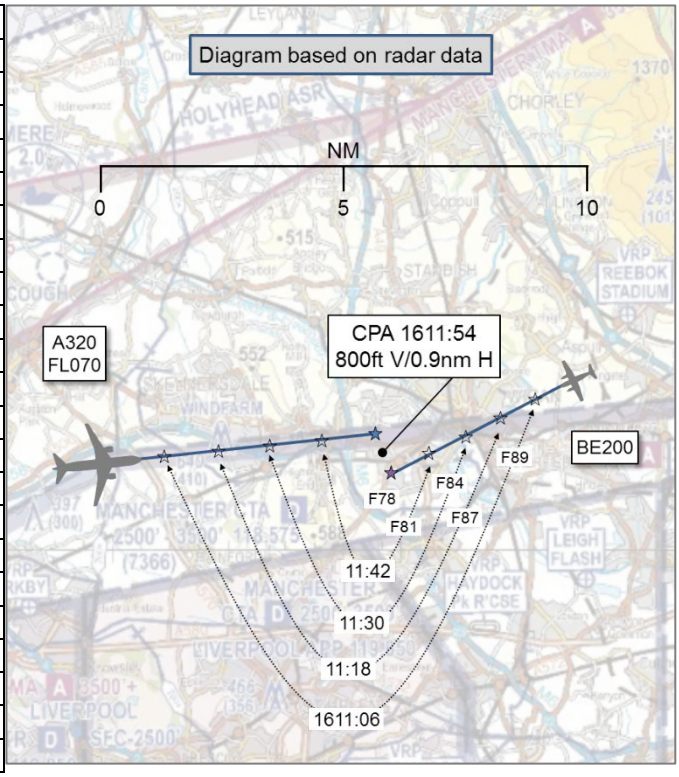
AIRPROX REPORT No 2019209

Date: 26 Jul 2019 Time: 1612Z Position: 5332N 00240W Location: 1nm E MIRSI

PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

Recorded	Aircraft 1	Aircraft 2
Aircraft	A320	BE200
Operator	CAT	Civ Comm
Airspace	Manchester TMA	Manchester TMA
Class	A	A
Rules	IFR	IFR
Service	Radar Control	Radar Control
Provider	Manchester APP	Wallasey Sector
Altitude/FL	FL70	FL78
Transponder	A,C,S	A,C,S[1]
Reported		
Colours	Company	NK
Lighting	NK	NK
Conditions	VMC	NK
Visibility	10km	NK
Altitude/FL	FL70	FL80
Heading	NK	NK
Speed	250kt	NK
ACAS/TAS	TCAS II	TAS
Alert	None	None
Separation		
Reported	NK	Not seen
Recorded	800ft V/0.9nm H	



THE MANCHESTER APPROACH SOUTH CONTROLLER reports that the A320 was at FL70, 1nm east of MIRSI, heading 085°. The pilot reported that an aircraft had just passed by 700ft above. The data blocks were slightly garbled but appeared to indicate that the King Air pilot, inbound to Liverpool, had descended to FL77, then climbed to FL80. The King Air passed less than 1nm south of the A320, westbound. As the two aircraft were then 1000ft apart, 2nm away and heading in the opposite direction, he considered it unnecessary to issue avoiding action. He informed the WALSY Sector Planner of the possible level-bust. The A320 pilot confirmed that he was visual with the aircraft 'all the way'. The minimum separation was recorded as 0.88nm horizontal and 700ft vertical.

THE WALLASEY TACTICAL/PLANNER CONTROLLER reports that the BE200, a Liverpool inbound, was cleared to descend to FL80. This was on top of the A320, a Manchester inbound that he had previously been working but which was now working Approach. The A320 was level at FL70. He received a telephone call from Manchester Approach. They said that the A320 pilot had reported that the aircraft above them went down to FL77. At this point, when he looked at his radar display, the aircraft had passed each other and the BE200 was at FL79. He did not notice the level-bust as his attention was elsewhere in the sector because there were a few other things going on, some of which added complexity. Afterwards, he was told by Manchester Radar that the BE200 pilot had bust his level. He asked the pilot and he said that they had had no indication that they had bust their level. After looking at the radar replay, the BE200 had descended down to FL77 and then back up again.

THE AIRBUS A320 PILOT reports that whilst he was being vectored for approach he noticed proximate traffic 800ft above their level on TCAS. He obtained visual contact with a small aircraft but he could not tell how close it was. There was no TCAS TA or RA. He asked ATC if they were aware of the aircraft. He could not remember the exact reply but he remembered the controller being aware but unconcerned

[1] The BE200 operating company reports that a Mode S transponder is fitted to this aircraft, but there was no evidence of Mode S functionality on the NATS radars.

and neither was he because he had visual contact at all times as the aircraft passed down their right-hand side. No mention of an Airprox was made by either him or the controller.

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

THE BEECH 200 KING AIR PILOT reports that during the descent into Liverpool he was instructed to descend to FL90. He initiated the descent with V/S [Vertical Speed] Mode. Because the DSC [Descent] Mode does not work properly he subsequently selected 'Alt Selection', which armed the system. On reaching FL93 he was instructed to descend further to FL80, which he acknowledged. He 'wound in' 8000ft on the altitude selector, the rate of descent was good and more than 1000fpm. On approaching FL80 he realised the aircraft was not decreasing pitch as it should. He disconnected the autopilot immediately and levelled the aircraft himself. The aircraft went through FL80 by approximately 150ft. He then re-engaged the autopilot and checked the systems. It seemed that turning the Alt Selection knob whilst within 400ft or so of the selected altitude disarmed the Alt Select Mode. With it only being a further 1000ft descent, the time to capture this was minimal, probably something in the region of 15 secs and, moreover, the other King Airs that he flies do not disarm the ALTSEL in this scenario. Scottish ATC then commented that a pilot had reported receiving a TCAS TA. This would have coincided with his level off but his aircraft did not pass through the level to the point of a 'level bust'. After downloading his Sky Demon log debriefing pack this showed to be correct. The other crew member also saw the altimeter as he disconnected the autopilot and had made a manual input. He had previously requested a sterile cockpit due to high workload. Shortly after the level-out they were transferred to Liverpool Radar who reported problems with their transponder; they switched to transponder 2. It appeared that the aircraft had been in maintenance the day before regarding the transponder.

Factual Background

Analysis and Investigation

UKAB Secretariat

The A320 and BE200 pilots shared an equal responsibility for collision avoidance and not to operate in such proximity to other aircraft as to create a collision hazard[2]. The Airprox occurred in Class A airspace where ATC instructions were mandatory.

Occurrence Investigation

BE200's Operating Company Investigation Report:

The Alt Select disengaging was a common occurrence on a number of their King Airs and, as a result, a big part of their line training. Liverpool ATC subsequently confirmed that no level-bust was recorded with them.

NATS PC Safety and Investigation Report

The A320 pilot, inbound to Manchester, was receiving a Radar Control Service from Manchester Approach and was level at FL70. The converging Liverpool inbound, the King Air, was receiving a Radar Control Service from the PC WAL sector and was cleared to descend to FL80.

Just after the tracks had passed, the A320 pilot reported to Manchester that an aircraft had just passed by, 700ft above. Neither controller noticed that the King Air pilot had descended to FL77 then climbed back to FL80, and, when questioned, the pilot stated that they had had no indication of a level-bust. The Manchester controller submitted an Airprox report.

During the level bust, the controller was busy with a traffic scenario which included Manchester and Liverpool arrivals and a Liverpool release for a BARTN departure. From the point at which STCA

[2] SERA.3205 Proximity.

activated, to the point at which the King Air was indicating FL78 (i.e. no longer a level bust), the R/T was taken up by the check-in of another pilot and the subsequent response from the controller. The WAL controller did not employ the defensive method of "maintain FL80, traffic 1000ft below"; however, even had they wanted to, they would have been unable due to the check-in of this pilot. The level-bust lasted for only 1 sweep of the radar and at the point the bust occurred, the labels were likely to have been merged on the radar display. The King Air did not have Mode S, and therefore the selected FL could never be verified by the controller.

Timeline:

1608:28. The A320 pilot was transferred from PC WAL sector to Manchester Radar

1608:58. The King Air pilot checked in with the WAL controller, FL100, routing direct WAL (VOR)

1609:53. The King Air pilot was instructed to descend to FL90

1610:41 (Figure 1). The King Air pilot was instructed to descend to FL80 (passing FL93 at the end of the instruction). This was read back correctly

1611:34 (Figure 2). STCA activated with a low-severity alert

1611:47 (Figure 3). Radar replay indicates that the King Air descends below FL80.

1611:55 (Figure 4). Separation was lost as the King Air's Mode C indicated 300ft below the cleared level of FL80

1612:03. Separation was regained as the King Air's Mode C indicated within 100ft of the cleared level

1612:11. STCA activation ceased

1612:18. The King Air pilot was instructed to descend to FL70

1612:44. The WAL controller answered the telephone call from Manchester, relating that the A320 pilot had reported that the King Air was about 700ft above when they passed abeam, about half a mile away. The WAL controller stated that they did not see it, and they would have a look at it

1613:14. The WAL controller passed on Manchester's message to the King Air pilot and asked 'Did you bust your level there'. The King Air pilot responded "Roger, didn't indicate that here, but OK, [King Air C/S]". The WAL controller asked "just confirm then, your indications are that you did not" to which the pilot responded "Didn't bust the level, no, [King Air C/S], on my indications".

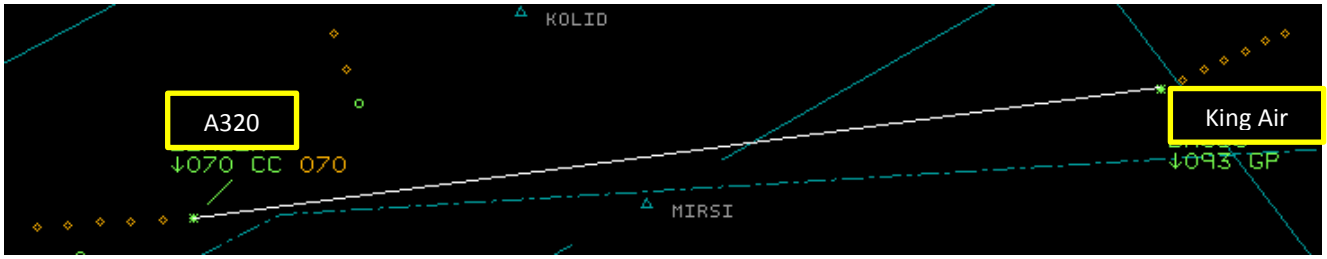


Figure 1. 1610:43; King Air was cleared FL80.

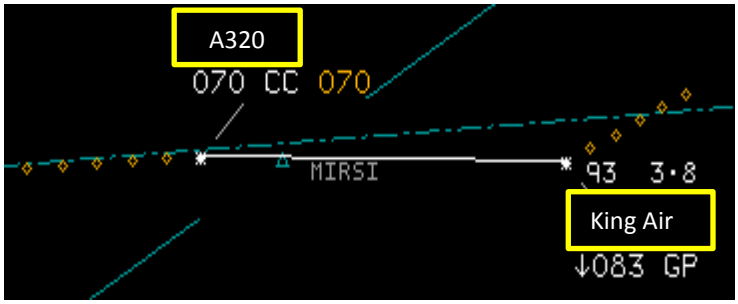


Figure 2. 1611:34; STCA activated.

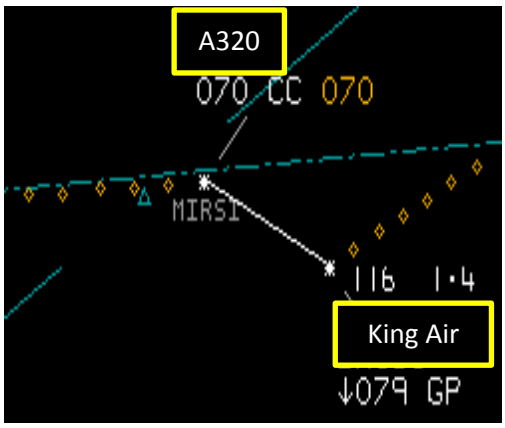


Figure 3. 1611:47; King Air indicated FL79.

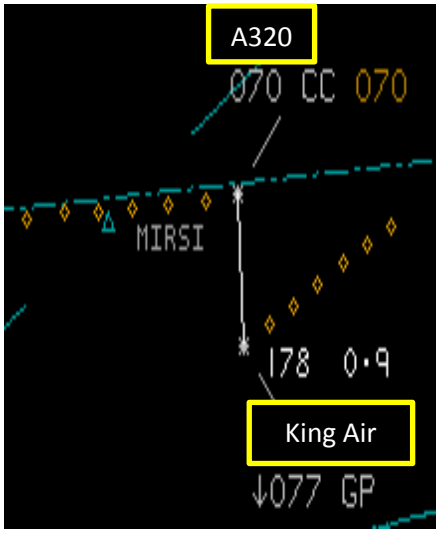


Figure 4. 1611:55 Separation lost as King Air's Mode C is outside the 200ft tolerance, indicating FL77.

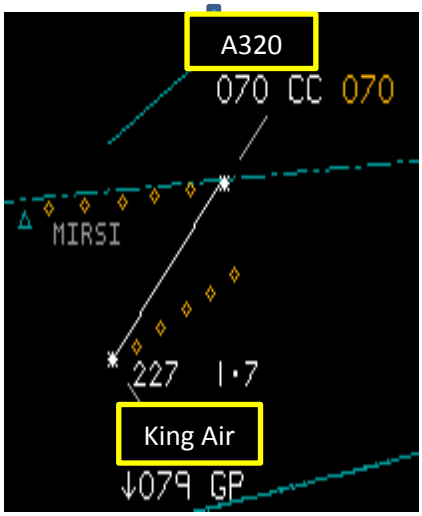


Figure 5. 1612:03 Separation regained as Mode C indicated within required tolerance (previous update also showed FL77).

Radar Analysis:

The Multi Radar Tracking (MRT), as used by the WAL controller, had a predictive element, which in certain circumstances can show a level different to what the aircraft was actually at. (Normally when an aircraft has a very high rate of climb/descent and a sudden levelling off.) In order to ascertain whether the King Air did in fact level bust, and to what extent, five Single Source radars were analysed. Four showed a descent to FL77, and the remaining radar showed a minimum of FL78

before a climb back up. It can therefore be concluded that it was not a radar processing anomaly that showed the King Air at FL77. It can also be concluded that either; a) the King Air did in fact descend to FL77 then climb again, or, b) A technical defect on the aircraft caused an incorrect level to be sent by the transponder, giving a false indication that the King Air descended below its cleared level and then climbed again.

STCA:

STCA functioned as expected. The WAL controller would not have been unduly concerned as the King Air pilot had read back their cleared level correctly and both aircraft were on a trajectory where it could be expected that STCA could activate with a nuisance alert. Although showing Enhanced Mode-S equipped in the extended track data block, no Mode S parameters were downlinked from the King Air, therefore the pilot's Selected Level was not displayed to the WAL controller.

Manchester QNH:

As shown in the radar replay, the Manchester QNH at the time of the event was 1009hPa. This would equate to approximately a 120ft difference between the cleared and actual levels (before recognition and recovery), whereas in this event the difference in the cleared and actual level displayed was approximately 300ft. The BPS [Barometric Pressure Setting] in use by the aircraft was not downlinked. On balance of probability, an incorrect pressure setting can be discounted in this event.

Summary

An Airprox was reported when an A320 and a BE200 flew into proximity near MIRSI at 1612hrs on Friday 26th July 2019. Both pilots were operating under IFR in Class A airspace in receipt of a Radar Control Service, the A320 pilot from Manchester Approach and the BE200 pilot from the Manchester Wallasey Sector.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots, the controllers, 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 looked at the actions of the BE200 pilot. Commending him for a frank and honest report, members noted that the BE200 pilot had been cleared initially to FL90, then further descent to FL80. This latter clearance was intended to provide standard vertical separation from the A320, which would be passing within about 1nm on its right-hand side at FL70. However, the radar recordings show that the aircraft descended to FL77 before climbing back to FL80, and the BE200 pilot himself had acknowledged that they had dipped below FL80 due to an autopilot handling issue. A board member with experience of piloting BE200s explained why the 'level-bust' occurred. On certain BE200 models, when an aircraft approaches a cleared level, in this case FL90, and was then cleared for further descent to FL80, the new selected altitude disarmed the Alt Select Mode. Consequently, unless it was reselected, which the BE200 pilot did not do, it would not engage to stop the descent at FL80 (**CF2**). The BE200 pilot's report confirmed this version of events. Ultimately, the BE200 pilot realised that the aircraft was not decreasing pitch as it should do to level at FL80 but was not able to avoid descending through FL80 as he disconnected the autopilot and manually levelled off the aircraft.

It was apparent to the board that the Airprox had occurred because the BE200 pilot did not stop descent at his cleared level (**CF1/3**). However, the radar recordings appeared to show that, at the point the 2 aircraft crossed abeam (CPA), the BE200 was still at or above FL78 and so a level-bust had not occurred at that point (an aircraft may be considered to be at an assigned level provided that the Mode

C readout indicates 200ft or less from that level[3]). The 'level-bust', if indeed there was one, occurred a few seconds after CPA when radar recording showed the BE200 at FL77, then 8 secs later climbed back through FL78, which was then within the Mode C vertical tolerance. Technically, vertical separation was regained at this point. The Board could come to no firm conclusion as to whether a level-bust had actually occurred or whether it had been a transponder error. But noted that the transponder had undergone maintenance the day before and that Liverpool had reported problems with its readout after the incident. In their view, the balance of probability was that although the BE200 pilot had descended through his cleared level (as he himself acknowledged), this had likely been amplified by a transponder error such that a level-bust was indicated on radar. The Board urged the King Air operating company to test their transponders to ensure accurate outputs.

Turning to the risk, the Board quickly decided that the immediate action taken by the BE200 pilot removed any risk of a collision. However, it was an unusual occurrence and, to an extent, safety had been degraded because 1000ft separation had not been maintained. Accordingly, the Board assessed the risk as Category C. Some members wondered if a 'level bust' should have been filed by the Manchester controller rather than an Airprox, but, nevertheless, it was considered that he was entitled to file an Airprox report because he was concerned about the separation loss and that safety may have been compromised.

Subsequent to the Board meeting, further correspondence took place between the Secretariat and the BE200's operating company. It was confirmed that the aircraft involved in this event was actually not one of those King Airs where the ALTSEL is disarmed by the selection of a new altitude. However, it was clear that ALTSEL was not armed in this case as the BE200 approached FL80 but the reasons for this are not known. Thus it was agreed that the contributory factors that were assigned by Board members remain extant.

PART C: ASSESSMENT OF CONTRIBUTORY FACTORS AND RISK

Contributory Factors:

	2019209		
CF	**Factor**	**Description**	**Amplification**
	Flight Elements		
	• Regulations, Processes, Procedures and Compliance		
1	Human Factors	• Flight Crew ATM Procedure Deviation	Regulations/procedures not complied with
	• Tactical Planning and Execution		
2	Human Factors	• Action Performed Incorrectly	Incorrect or ineffective execution
3	Human Factors	• Flight Level/Altitude Deviation (Level Bust)	

Degree of Risk: C

Safety Barrier Assessment[4]

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

Flight Elements:

Regulations, Processes, Procedures and Compliance were assessed as **partially effective** because the BE200 pilot passed through his cleared level, albeit for a marginal time.

[3] MATS Part 1, Section 1, Chapter 6, ATS Surveillance Systems, Page 15.
[4] The UK Airprox Board scheme for assessing the Availability, Functionality and Effectiveness of safety barriers can be found on the UKAB Website.

Tactical Planning and Execution was assessed as **partially effective** because although the BE200 descended through its cleared level, the pilot quickly realised the situation and climbed back to the required level.