nets (STCA)	Appropriate electronic warning systems were available	Electronic warning systems is not optimally configured (e.g. too few/many alerts)	No electronic warning systems were available	Electronic warning systems functioned as intended, including outside alerting parameters, and actions were appropriate	Electronic warning systems functioned as intended but actions were not optimal	Electronic warning systems did not function as intended or information was not acted upon	
Flight Crew Pre-Flight Planning	Appropriate pre-flight operational management and planning facilities were deemed available	Limited or rudimentary pre-flight operational management and planning facilities were deemed available	Pre-flight operational management and planning facilities were not deemed available	Pre-flight preparation and planning were deemed comprehensive and appropriate	Pre-flight preparation and/or planning were deemed lacking in some respects	Pre-flight preparation and/or planning were deemed either absent or inadequate	
Flight Crew Compliance with Instructions	Specific instructions and/or procedures pertinent to the scenario were fully available	Instructions and/or procedures pertinent to the scenario were only partially available or were generic only	Instructions and/or procedures pertinent to the scenario were not available	Flight crew complied fully with ATC instructions and procedures in a timely and effective manner	Flight crew complied later than desirable or partially with ATC instructions and/or procedures	Flight crew did not comply with ATC instructions and/or procedures	
Flight Crew Situational Awareness	Specific situational awareness from either external or onboard systems was available	Only generic situational awareness was available to the Flight Crew	No systems were present to provide the Flight Crew with situational awareness relevant to the scenario	Flight Crew had appropriate awareness of specific aircraft and/or airspace in their vicinity	Flight Crew had awareness of general aircraft and/or airspace in their vicinity	Flight Crew were unaware of aircraft and/or airspace in their vicinity	
Onboard Warning/Collision Avoidance Equipment	Both aircraft were equipped with ACAS/TAS systems that were selected and serviceable	One aircraft was equipped with ACAS/TAS that was selected and serviceable and able to detect the other aircraft	One aircraft was equipped with ACAS/TAS that was selected and serviceable but unable to detect the other aircraft (e.g. other aircraft not transponding)	Equipment functioned correctly and at least one Flight Crew acted appropriately in a timely and effective manner	ACAS/TAS alerted late/ambiguously or Flight Crew delayed acting until closer than desirable	ACAS/TAS did not alert as expected, or Flight Crew did not act appropriately or at all	
See and Avoid	Both pilots were able to see the other aircraft (e.g. both clear of cloud)	One pilots visibility was uninhibited, one pilots visibility was impaired (e.g. one in cloud one clear of cloud)	Both aircraft were unable to see the other aircraft (e.g. both in cloud)	At least one pilot takes timely action/inaction	Both pilots or one pilot sees the other late and one or both are only able to take emergency avoiding action	Neither pilot sees each other in time to take action that materially affects the outcome (i.e. the non-sighting scenario)	