

the same NDB DME again as flown at 1041 approaching GST at 4000ft. So instead of 'low pass (or touch & go)' he declared, albeit mistakenly, 'missed approach' meaning he should have returned to the beacon at the published 2800ft which would not have resulted in any conflict. Since the incident, he has listened to the RT tapes at Gloucestershire ATC in order to tie up the actual events with his own recollection. The other ac involved, a SR22, was not seen but was believed to 4nm W of the GST when he reported O/H the GST, beacon outbound, at 4000ft QNH 1009hPa and 120kt turning onto heading 095°. He initiated a dive to 2800ft on receiving ATC instructions to descend. He assessed the risk as low.

THE SR22 PILOT reports was inbound to Gloucestershire from Oxford, IFR for instrument approach training and in receipt of a PS from Gloster Approach on 128.55Mhz, squawking 7000 with Modes S and C. He was aware of another ac in the procedure, the NDB/DME for RW27, so he was expecting to hold at 4000ft. He received clearance to join the hold at altitude 4000ft and achieved 4000ft before entering the procedural area of GST. This clearance was read back and he did not hear any other ac transmit the same clearance; he made a parallel join to the hold. The Wx was intermittent IMC/VMC. The first time he was aware of another ac at his level was when it's pilot called 'beacon outbound' at the GST at altitude 4000ft, as this formed part of his decision making; at the time his ac was 4nm W of the GST. The controller immediately instructed the other ac's pilot to descend beacon outbound and then informed him of the conflict. Based on his range and the information, he considered it safe to continue to the GST; there were no further issues.

ATSI reports that the Airprox occurred close to the GST(L)NDB at Gloucestershire Airport, within Class G airspace, between a BE35 and an SR22. The CPA occurred at 1058:50UTC, 2.3nm NW of the GST(L)NDB, which is located on Gloucestershire aerodrome.

The BE35 flight was operating locally from Gloucestershire and in receipt of a PS from 'Gloster' Approach on frequency 128.55MHz. The BE35 flight, operating IFR, had just completed a practice NDB(L)/DME approach for RW27. The SR22 was inbound IFR from Oxford in receipt of a PS from 'Gloster' Approach on frequency 128.55MHz. The SR22 was entering the hold at 4000ft for some Instrument Approach training.

Gloucestershire ATSU was providing a split Aerodrome and Approach Control Service from the VCR without the aid of surveillance equipment. The APP was acting as OJTI to a trainee. Gloucestershire is equipped with a Primary Radar System, without SSR surveillance capability and limited coverage due to the narrow beam width, tilt mechanism and radar O/H limitations. The AIP entry for Gloucestershire Airport, page AD 2-EGBJ-1-6 (30 Jun 11) paragraph EGBJ AD2.18 states:

'Radar services (Primary only) within 25nm below FL80, availability subject to manning. Use of 'Radar' suffix denotes availability only. Provision of a specific radar service is not implied.

The Radar room is situated on a floor below the VCR and the radar system has an additional slaved display in the VCR, which is approved for use as an ATM. RW27 was in use for Instrument Approaches and RW22 was in use for the visual cct.

CAA ATSI had access to RTF recordings for Gloster Tower and Approach, together with area radar recording, written reports from the APP and the 2 pilots concerned.

The Gloucestershire METAR was: EGBJ 041050Z 22007KT 180V260 9999 SCT028 13/08 Q1009=

At 1039:51, the BE35 flight reported returning to Gloucestershire at 4700ft, ready to go outbound for the procedure. The APP replied, *"(BE35 c/s) cleared to the Golf Sierra Tango at er altitude four thousand feet no delay expected NDB DME approach runway two seven."* This was acknowledged correctly and the BE35 pilot advised of his intentions after the approach, *"probably a touch and go please and back in the circuit if possible."*

At 1042:40, the BE35 pilot reported beacon outbound and the APP responded, “(BE35 c/s) cleared NDB DME approach runway two seven report base turn complete.” The BE35 pilot replied, “Clear for the procedure and er report base turn complete (BE35 c/s).”

At 1046:10, the BE35 was advised of a new QNH 1009.

At 1046:31, the SR22 flight contacted Oxford Approach and reported, “(SR22 c/s) S R twenty-two out of La – out of Oxford bound to your field one zero zero seven request NDB hold plus approach and two R Nav approaches (SR22 c/s).” In response to the APP’s requests the SR22 pilot reported at an altitude of 4000ft and the BE35 pilot (in the procedure) reported at 2300ft. The APP responded to the SR22 flight, “(SR22 c/s) Procedural Service cleared to the Golf Sierra Tango at er altitude four thousand feet --- (momentary break in transmission) and er QNH one zero zero niner”. The BE35 pilot replied, “One zero zero –”, which was clipped before the SR22 pilot transmitted, “Confirm that clearance (SR22 c/s)”. The APP replied (1048:00), “(SR22 c/s) clear to the Golf Sierra Tango at altitude four thousand feet no delay expected NDB DME approach Runway two seven.” This was acknowledged correctly and the SR22 pilot read back the QNH 1009.

By 1050:02, the BE35 flight had not reported base turn and the APP advised, “(BE35 c/s) I see you approaching four miles contact Tower one two two decimal nine fixed wing circuit is active.” The BE35 pilot replied, “- two decimal nine and I would like to make this one missed approach and another NDB DME if available.” The APP responded, “(BE35 c/s) Roger.”

The missed approach procedure for the NDB(L)/DME RW27 approach is promulgated in the UK AIP AD 2-EGBJ-8-6 as: ‘Climbing right turn onto a track 270°M to 900 then turn right onto 359°M climbing to 2800, then turn right to NDB(L) GST at 2800’. The hold is a 1min LH racetrack inbound QDR 092°. (See Fig 1 below)

In view of the intended missed approach by the BE35, the APP passed the SR22 pilot an amended EAT of 1111.

The ADC was made aware of the BE35’s intended missed approach and appropriate instructions were passed to other ac in the RW22 visual cct. The BE35 pilot called on Tower frequency, “Gloster Tower hello again (BE35 c/s) erm er NDB DME two seven er three miles to run.” The ADC replied (1051:00), “(BE35 c/s) Gloster Tower cleared low approach and go around runway two seven wind two one zero one one the fixed wing circuit active Runway two two.” This was acknowledged by the BE35 pilot.

At 1051:54 the radar recording shows the BE35 on a 1nm final at FL006 descending (~500ft QNH) with the inbound SR22 positioned 11.4nm E of the airfield tracking W indicating FL040 (~3900ft QNH 1009hPa).

At 1052:12, the BE35 pilot reported going around and shortly afterwards the ADC transferred the BE35 flight back to Approach on frequency 128.55MHz.

At 1054:33 the APP called the BE35 flight, “(BE35 c/s) Gloster Approach are you on frequency.” The BE35 pilot replied, “(BE35 c/s) go.” The APP responded, “(BE35 c/s) Procedural Service and er cleared NDB DME approach runway two seven report beacon outbound.” The BE35 pilot acknowledged, “Cleared for the er procedure and er report beacon outbound (BE35 c/s).” The QNH 1009hPa was then passed.

[UKAB Note (1): The radar recording at 1054:34 shows the BE35 2.6nm N of Gloucestershire tracking N indicating FL020 climbing with the SR22 5.7nm to the E of the aerodrome tracking W indicating FL040. Ninety seconds later at 1055:54 the BE35 is seen to commence a L turn climbing through FL030 6.9nm NW of the SR22 which is level at FL040.]

INSTRUMENT APPROACH CHART - ICAO

**GLOUCESTERSHIRE
NDB(L)/DME
RWY 27
(ACFT CAT A,B,C)**

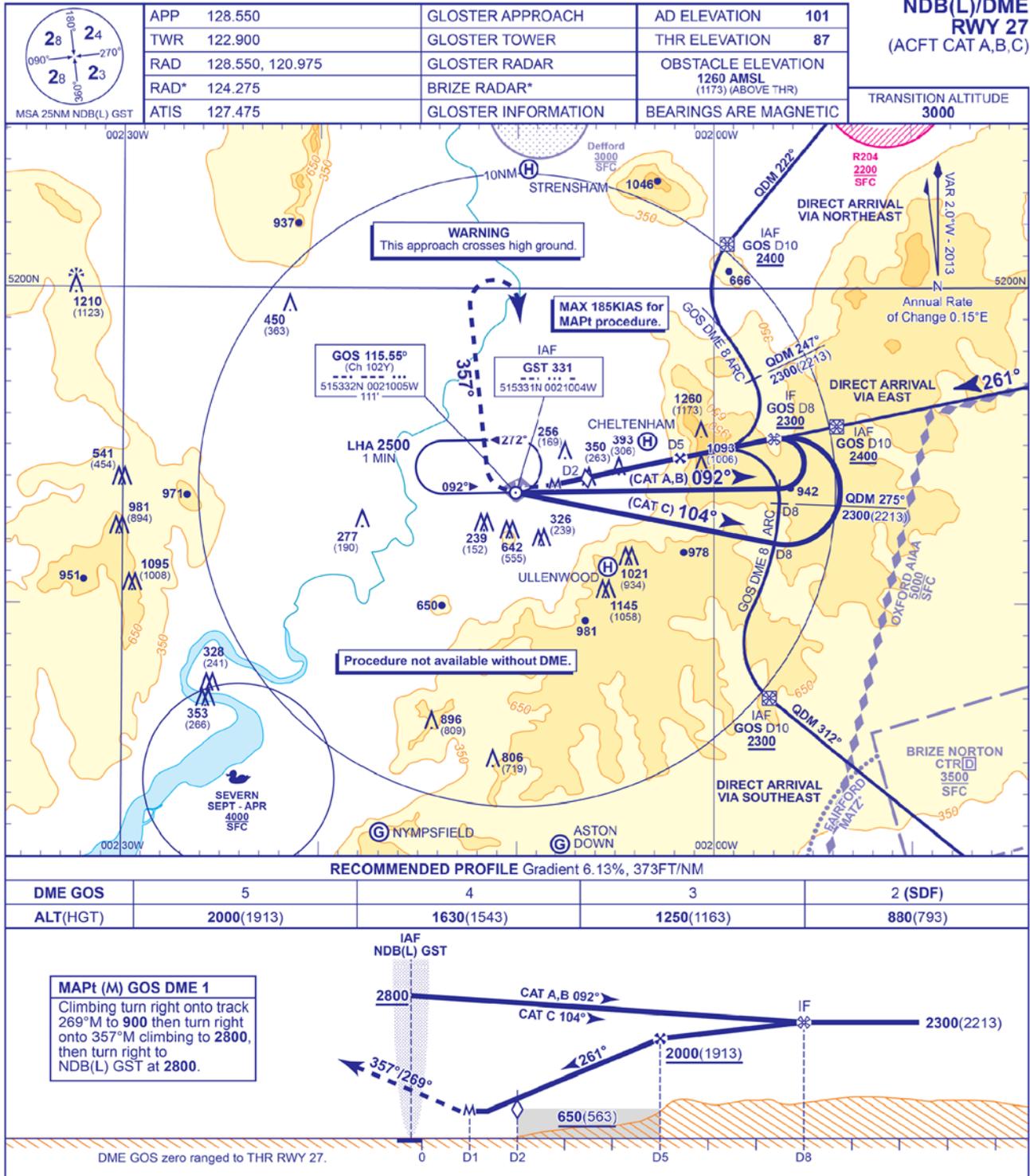


Fig (1)

At 1056:50, the radar recording shows the BE35 in the missed approach procedure 6-8nm N of the airfield in a non-standard L turn passing FL034 in the climb. The SR22 is approaching the GST on W'ly heading at FL042.

At 1057:08, the following RT exchange occurred:

- ATC “(BE35 c/s) request your intentions after this approach.”
- BE35 “(BE35 c/s) is six miles to the north.”
- ATC “(BE35 c/s) roger report your intentions after the approach.”
- BE35 “Say again (BE35 c/s)”
- ATC “(BE35 c/s) report your intentions after the approach please.”

BE35 *"Intentions after the approach is er to return to the circuit of er righthand circuit of two two please touch and go into the circuit."*
ATC *"Roger"*
ATC *"(SR22 c/s) confirm in the hold now"*
SR22 *"-ffirm (SR22 c/s)."(Clipped transmission)*

[UKAB Note (2): By 1058:10 the BE35, indicating level at FL041, has steadied on a track of 170° with the SR22, tracking 280° and carrying out its parallel entry into the GST hold, crossing through its 12 o'clock range 3-5nm at the same level. Thereafter the BE35 commences a gradual L turn onto a track of 150° towards the GST as the SR22 continues on a W'ly track. The CPA occurs at 1058:50 with the SR22, at FL043, in the BE35's 2 o'clock range 2.1nm, vertical separation 200ft. The ac then diverge until the SR22 commences a R turn to track back towards the GST as the BE35 passes O/H the beacon.]

At 1100:10, the BE35 pilot reported, *"(BE35 c/s) is beacon outbound at four thousand feet on one zero zero nine."* The APP controller replied, *"(BE35 c/s) confirm your level your cleared level is er two thousand eight hundred feet."* There was no response from the BE35 pilot so the APP asked, *"(BE35 c/s) confirm your level."* At 1100:31, the BE35 pilot reported, *"(BE35 c/s) four thousand feet on one zero zero nine"* and in response the APP instructed, *"(BE35 c/s) roger descend er immediately with the procedure essential traffic in the hold at four thousand feet is a Cirrus S R twenty two."* The BE35 pilot replied, *"descending (BE35 c/s)".* The APP then advised the SR22 pilot, *"(SR22 c/s) er essential traffic beacon outbound four thousand feet descending it's a Beech Bonanza."* The SR22 pilot replied, *"Roger er (SR22 c/s) we're four miles to the er west of the beacon at the moment four thousand feet."* The APP acknowledged, *"(SR22 c/s) roger"*.

[UKAB Note (3): The BE35's descent is seen to have commenced at 1100:50 as its Mode C is showing FL038 descending, the SR22 is in its 6 o'clock range 6nm still in the R turn towards the GST.]

Just after 1102:00 the BE35 pilot reported descending through 3000ft on QNH 1009 and the BE35 completed the instrument approach without further incident.

The ATSU has recommended that as part of unit best practice controllers should, at an appropriate point, include the reiteration of the missed approach level, together with appropriate TI. Since the Airprox, controllers have been made aware of the requirement and the unit MATS Part 2 will reflect these changes at the next update due February 2013.

During the first NDB(L)/DME RW27 approach, the BE35 pilot did not make the requested base turn report. When the BE35 reached a 3nm final, the flight was transferred to the Tower and during the pilot's acknowledgement, the BE35 pilot advised of an intention to carry out the missed approach procedure. CAP 413, Chapter 4, Page 15, Paragraph 1.10.1, states:

'.....When a missed approach is initiated cockpit workload is inevitably high. Any transmissions to aircraft going around shall be brief and kept to a minimum.'

In order to accommodate the missed approach and the additional instrument procedure for the BE35, the APP revised the EAT for the SR22 approaching the GST at 4000ft.

After the BE35 was transferred from Tower to Approach, the flight did not immediately establish 2-way communication with the APP. The APP contacted the BE35 pilot, advising of the PS with a clearance to the NDB DME RW27 and a request for the BE35 pilot to report beacon outbound. The APP had an expectation that the BE35 pilot would comply with the missed approach procedure, returning to the GST(L)NDB at 2800ft.

The missed approach procedure for the NDB(L)/DME RW27 is a segment of the Instrument Approach Procedure (IAP) and is published on the IAP chart/plate. It is the procedure to be followed when the approach cannot be continued and it is expected that the pilot will fly the missed approach

procedure as published (ICAO). The UK AIP Page GEN 3-3-5 (22 Oct 09) paragraph 3.7.4.1 (Instrument Approaches) states:

‘Pilots will be expected to be conversant with the correct notified Instrument Approach Procedures detailed in published charts, but on request, in exceptional circumstances, Approach Control will supply the following information:

- a. The aid concerned, aircraft category and Final Approach Track;
- b. arrival level;
- c. type of reversal manoeuvre, including outbound track, length in time or distance, level instructions, and direction of procedure turn where applicable;
- d. intermediate and final approach tracks and fixes, and step down fixes (where applicable), with level instructions;
- e. Obstacle Clearance Height;
- f. Missed Approach Point and Missed Approach Procedure.’

The BE35 pilot did not comply with the requirement of the missed approach procedure track; *‘359°M climbing to 2800, then turn right to NDB(L)GST at 2800’*. The BE35 flight made a non-standard L turn at FL033 and returned to the GST(L)NDB in the climb to 4000ft. It is likely that the BE35 pilot would have heard the earlier call from the SR22 inbound to the beacon at 4000ft together with the clearance and revised EAT issued to the SR22.

When the loss of procedural deconfliction minima became apparent, the APP immediately instructed the BE35 pilot to descend in the procedure and then passed essential TI to both flights. At this point, unknown to the controller, the 2 ac had passed and were diverging.

CAP774, Chapter 1, Page1, Paragraph 2, states:

‘Within Class F and G airspace, regardless of the service being provided, pilots are ultimately responsible for collision avoidance and terrain clearance, and they should consider service provision to be constrained by the unpredictable nature of this environment.’

The Airprox occurred when following the NDB(L)/DME RW27 approach, the BE35 pilot elected to make a missed approach, but did not to follow the promulgated procedure which required a climb to maintain 2800ft. The BE35 pilot climbed to 4000ft and into conflict with the SR22 that had been cleared to the GST at 4000ft.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

Information available included reports from the pilots of both ac, transcripts of the relevant RT frequencies, radar video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC authorities.

Members ultimately agreed with the ATSI conclusion as to the cause of the Airprox. However, controller Members were quick to point out that there was an opportunity to break the chain before separation was lost between the ac. After the BE35 pilot had elected to carry-out a missed approach, which was approved by ATC, he did not call on the APP frequency after going-around and being transferred from Tower. This had required a prompt from the APP to elicit whether the BE35 was on his frequency; in response, the BE35 pilot’s initial call did not use the standard IFR phraseology which should have included the ac’s passing level and its cleared level [CAP413 Chptr 3 Pg 6]. The APP did not challenge the BE35 pilot’s transmission or state the ac’s cleared level, good defensive controllership, only reiterating the PS and clearing the flight for the NDB DME procedure. Thereafter the seeds were sown for the eventual outcome. The SR22 flight was on frequency but was unaware of the BE35 pilot’s climb above 2800ft and when ATC asked the SR22 pilot to confirm that he was in the hold, the pilot replied “affirm”, again with no mention of a level by either party. The BE35 pilot’s SA should have been updated as to the SR22’s presence as the SR22 pilot had called and been cleared to the GST NDB at 4000ft as the BE35 had commenced his 1st approach. As it

was, APP was unaware of the conflict until the BE35 pilot reported beacon outbound at 4000ft. By then it was too late. The ac had already passed as the SR22 was carrying out its parallel entry into the GST hold and the BE35 was tracking back to the NDB from the NW, having erroneously made a L not R turn after following the initial missed approach track to the N. One Member thought that a definite risk of collision existed as luck had played a major part in the incident, the ac passing without any visual sighting by either crew. This view was not shared by the majority; although there had been an element of luck in the proceedings, the actual geometry of the encounter, as revealed by the recorded radar, shows the ac passing over 2nm apart with 200ft vertical separation at the CPA. However the Board unanimously agreed that safety had not been assured.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: The BE35 pilot did not follow the standard Missed Approach Procedure and climbed into conflict with the SR22.

Degree of Risk: B.