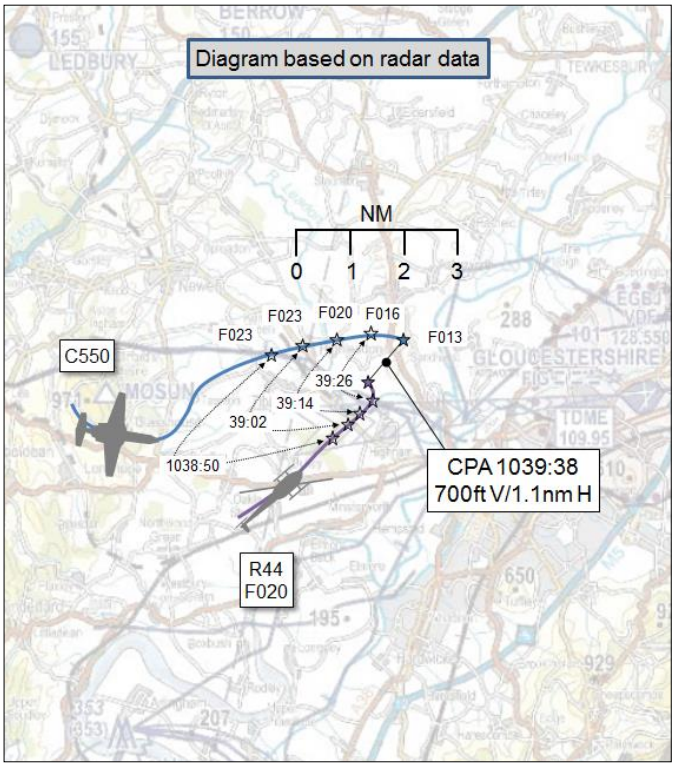
AIRPROX REPORT No 2016177

Date: 16 Aug 2016 Time: 1039Z Position: 5154N 00218W Location: 7nm W Gloucestershire airport

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	C550	R44
Operator	Civ Comm	Civ Trg
Airspace	London FIR	London FIR
Class	G	G
Rules	IFR	VFR
Service	Procedural	Basic
Provider	Gloster	Gloster
Altitude/FL	FL20	FL19
Transponder	A,C,S	A,C,S
Reported		
Colours	Mainly white	Green/silver
Lighting	NK	NK
Conditions	VMC	VMC
Visibility	>10km	>10km
Altitude/FL	2500ft	NK
Altimeter	QNH (1020hPa)	NK
Heading	086°	NK
Speed	100-200kt	NK
ACAS/TAS	TCAS II	Not fitted
Alert	Proximate	N/A
Separation		
Reported	300ft V/1nmH	Not seen
Recorded	700ft V/1.1nm H 100ft V/1.5nm H	



THE CESSNA 550 CITATION PILOT reports that he was cleared for an RNAV approach to RW09 at Gloucestershire airport. Approaching waypoint BJ091 at 2500ft proximate traffic was observed on TCAS ahead of them on their approach track, 400-700ft below them. It did not appear to be moving away. As a result, at BJ091 they maintained 2500ft and turned away to the north-east. Then they paralleled the final approach track of 086° to RW09. Visual contact with the helicopter was made approximately 300ft below their altitude within 1nm. The helicopter pilot appeared to be on the final approach track for RW09. He commented that they would have descended on to it if they had not observed the proximate traffic on TCAS. He notified Gloster Tower and they attempted several times to establish communication with the helicopter pilot but without success.

He assessed the risk of collision as 'Medium'.

THE ROBINSON R44 PILOT reports that he was completely unaware of the Airprox until the 7th September (21 days after the event) when he was contacted by e-mail. His helicopter company does many training flights to the north-west of Gloucestershire airport and considering the length of time involved he could not remember any specific details of where they were precisely on that day other than to the north-west. There has been a safety meeting at the helicopter operating company since and the importance of staying clear of the ILS even when 10nm from the airfield was brought up for discussion. He pointed out that it is an automatic process to receive a Basic Service from Gloster Approach when departing on a training flight in the local area and he would have been monitoring the Approach frequency throughout the duration of the flight. All their pilots have now been briefed on the issues of flying around the 10nm zone and the typical altitudes that can be hazardous.

THE GLOUCESTERSHIRE APPROACH CONTROLLER reports that the C550 was inbound to the airport conducting an RNAV approach to RW09 under a Procedural Service in Class G airspace. He was about to call suspected traffic (no radar identification) on his right-hand side about 5-6nm west of the airport when

the pilot asked him if he knew about traffic there. Being under a Procedural Service the pilot should be passed Traffic Information, if it is considered that a confliction may exist, on other known traffic; however, that traffic was not "known". He did try and contact the unknown traffic but did not receive a response. He was reasonably certain that the aircraft was a locally based R44. The R44 pilot called him slightly later to join from the north-west. At the time the C550 was passing the traffic, the R44 pilot did not respond to his calls, he was nominally under a Basic Service at the time.

Factual Background

The weather at Gloucestershire was recorded as follows:

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METAR EGBJ 161020Z 11005KT 060V160 CAVOK 21/12 Q1020=
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Analysis and Investigation

CAA ATSI

The C550 pilot was inbound to Gloucestershire Airport on an RNAV (GNSS) approach to RW09. The R44 had previously departed Gloucestershire Airport and had agreed a Basic Service at 1022:50. Both aircraft were being provided with an ATC service by the Gloucestershire Aerodrome controller who was operating Aerodrome and Approach combined.

At 1037:33 the C550 pilot, having previously reported passing the Initial Approach Fix for the RNAV approach, reported passing the Final Approach Fix and was advised that he was number 1 for the approach.

At 1037:37 the C550 pilot, based on TCAS information available to him, reported traffic 500ft below and asked the Gloucestershire controller if they were speaking to that traffic (Figure 1).

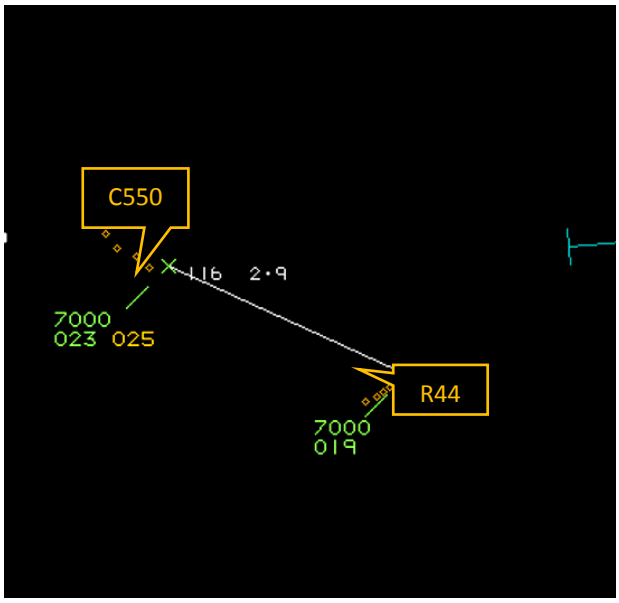


Figure 1 – 1037:33.

The Gloucestershire controller made a broadcast call, asking if the pilot of the aircraft passing to the west of them, on a north-easterly track, was on frequency, but received no response. The controller then contacted a specific pilot to determine their position which placed them away from that geographical area (not therefore the subject R44).

At 1038:05 the C550 pilot reported the other aircraft was now 300ft beneath them and that they, (the C550) were turning to the north and then back on track. The controller again tried a broadcast call but received no response (Figure 2).

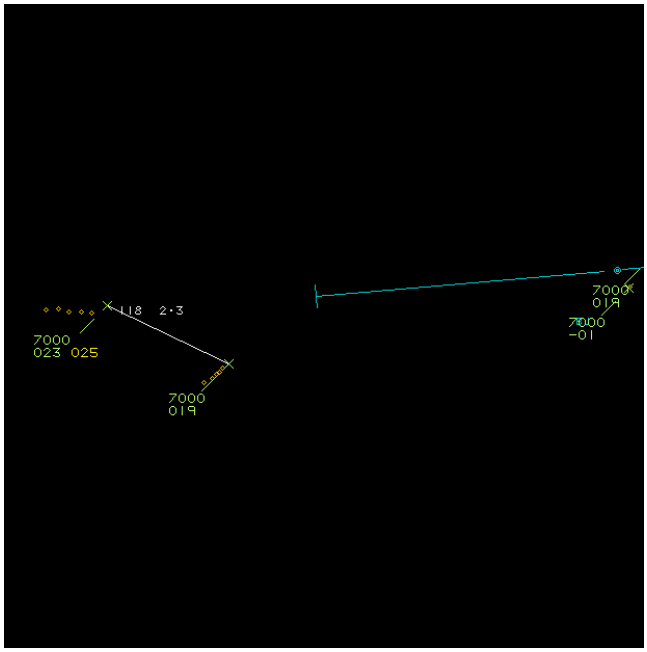


Figure 2 – 1038:05.

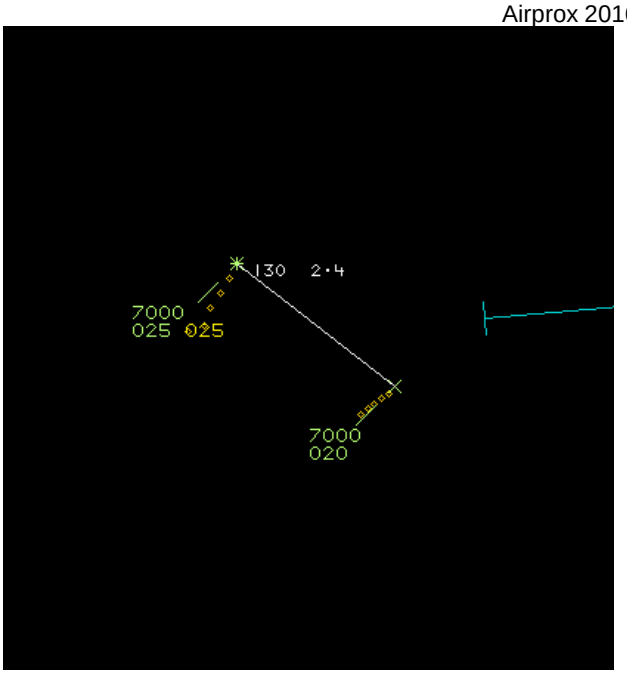


Figure 3– 1038:24.

At 1038:25 the C550 pilot reported visual with the other aircraft and the Gloucestershire controller then cleared them for a visual approach (Figure 3).

At 1039:08 the C550 pilot reported the other aircraft type as a helicopter, at which point the Gloucestershire controller called the R44 pilot but received no reply.

At 1039:38 the C550 pilot reported the colour of the other aircraft and confirmed that it was an R44. This was coincident with CPA, with the aircraft separated by 1.1nm laterally and 700ft vertically (Figure 4).

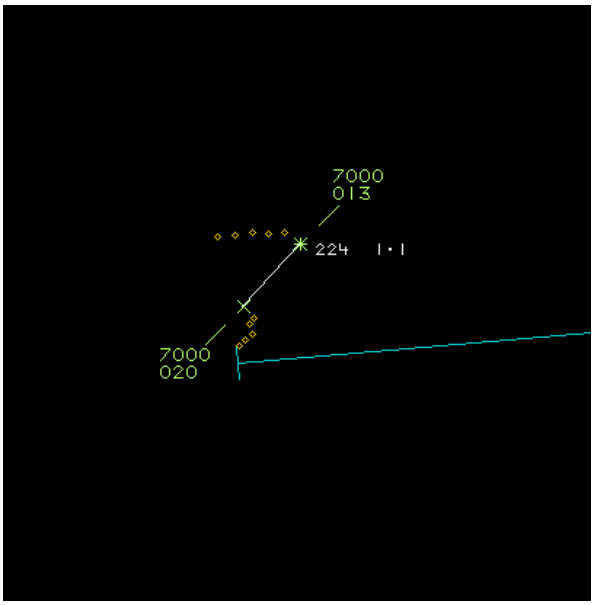


Figure 4 – 1039:38.

The R44 pilot called the Gloucestershire controller for a joining clearance at 1041:40 which was the first transmission they had made since agreeing a Basic Service at 1022:50.
CAP774 states:

> *A Procedural Service is an ATS where, in addition to the provisions of a Basic Service, the controller provides restrictions, instructions, and approach clearances, which if complied with, shall achieve*

deconfliction minima against other aircraft participating in the Procedural Service. Neither traffic information nor deconfliction advice can be passed with respect to unknown traffic.

A Procedural Service does not require information derived from an ATS surveillance system. Therefore, due to the ability for autonomous flight in Class G airspace, pilots in receipt of a Procedural Service should be aware of the high likelihood of encountering conflicting traffic without warnings being provided by ATC.

Pilots flying in the vicinity of aerodromes, ATS routes, or navigational aids where it is known that a Procedural Service is provided, are strongly encouraged to attempt to establish RTF contact with the notified ATS provider.

CAP774 also states:

The controller shall provide traffic information, if it is considered that a confliction may exist, on aircraft being provided with a Basic Service and those where traffic information has been passed by another ATS unit; however, there is no requirement for deconfliction advice to be passed, and the pilot is wholly responsible for collision avoidance.

The Gloucestershire controller was operating without surveillance equipment, although a primary radar feed to an ATM is often used for what the unit describes as "situational awareness". The controller, who was busy with aircraft on both Tower and Approach, was not aware of the proximity of the R44 to the C550. The controller reported that he had seen a contact on the display when he was about to pass Traffic Information to the C550 pilot, however, the C550 pilot then reported the traffic (based on TCAS).

UKAB Secretariat

The C550 and R44 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]. Because the incident geometry is considered as converging then the C550 pilot was required to give way to the R44, which he did[2].

Summary

An Airprox was reported when a C550 and an R44 flew into proximity at 1039 Tuesday 16th August 2016. The C550 pilot was operating under IFR in VMC, inbound to Gloucestershire, and was in receipt of a Procedural Service. The R44 pilot was operating under VFR in VMC, in receipt of a Basic Service. The C550 pilot was initially warned about the traffic on his TCAS, before sighting the aircraft. The R44 pilot did not see the C550.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from both pilots, the controller concerned, area radar and RTF recordings and reports from the appropriate ATC and operating authorities.

Looking first at the actions of the C550 pilot, the Board noted that he was inbound to Gloucestershire, which is situated outside CAS, on an IFR flight in VMC, in receipt of a Procedural Service. The pilot had been cleared for an RNAV approach to RW09 and had turned to the north to avoid traffic which had been displayed as proximate on his TCAS. Shortly afterwards the pilot reported that he was visual with the traffic and the controller cleared him for a visual approach. The Board commended the pilot for taking appropriate positive action to avoid the possibility of a collision and noted the usefulness of TCAS to pilots operating outside CAS, especially, as on this occasion, when no radar service was available. Fortuitously, the R44 was transponding at the time, which allowed the TCAS to function and pass information to the C550 pilot; members highlighted the inherent safety value to pilots of selecting transponder on even though their aircraft may not be fitted with TCAS equipment. Although the C550 pilot had taken avoiding action on his own initiative (as he was required to do under the Rules of the Air), some members thought he may have

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

been surprised to see conflicting traffic close to an instrument approach. Despite the fact that Gloucester Airport had a radar capability for situational awareness purposes it was not certified for controlling purposes and members reiterated the fact that in Class G airspace there was no specific separation afforded to aircraft on a Procedural Service other than to other aircraft also participating in the Procedural Service.

The Board commended the actions of the Gloucester controller in attempting to contact the pilot of the unknown aircraft after the C550 pilot had reported its presence. The Board were aware that the controller did have access to a radar display in the VCR but that it is only usable for 'situational awareness' and he had no definite knowledge of the R44's position until its pilot later called to rejoin. He did comment that he was about to pass information on the suspected traffic seen on the display just as the C550 pilot reported his TCAS sighting.

The Board then turned its attention to the actions of the R44 pilot. It was noted that he had departed Gloucestershire airport on a local VFR training flight, in receipt of a Basic Service. He reported that he would have been monitoring the Approach frequency in accordance with the requirements of a Basic Service; however, he did not react to the general broadcast made by ATC or the specific call to his helicopter. The Board noted that the Airprox occurred about 7nm west of Gloucestershire airport as the R44 was crossing the instrument approach path to RW09. GA pilot members commented on the wisdom of crossing an instrument approach at a similar altitude to the descent path. In response, a Civil Helicopter Pilot member commented that most pilot training on types like the R44 would only consist of VFR flights and he wondered whether, despite being locally based, the R44 pilot was aware of the position of the instrument approach path. In this respect, the Board were heartened to hear that the helicopter operating company has since briefed their pilots on the issues of flying near the instrument approach, and the typical altitudes that can be hazardous.

Looking at the safety barriers relevant to this incident, members felt that the following were the key factors:

- **Flight Crew Pre-flight Planning** was assessed as **partially effective** because the R44 pilot had not sufficiently taken into account the impact of his flight on aircraft conducting approaches to RWY09 at Gloucester.

- **Flight Crew Situational Awareness** was also only **partially effective** because the R44 pilot did not hear ATC's calls to him as they tried to establish his intentions and potentially provide him with Traffic Information.

The Board then turned its attention to the cause and risk of the Airprox. Some members wondered whether this incident had simply been a TCAS sighting report, whilst others felt that the event warranted more than this because it was apparent that the C550 pilot had been concerned about the visual proximity of the R44 and neither he nor the controller were aware of its intentions; this latter view prevailed in the discussion. As to the risk, some members believed that the achieved separation had meant that normal safety standards had pertained for Class G operations. However, the majority thought that, because the R44 pilot had not seen the C550, safety had been degraded. That being agreed after a prolonged discussion, all members then further agreed that the C550 pilot had taken timely and effective action to prevent a collision and so the risk was assessed as Category C.

PART C: ASSESSMENT OF CAUSE AND RISK

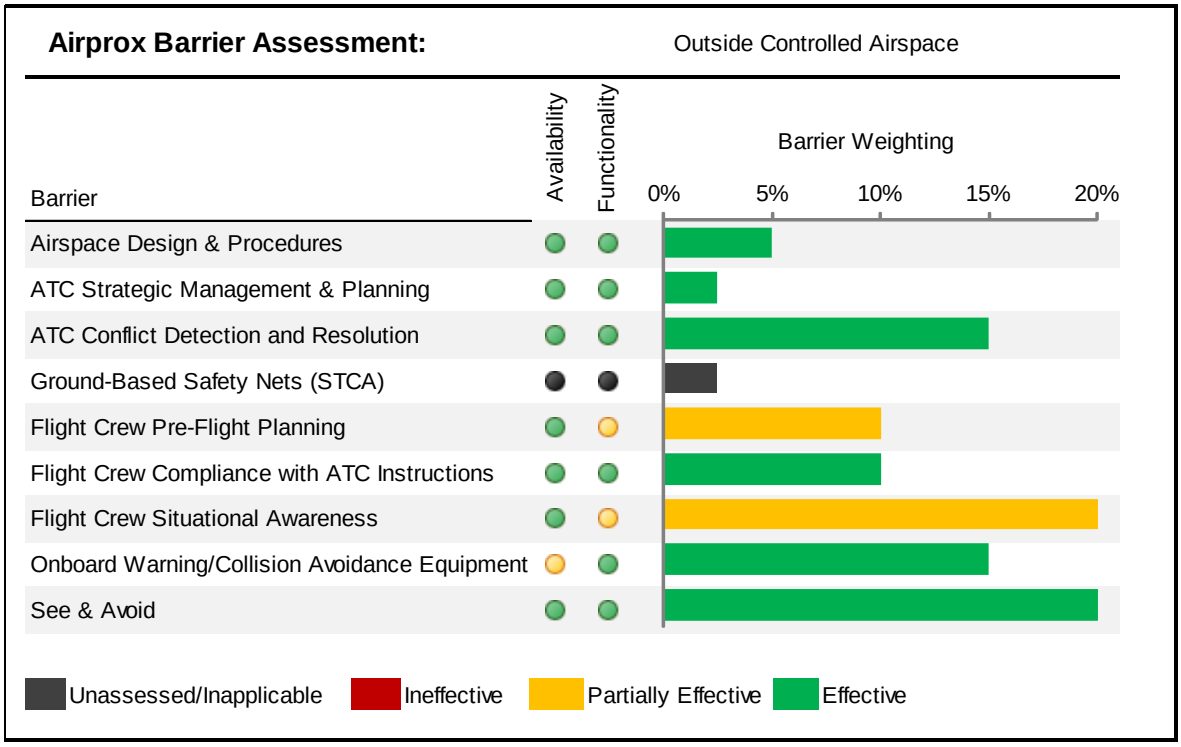
Cause: The C550 pilot was concerned by the proximity of the R44

Degree of Risk: C.

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).[3] 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		Consequence		
		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:

Effective

Partially Effective (If the system was partially available but fully functional score availability as 2.5)

Ineffective

Unassessed/Inapplicable

[3] 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	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. Note: The Board may comment on the benefits of this barrier if it had been available
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 confliction 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)	