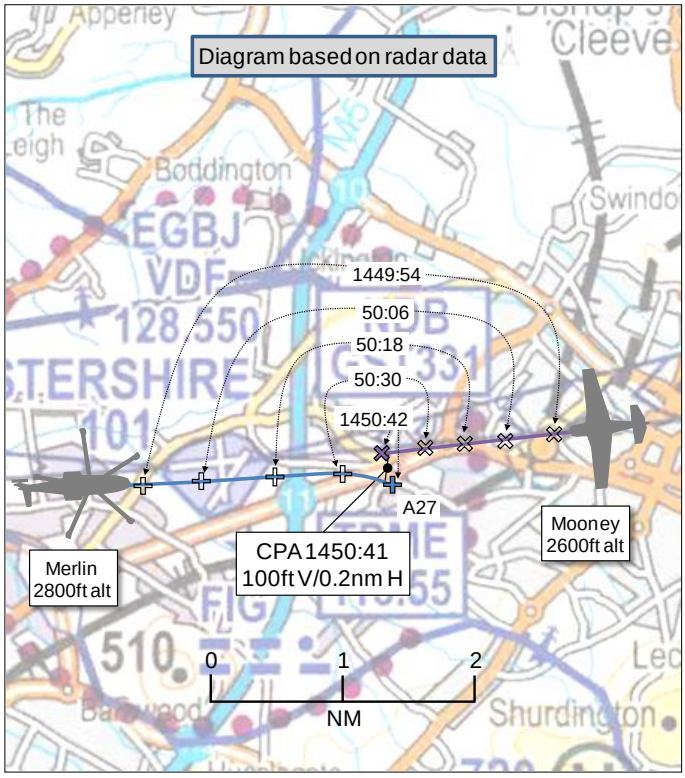
AIRPROX REPORT No 2013108

Date/Time:	9 Aug 2013 1450Z	
Position:	5154N 00210W (1.3nm E Gloucestershire A/D - elevation 101ft)	
Airspace:	Lon FIR	(*Class*: G)
	Reporting Ac	*Reported Ac*
Type:	Merlin HC3	Mooney M20C
Operator:	HQ JHC	Civ Pte
Alt/FL:	2500ft QNH (1020hPa)	↓2000ft QFE NK
Weather:	VMC CLBC	VMC CLBC
Visibility:	30km	>10km
Reported Separation:	200ft V/150m H	NK
Recorded Separation:	100ft V/0.2nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE MERLIN PILOT reports operating on an IFR training flight carrying out an NDB/DME approach to RW27 at Gloucestershire airport (GLO) and in receipt of a Procedural Service from the Approach controller. The aircraft's white tail and lower fuselage HISLs were illuminated, as were the navigation lights; SSR Modes C and S were selected. During the approach, the crew noticed a small fixed-wing aircraft pass down the left-hand side of the helicopter. The aircraft was first observed at 150m and it passed before avoiding action could be taken. He reported the minimum separation was 200ft vertical and 150m horizontal.

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

THE MOONEY PILOT reports inbound, VFR, to GLO in receipt of a Basic Service from ATC. The aircraft was coloured predominantly white; SSR Mode C was selected, the aircraft was not equipped with Mode S. After departure from Oxford airport (OXF), cruising at about 130kt, he was informed by the passenger in the right-hand seat [also a pilot] that the dipstick cowl-flap [sic] was open. He was concerned about its possible detachment, causing potential damage to the windscreen or tail-plane. He reduced cruise speed to about 100kt and requested a diversion to GLO. This was considered the best place to land and check the flap. He did not declare an emergency, as he judged that the reduced speed and diversion were sufficient precautions and he did not wish to inconvenience other traffic at GLO. He did not accept a straight-in approach offered by ATC for the same reason. At no time did he, or the passenger, observe the helicopter. Consequently, he was not aware that the Airprox had occurred as he routed towards the overhead. He was of the impression it had occurred as he joined the circuit.

THE GLO APPROACH CONTROLLER reports that the Merlin had been in the GLO GST NDB hold at FL40 and was cleared for an NDB/DME approach to RWY27, under a Procedural Service. The M20 was joining overhead RWY27 right-hand under a Basic Service, inbound from the east, having departed from OXF. One minute after reporting Beacon Outbound, the Merlin pilot advised that he wished to report an Airprox. After his go-around and departure he said that the M20 had passed 200m down his LHS, 200ft below. Traffic information was not passed as he did not consider, at the time, that a confliction existed, expecting the M20 to join at 2000ft and the Merlin to be commencing descent from FL40.

Factual Background

The GLO weather was:

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METAR EGBJ 091420Z 30009KT 280V340 9999 SCT040 20/09 Q1020=
METAR EGBJ 091450Z 29008KT 9999 FEW020 SCT042 20/08 Q1020=
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The Rules of the Air Regulations 2007[1] state that: 'Notwithstanding that a flight is being made with air traffic control clearance it shall remain the duty of the commander of the aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft.'

A Procedural Service is defined in CAP 774 UK Flight Information Services[2]. It 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...'

CAP 774 Flight Information Services[3] describes a Basic Service. It states:

> 'Pilots should not expect any form of traffic information from a controller, as there is no such obligation placed on the controller under a Basic Service outside an Aerodrome Traffic Zone (ATZ), and the pilot remains responsible for collision avoidance at all times. However, on initial contact the controller may provide traffic information in general terms to assist with the pilot's situational awareness. This will not normally be updated by the controller unless the situation has changed markedly, or the pilot requests an update…'

Analysis and Investigation

CAA ATSI

An Airprox occurred at 1450:40, 1.3nm East of GLO within Class G uncontrolled airspace between an Agusta/Westland EH101 Merlin (Merlin) and a Mooney M20C Mark21 (M20). CAA ATSI had access to the RTF and area radar recordings, the written report from the controller and the unit investigation, together with reports from the Merlin and the M20 pilots. The controller was interviewed by CAA ATSI.

The ATSU is equipped with a primary radar system only (without SSR), which is utilised to expedite the procedural environment. It is available subject to manning and operational requirements. The radar does not display traffic in the overhead.

The GLO controller was an experienced controller who had been based at the unit for 8 years. Prior to the Airprox he had been operating a combined Aerodrome and Approach Control Service without the aid of surveillance equipment. The controller's workload had gradually increased, becoming heavy at the time of the Airprox with the added complexity of using RW36, RW27 and grass RW22. Relief breaks had been re-arranged to accommodate a radar examination earlier in the day together with disruption caused by an aircraft accident at 1224.

The M20 was operating VFR and, due to an open cowling, had decided to divert to GLO and was in receipt of a Basic Service from GLO Approach on frequency 128.550MHz.

The Merlin was conducting an IFR training flight operating from RAF Benson and was in receipt of a Procedural Service from GLO Approach on frequency 128.550MHz. The Merlin intended to

[1] Rule 8 (1)-Avoiding aerial collisions
[2] Chapter 2, Paragraph 5
[3] Chapter 5, Paragraph 5

carry out an NDB/DME approach to RW27. An extract from the Instrument Approach Plate (IAP) taken from the UK AIP page AD 2-EGBJ-8-8 (30 May 13) is shown below Figure 1.

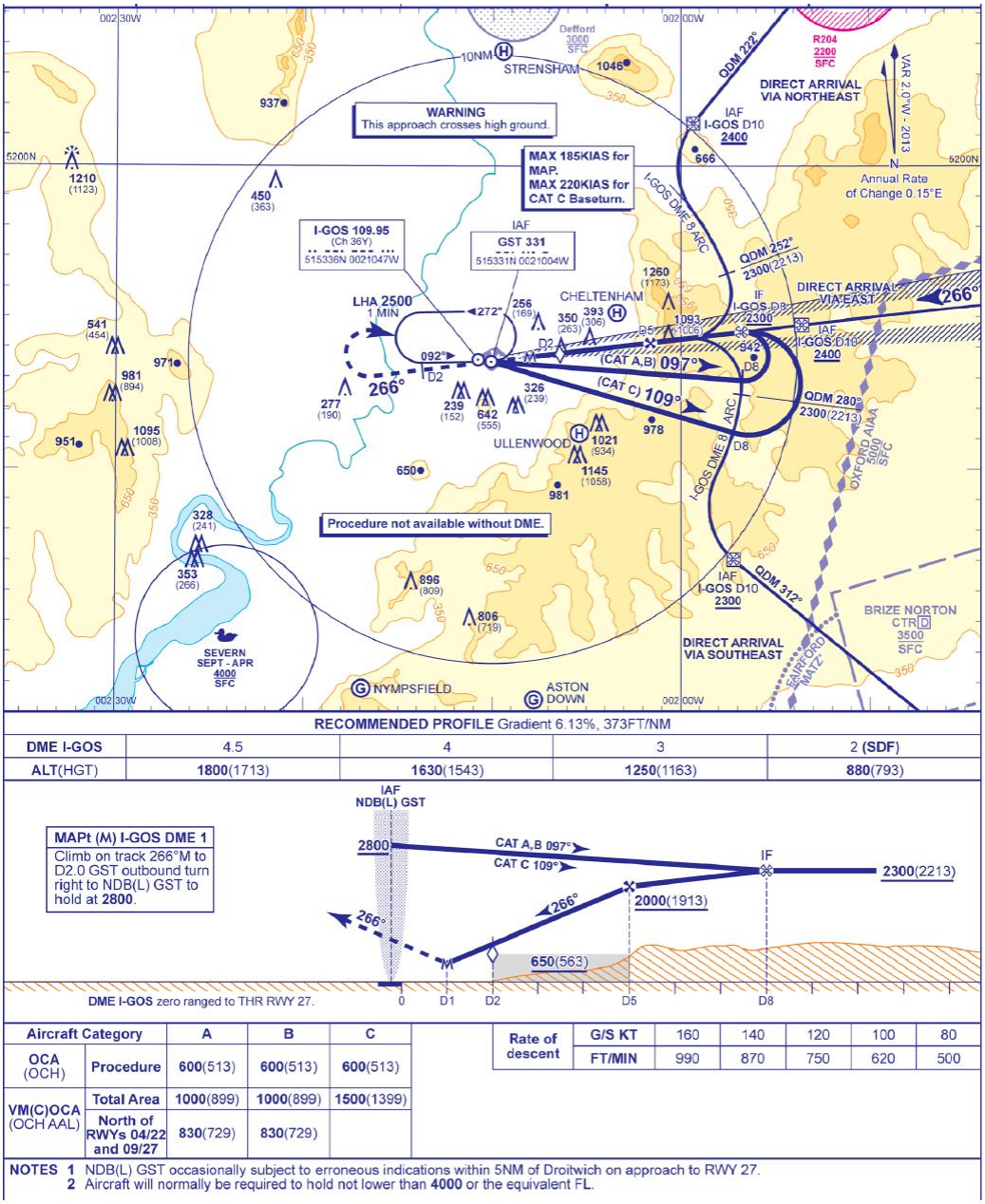

Figure 1 – Extract from the IAP – NDB/DME RW27

The Merlin pilot first contacted GLO Approach at 1428:42 reporting at altitude 2400ft and requesting a join for the NDB/DME RW27. The GLO controller marked 2400ft on the flight progress strip (FPS) and cleared the Merlin to the GST(NDB) at FL40 which was also marked on the FPS with a climb arrow.

At 1439:50, the Merlin pilot reported taking up the hold at the GST NDB at FL040 prior to commencing an NDB/DME approach to RW27. The GLO controller instructed the Merlin pilot to report when ready for the procedure.

At 1441:38, the M20 pilot contacted GLO Approach and the following RTF exchange occurred:

M20 *"Er good afternoon [M20 C/S] out from Oxford erm originally enroute to Shobdon but we've erm got a popped er erm hatch on the on the front, it's not dangerous but we better land though as soon possible er just request joining instructions"*

ATC *"[M20 C/S] er Basic Service make a straight in approach runway two seven QFE one zero one seven"*

M20 *"Er we can do a standard er overhead join if you like [M20 C/S] and QFE one zero one seven we have also got one four miles to run"*

ATC *"[M20 C/S] roger report three miles and it'll be a standard overhead join then "*

M20 *"Okay report three miles overhead join thanks [M20 C/S]".*

The M20 at was at FL025, 16.5nm east of GLO and the Merlin in the GST hold at FL040.

At 1446:34 the Merlin pilot reported, *"[Merlin C/S] ready for the Approach following this hold"* and the controller replied, *"[Merlin C/S] cleared NDB DME approach runway two seven QNH one zero two zero report beacon outbound".* This was acknowledged by the Merlin pilot, *"Cleared NDB DME runway two seven QNH one zero two zero set [Merlin C/S] Wilco"*. At this time the Merlin was turning westbound in the holding pattern and then descended to FL026 (2800ft) the lowest level available from which to commence the procedure.

The controller's workload was significantly increased by the complexity of using RW36, RW27 and the grass RW22. At 1447:40 the controller was preparing to handover the Aerodrome Control position and instructed a number of circuit aircraft to change from the combined frequency 128.550MHz to the Tower frequency 122.900MHz. A number of aircraft were instructed to standby as the RTF loading increased and the controller became involved in the handover.

At 1449:01 the M20 pilot reported, *"and Gloster [M20 C/S] three miles to run at two thousand three hundred feet on one zero two zero".* The controller replied, *"[M20 C/S] just hold there thanks"*. There was no acknowledgement from the M20 pilot. The M20 was at FL024 (2600ft).

Two aircraft called on the combined frequency but received no response. At 1449:42 the M20 pilot called again, *"Er [M20 C/S] we have two miles to run to the field and we're at two thousand three hundred feet one zero two zero"*. The controller responded *"[M20 C/S] just standby please"*.

At 1450:00 the Merlin pilot reported, *"[Merlin C/S] beacon outbound".* After a 10sec pause the controller replied, *"[Merlin C/S] report commencing the base turn".* This was acknowledged *"[Merlin C/S] Wilco".* The two aircraft were on reciprocal tracks, with a horizontal distance of 2.8nm and a vertical separation of 200ft (Figure 2).

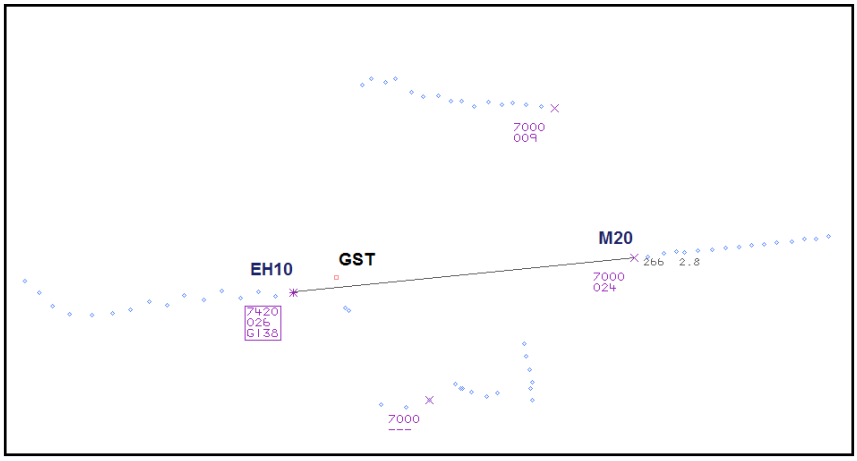

Figure 2 – Swanwick MRT at 1450:00

At 1450:27 the Merlin was Beacon Outbound indicating FL026 (2800ft) with the M20 slightly left of the Merlin's 12 o'clock at a range of 0.9nm indicating 200ft below (Figure 3). At this point the handover of the Tower frequency was completed and the frequencies split.

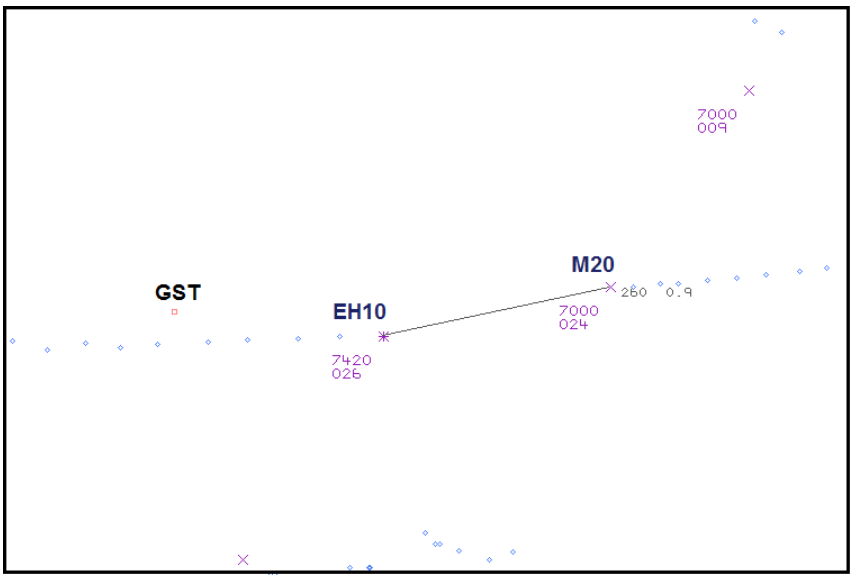

Figure 3 – Swanwick MRT at 1450:27

At 1450:31 the controller responded to the M20 pilot's previous call, *"[M20 C/S] fixed wing circuit is active runway three six; however, you're for runway two seven righthand continue to the overhead for it's a standard overhead join and contact tower one two two decimal nine".* The M20 pilot replied, *"One two two decimal nine and two seven er standard righthand er overhead join thanks er [M20 C/S]".* The controller annotated the FPS with standard arrival 27R but no level information was shown.

At 1450:44 the two aircraft passed abeam at a horizontal distance of 0.2nm and a vertical separation of 100ft. The Merlin pilot's written report indicated that he took no form of avoiding action, his right turn presumably being the outbound turn for the procedure (Figure 4).

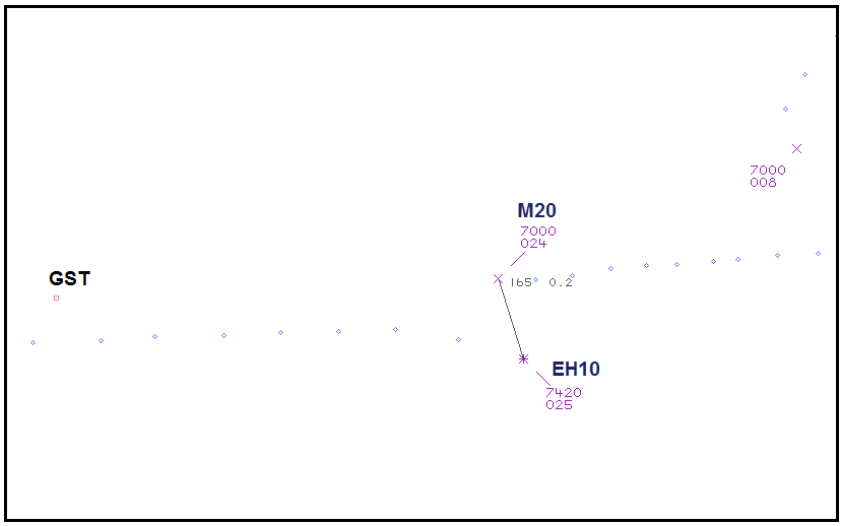

Figure 4 – Combination picture of Swanwick MRT and CLH as single source at 1450:44

At 1450:55 the following RTF exchange occurred:

Merlin	*"Er Gloster Approach [Merlin C/S] er like to declare AIRPROX on that"*
ATC	*"[Merlin C/S] go ahead"*
Merlin	*"Er [Merlin C/S] we'll continue the approach and debrief you er on the overshoot if possible"*
ATC	*"[Merlin C/S] affirm from the go around it'll be climb straight ahead to altitude three thousand feet"*
Merlin	*"From the go around climb ahead three thousand feet [Merlin C/S]"*
ATC	*"[M20 C/S] contact the Tower one two two decimal niner"*

The M20 continued to the overhead and joined the visual circuit landing on RW27 and shortly afterwards, at 1458:23, the Merlin was cleared for the go-around on runway 27. The M20 pilot's written report indicated that he had not sighted the Merlin and mistakenly believed that the Airprox had occurred when joining the circuit and turning onto final approach ahead of the Merlin.

At 1500:20 the controller elected to utilise radar in order to expedite the departure of the Merlin and Traffic Service was agreed [limited with no SSR]. Shortly afterwards the controller asked the Merlin pilot for his comments and at 1503:50 the following RTF exchange occurred:

Merlin *"[Merlin C/S] er following the er published approach procedure at three DME on the outbound leg erm one small fixed wing er believed to be the aircraft backtracking up the runway as we initiated the low approach roger so far"*
ATC *"Er confirmed as the orange Mooney was it"*
E10 "[Merlin C/S] *affirm passed down the lefthand side of the aircraft er within"...[interrupted]*
E10 *…"Er [Merlin C/S] er within two hundred metres and 200ft feet down our left hand side".*
ATC *"[Merlin C/S] roger and freecall Brize now on one one nine decimal zero"*

When questioned at interview, the controller indicated an expectation that the M20 would make a standard overhead join at 2000ft aal (elevation 101ft) and considered that with the Merlin holding at FL40, there was not likely to be a conflict. The controller was not initially aware of the M20's altitude and indicated that this would normally have been passed by the M20 pilot on initial contact. However, the M20 pilot reported an open cowl and had requested a landing as soon as possible. The controller believed that the nature of the non-standard call inbound may have caused the pilot not to report, or the controller not to request, the level of the M20.

The controller indicated that when clearing the Merlin for the instrument approach, he was content to allow the Merlin to descend to 2800ft and had not asked for a report vacating FL40 or reaching 2800ft. The FPS showed the Merlin cleared for descent (indicated by a descent arrow) but with no indication of having vacated FL40. The controller recognised that normal practise would have been for him to consider leaving the Merlin at FL40 until calling Beacon Outbound, however, at the time, there were no other instrument departures or arrivals and he did not perceive that there was any problem.

The controller, when asked why the positions had not been split earlier, indicated that due to changes in the staff breaks, the combined operation of Aerodrome and Approach had been extended in order to provide a break to the Aerodrome controller following an aircraft accident. The controller indicated that workload had increased sharply prior to commencement of handover of the Tower position to the oncoming Aerodrome controller.

The controller indicated that when the M20 pilot had called east of the airfield, he judged it was approaching the ATZ and transferred it to the Tower. The controller could not recall whether he had heard the M20 reporting at 2300ft and was not aware of the conflict situation.

When the controller was asked how a similar conflict might be prevented in the future, he indicated that keeping the Merlin at FL40 until Beacon Outbound, obtaining an earlier level report from the M20, together with traffic information to both aircraft would have prevented the occurrence.

The ATSU indicated that under normal circumstances the Aerodrome and Approach control positions would not have been combined. However, due to the re-arranged watch breaks precipitated by the earlier aircraft accident and radar examination requirements, the combined operation had been approved by the Senior Controller on Duty (SCoD), allowing the Tower controller to take a suitable recovery break.

The ATSU normally operates a combined Aerodrome and Approach Service at the beginning and end of airport opening hours. The GLO Manual of Air Traffic Services (MATS) Part 2[4] states: 'In accordance with the contingency arrangements…ADC and APC are normally combined at the beginning and end of the airport opening hours and during extensions of the watch…'

The SCoD is responsible for the efficient running and administration of the ATC Watch. The MATS Part 2[5] states: 'The SCoD shall ensure that ATC staff are deployed as effectively as possible to meet the operational needs of the airport. Light traffic conditions and, particularly poor weather, may enable contingency arrangements to be made to maximise the efficiency of the duty staff. Similarly, in situations of staff sickness or shortage, staff should be deployed to minimise any reduction in overall service levels consistent with safety.'

The MATS Part 2[6] lists the standard operating configuration and, in order of preference, the recommended contingency staffing arrangements and states that: '…the SCoD may elect to alter these arrangements if traffic conditions dictate'.

Because of the earlier aircraft accident, the SCoD was sympathetic in allowing the Aerodrome controller a relief break and elected to allow the combined operation of Aerodrome and Approach control positions as a contingency arrangement. However no restrictions or limitations on traffic levels were applied. The MATS Part 2[7] states: 'During contingency operations, it may be necessary to apply certain restrictions to ensure traffic levels are adequately managed. The list below is not exhaustive, nor in any preferential order but SCoD may elect to apply the following restrictions:

IR Training: Cancel/reduce bookings to one per hour or less.
Circuits: Reduce maximum number accepted.
Multiple Runway: Limit or curtail crossing runway operations.
Flight Information Service: Limit availability.

Any restriction placed should be periodically reviewed against actual or forecast traffic and weather conditions.'

No safeguards were put in place. The controller was confident that he could cope with the combined operation whilst providing a relief break for the Aerodrome controller. The controller allowed the traffic level to increase, with the added complexity of multiple runway operations and crew training. As traffic levels reached 'overload', the controller commenced a handover to the Aerodrome controller. At the same time the M20 pilot called twice at 2300ft and the Merlin pilot reported Beacon Outbound.

Due to the increased traffic levels and funnelling effect of concentrating on the handover of the Aerodrome position, the controller was distracted from the Approach Control task and his ability to recognise the conflict between the two aircraft was significantly reduced.

There was no visual indication or prompt from the FPS presentation showing the Merlin at FL40, cleared for descent and there was no level information on the M20 strip. The controller's mental picture had the M20 approaching the overhead at 2000ft and the Merlin cleared for the procedure descending from FL40 to 2800ft. Whereas the M20 was approaching from the east at 2600ft as the Merlin crossed the beacon westbound at 2800ft descending.

The Merlin was cleared for the procedure and descended prior to going Beacon Outbound. After an Airprox in 2011 (2011058) the GLO MATS Part 2[8] was updated and states:

[4] Section 4, Chapter 1, Paragraph 1.6.1 (Combined Operations)
[5] Section 1, Chapter 11, Paragraph 11.10
[6] Section 1, Chapter 11, Paragraph 11.12
[7] Section 1, Chapter 11, Paragraph 11.13
[8] Section 2, Chapter 1, Paragraph 12.2.

'Controllers should consider not issuing a descent clearance to the arriving aircraft until after it has reported Beacon Outbound and that has been checked by VDF and/or radar derived information. e.g. *G-ABCD cleared NDB/DME Approach RWY27, maintain Flight Level 50 until advised, report Beacon Outbound.'*

The controller judged that with no other IFR traffic, he was content to allow the Merlin to descend prior to going Beacon Outbound. The controller had not asked for any intermediate level reports, which would have served to provide a better understanding of the Merlin's vertical profile.

ATSI made two recommendations as a result of this Airprox:

It is recommended that prior to the implementation of combined Aerodrome and Approach arrangements at non-mandated times, the ATSU take action to ensure that appropriate limitations and restrictions are applied to ensure traffic levels are adequately managed.

It is recommended that the ATSU introduce a means for the robust control of the vertical environment in situations when aircraft are using the GST holding pattern prior to commencing an instrument approach and ensure that controllers utilise the appropriate phraseology tools for aircraft vacating passing or reaching assigned levels.

Comments

JHC

This incident may have been averted if the increasing workload and complexity of task of the sole controller had been identified and addressed earlier. Due to controllers' workload, assumptions and procedural errors were made that conspired to ensure that a scenario developed where 2 aircraft came into close proximity with each other, one possibly heads-down changing frequency and unaware of the confliction, the other making a sighting too late to take any avoiding action. We are confident that lessons have been learnt and that in-place procedures and recommendations would be implemented to ensure that it would be highly unlikely that a similar situation would occur again. Plans to fit Merlin with TCAS are in-place; however, fleet-wide upgrade is not scheduled to be completed until 2019.

Summary

The Airprox occurred in Class G airspace; both pilots were equally responsible for collision avoidance. The Merlin pilot was operating IFR, carrying out an NDB/DME approach to RW27. He was in receipt of a Procedural Service from the Approach controller. The M20 pilot, operating VFR, was diverting into GLO due to a non-emergency situation, in receipt of a Basic Service from the Approach controller. The Approach and Tower positions were combined; traffic levels and workload were reported as high. The Merlin was cleared for the NDB/DME approach before it reached Beacon Outbound, allowing it to descend from FL40 to 2800ft in accordance with the procedure. At the time the M20 was opposite direction at 2600ft; the controller had not established its altitude. The Approach controller, unaware of the confliction, did not pass traffic information to either pilot. The Merlin pilot reported observing the M20 at a range of 150m, adding that it passed before avoiding action could be taken. He reported the minimum separation was 200ft vertical and 150m horizontal. The M20 pilot did not see the Merlin. The recorded separation was 100ft vertical and 0.2nm horizontal.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both aircraft, transcripts of the relevant RT frequency, radar video recordings, a report from the controller involved, and reports from the appropriate ATC and operating authorities.

The Board first considered the actions of the Merlin pilot and quickly agreed that, in being in receipt of a Procedural Service and having received his clearance to commence the GST NDB procedure,

although he had not yet reached Beacon Outbound, he was entitled to descend, at his discretion, from FL40 to 2800ft, the lowest altitude available to commence the procedure.

Turning to the M20 pilot, the Board noted that he was on a VFR flight, was diverting to GLO due to a dipstick-cover becoming open, was probably pre-occupied and distracted by that factor, and had not reported his altitude on initial contact with GLO (and this had not been requested by the controller). A pilot member thought that perhaps the M20 pilot should have made a PAN call to alert the controller to his situation and thereby obtain a priority approach. However, the Board noted that the pilot had been offered the choice of a straight-in approach by GLO but had decided to join overhead; as far as he was concerned it was not an emergency situation and he was content to route westbound towards the overhead to join at 2000ft as cleared.

Turning to the ATC involvement, it was apparent to the Board that this was where the root source of the Airprox lay, and much of the Board's discussion centred on these aspects. The GLO Approach and Aerodrome positions had been combined in the period leading up to the Airprox. The SCoD had decided, due to problems earlier in the day, to combine the positions to allow the Aerodrome controller a break; however, although the Aerodrome/Approach controller believed he could cope with the traffic situation, the workload subsequently became very high and the Board deduced that this had affected his ability to maintain situational awareness of what had become a complex air traffic environment. Whilst the rationale for combining the two positions was understood, controller members were surprised that the SCoD had not put in place any traffic management restrictions at the time of combination, or afterwards, in order to reduce the workload; especially as suitable options were stated in the GLO MATS Part 2. On top of this already busy traffic environment, the Board thought that it was likely that the Approach controller had probably then become further distracted during his handover of the Aerodrome position. As a result, the Board opined that the controller cleared the Merlin pilot for his procedure without being fully cognisant of the position and altitude of the M20 even though the M20 pilot had reported at both 3nm and 2nm that his height was 2300ft. The fact that the Merlin's Flight Progress Strip had not been annotated to show that the helicopter had vacated FL40 caused the Board to believe that, despite having cleared the Merlin pilot for the procedure, the controller thought that the Merlin was still at FL40 with the M20 joining overhead at 2000ft. It was also noted by several Board members that, not only were the two aircraft not separated, but also that Traffic Information had not been passed to either pilot. Consequently, neither pilot was aware of the presence of the other aircraft. The Board considered that all of these factors were directly caused by the controller's high workload.

Discussion then turned to whether the controller had complied with the requirements of CAP 774, and specifically with regard to the provision of Procedural and Basic Services. ATC are not required to provide separation between aircraft in receipt of Procedural and Basic Services; responsibility for collision avoidance remains with the pilots concerned. Under a Procedural Service the controller shall pass Traffic Information if it is considered that a confliction may exist but, on this occasion, the controller had not correlated the flight paths as such in his mind. Under a Basic Service, outside an ATZ, there is no obligation for a controller to pass Traffic Information. Technically, therefore, the controller had complied with the required procedures. This, the Board found, made the cause and contributory factors of the Airprox difficult to establish. Some members considered that the cause should include the fact that the controller had lost situational awareness, which would explain why the Merlin pilot had not been informed about the presence of the M20. Others mooted that, because ATC requirements had technically been followed, the cause should be a late sighting by the Merlin pilot and a non-sighting by the M20 pilot. However, following a lengthy discussion, it was agreed that it was the absence of Traffic Information to the Merlin pilot, and his subsequent unknowing descent into conflict with the M20, that were the fundamental cause of the Airprox. It was decided that, although they were the root source of the incident, the ATC workload aspects should simply be considered as contributory factors, rather than specifically part of the cause. Having debated the cause at length, it was quickly decided, unanimously, that, because the aircraft had passed 100ft vertically and 0.2nm horizontally apart without any form of avoiding action due to the late- and non-sightings, the degree of Risk was A.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause:	In the absence of Traffic Information, the Merlin pilot descended into conflict with the Mooney.
Degree of Risk:	A.
Contributory:	1. The Air Traffic Controller lost SA. 2. The SCoD did not appropriately manage controller task loading.
ERC Score:	500