

AIRPROX REPORT No 2014026

Date/Time: 24 Mar 2014 1548Z

Position: 5311N 00023W
(Waddington RTC)

Airspace: Lon FIR (Class: G)

Aircraft 1 Aircraft 2

Type: BAe146 C172

Operator: HQ Air (Ops) Civ Trg

Alt/FL: 2500ft 2500ft
NK (1001hPa) RPS (1001hPa)

Conditions: VMC VMC

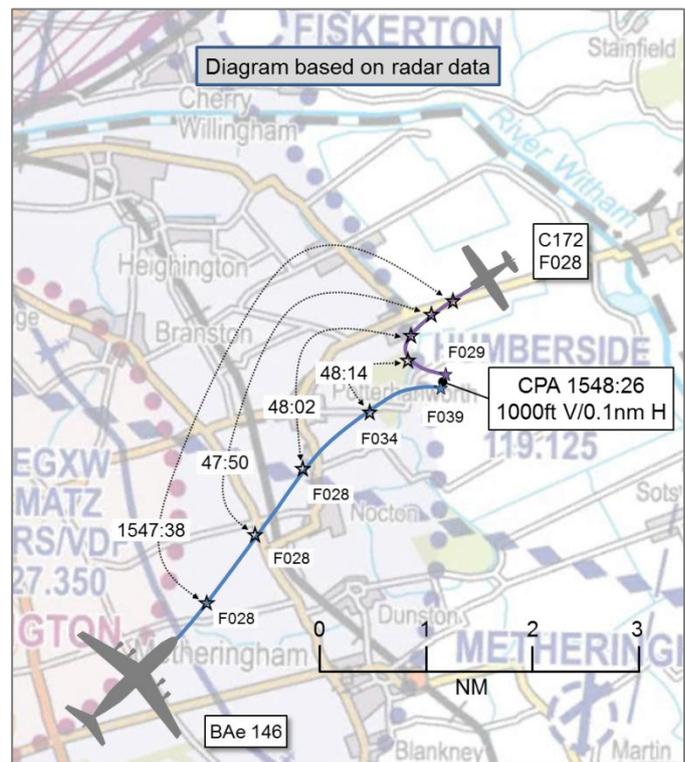
Visibility: 20km 10km

Reported Separation:

0ft V/<1nm H 0ft V/2nm H

Recorded Separation:

1000ft V/0.1nm H



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE BAe146 PILOT reports conducting instrument and visual circuit training at Waddington. The blue and white aircraft had navigation, beacon, strobe and taxi lights selected on, as was the SSR transponder with Modes A, C and S. The aircraft was fitted with TCAS. The pilot was operating under IFR, in VMC, and was in receipt of a Traffic Service from Waddington Director (DIR). During a preceding PAR approach, clearance passed by ATC was, "following touch and go, climb runway track, 2500ft, on passing 1300ft, left turn heading 045°, maintain squawk, contact Waddington Director 378.5 MHz". Following an uneventful touch and go, a simulated Engine Failure After Take-Off (EFATO) was conducted for training. The standard EFATO procedure was carried out and the departure flown in accordance with the clearance; contact with DIR was initiated. As the aircraft approached 2500ft, still in the left turn, DIR advised him of traffic inbound to Waddington and, as he rolled out on heading 045° at 190kt, gave instruction to turn right onto 090°. As the turn was initiated, he received a TCAS Traffic Advisory audio warning. The visual display showed TA traffic co-altitude (+00) at close range in approximately the 10 o'clock relative position. The Handling Pilot (in the left seat) visually acquired the conflicting traffic (head-on or tail-on aspect) whilst turning away (in a right-hand turn) and therefore terminated the simulated asymmetric drill, increased power on all four engines and increased bank angle. This was immediately followed by a TCAS RA "Climb". Go-around power was applied on all 4 engines and the aircraft climbed in accordance with the RA. A TCAS "Clear of Conflict" was announced at about 3100ft and the aircraft levelled at 3500ft. ATC was informed of the TCAS RA. The pilot noted that the DIR climb-out clearance placed his aircraft in direct conflict with traffic

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

THE C172 PILOT reports conducting an instructional sortie. The white and green aircraft had navigation and strobe lights selected on, as was the SSR transponder with Modes A, C and S. The aircraft was not fitted with a TAS or ACAS. The pilot was operating under VFR in VMC, in receipt of a Basic Service from Waddington ZONE. The sortie general handling was conducted in the vicinity of Bardney [8nm east-northeast of Waddington]. A Basic Service was provided throughout, although the pilot stated the controller was clearly working hard with multiple aircraft and types in receipt of a service. On completing the general handling, ZONE was informed that they intended to recover and proceed back to Waddington at 2500ft for an overhead join. As they approached the edge of the Waddington MATZ they were finding it hard to 'get their radio call in' due to the level of traffic on

frequency. They were told to remain "not below 2500ft" and, whilst in a left hand turn, passing through south at 100kt and remaining 'clear of the MATZ until cleared', were given notification of the BAe146 being just south of their position by 2nm, 300ft above. The pilot immediately saw the BAe146 and noticed it was 'well through their level and no confliction'. He tightened the left turn to increase separation and estimated the range at CPA as 2nm.

He assessed the risk of collision as 'Low'.

THE DIRECTOR reports controlling the BAe146 in the RTC. The pilot had just rolled for the second radar pattern circuit, climbing to height 2500ft on the RAF Waddington QFE and heading of 045° (instructions previously given on their last radar pattern when they were well south of Cranwell). An 'Ascot' C/S was just turning '10 miles final' for an SRA to RW20. The BAe146 had been identified and retained a Traffic Service throughout the previous PAR approach and through to climb-out for a further radar (to ILS) approach. The BAe146 pilot was requested to report steady and level on the climb-out. At this point DIR was just sending the Ascot C/S to Talkdown on #5 for SRA. The SRA console had been set up incorrectly (Cranwell Radar was operating from the Waddington ACR due to planned outage of the Cranwell radar head and the console had been configured to the Scampton RW22RH SRA) and the Talkdown controller had to switch consoles rapidly between completing the BAe146 PAR and commencing the Ascot C/S SRA. Therefore DIR also made the Ascot C/S '8 mile call' to Tower on behalf of Talkdown to ease Talkdown's workload and ensure the call was made. Whilst on the line to Tower, ZONE started calling DIR who, just prior to this, saw traffic to affect the BAe146. The traffic was a ZONE track [the subject C172] which was indicating the same Mode C level. DIR called the traffic and the BAe146 pilot acknowledged. The pilot did not request a Deconfliction Service or deconfliction advice. DIR noted that some confusing information was also being passed to both themselves and the U/T ZONE controller on the intentions of the subject C172. DIR felt uncomfortable with the situation and gave the BAe146 pilot a turn to the right, heading 090°, to clear airspace to the east of Waddington. DIR stated that although they had answered the ZONE line, no effective information was passed before the TCAS RA was called. DIR did not want to descend the aircraft in case the pilot decided to continue his track northeast, where the RVC is 2500ft on Waddington QFE, and was also unsure of the subject C172 pilot's intentions. The vector was provided before the RA was called. The contacts did not merge; there was at least 1 or 2 miles "gap" between them.

DIR perceived the severity of the incident as 'Low'.

THE ZONE reports all console positions were open (RAD/DIR/ZONE). DIR was working the BAe146. ZONE had a C152 [actually the subject C172] under a Basic Service, general handling to the east of Waddington between 500ft and 4000ft. During the BAe146 pilot's first GCA, DIR rang through for Traffic Information and subsequently co-ordination. The BAe146 track was not above 2000ft QFE and the C172 track not below 2500ft. ZONE was not told that the BAe146 intention was for a further approach. When ZONE saw that the BAe146 was established on the approach, he cleared the C172 pilot to manoeuvre as required. On climb-out he then saw that the BAe146 was taking a profile that looked like he was for further approach so, with a prompt from the screening controller, he rang DIR to ascertain its intentions and asked the C172 pilot to operate not below 2500ft to help DIR (assuming the BAe146 would be climbed to 2000ft). DIR didn't answer the line initially, and when she did the Mode C of the BAe146 was the same height as the C172. The BAe146 was called to the C172 pilot, who reported visual.

ZONE perceived the severity of the incident as 'Medium'.

THE SUPERVISOR reports the BAe146 pilot climbed out into the RTC from his first PAR. The C172 pilot was general handling east of Waddington by approximately 6nm. He didn't take note of the height to which the BAe146 was climbing, but noted that the C172 was indicating F028 from Mode C. He went across to ZONE to point out that the BAe146 was climbing out into the RTC, as he perceived it to be acutely relevant. He returned to the SUP console and moments later witnessed the BAe146 and C172 with no more than 1nm separation, both indicating F028 on Mode C with converging flight paths. Simultaneously, he switched on the DIR frequency and heard the BAe146 pilot transmit that he

was responding to a TCAS RA. The RA was completed with the BAe146 climbing to height 3500ft on a heading of 090°.

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

Factual Background

The weather at RAF Waddington was recorded as follows:

METAR EGXW 241550Z 16015KT CAVOK 09/M02 Q1009 BLU NOSIG

Analysis and Investigation

Military ATM

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated.

The Waddington ZONE reported having three aircraft on frequency and was working with a 'medium to low' workload and a 'low' task difficulty. The C172 pilot was initially general handling between 500ft and 4000ft and co-ordinated against the BAe146 for its first instrument approach (the C172 not below 2500ft QFE and the BAe146 not above 2000ft QFE). The ZONE did not know the intentions of the BAe146 pilot following the first approach and, once it had 'tracked away', the C172 pilot was allowed to manoeuvre as required. ZONE noticed the BAe146 climb-out for a further instrument approach and instructed the C172 pilot to operate not below 2500ft whilst a call was placed to DIR. There was a delay in DIR answering the landline, at which time the BAe146 was at the same height as the C172 (Mode C). Traffic Information was passed to the C172 pilot, who reported visual with the BAe146. The ZONE was subject to a Standards Check at the time and the member of the Standards Team supported the actions of the ZONE. The SUP recalled seeing the C172 with Mode C indicating 028 and approached the ZONE to inform of the BAe146 pilot's intentions for further radar approaches. The SUP confirmed that the unit and controller workload was 'low' and described the perceived severity as 'high'.

The Waddington DIR had one aircraft on frequency and described the workload and task difficulty as 'low'. The DIR recalled the BAe146 pilot climbing out for a further approach with another aircraft 10nm finals in the process of a handover to Talkdown (TDN). The aircraft on finals was sent to the TDN frequency but there was a problem with the set-up of the console and the TDN had to rapidly switch consoles. The DIR did the 8nm liaison call to the ADC, on behalf of the TDN. Whilst on the line to the ADC it was apparent to DIR that ZONE was also calling. The DIR recalled seeing the ZONE traffic, at a similar level, and passed Traffic Information at a range of approximately 3nm. The DIR recalled an acknowledgement from the BAe146 pilot but no request for an upgrade to Deconfliction Service. The DIR felt uncomfortable with the situation and called the ZONE. There was no reply, and DIR recalled passing a turn to 090° with 2 to 3nm separation. The DIR had considered a descent but the Radar Vector Chart was 2500ft to the east, and this prompted the Director to use lateral separation; the aircraft reported a TCAS RA with a climb to 3500ft. The DIR perceived the situation as a 'low' risk because Traffic Information was called and acknowledged and there was a 1 to 2nm gap between tracks.

At 1546:34, the BAe146 climbed out and was provided a Traffic Service by DIR in the climb to 2500ft QFE, heading 045°. As per Figure 1, the C172 pilot was manoeuvring 6.7nm to the northeast of Waddington.

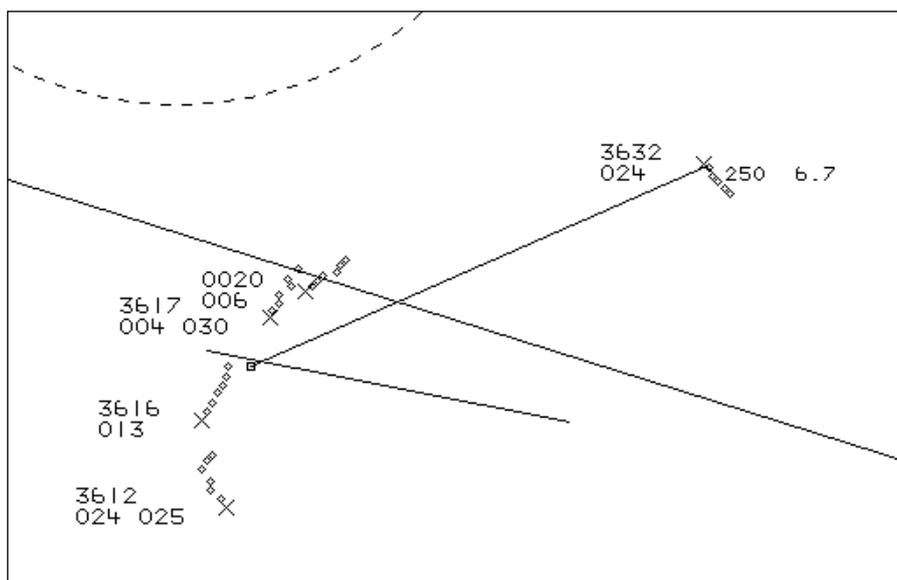


Figure 1: BAe146 climbing out on 3612 squawk; C172 squawking 3632 at 1546:34

At 1546:45, the DIR transferred the other radar traffic to the TDN and asked the BAe146 pilot to report steady and level, as per Figure 2.

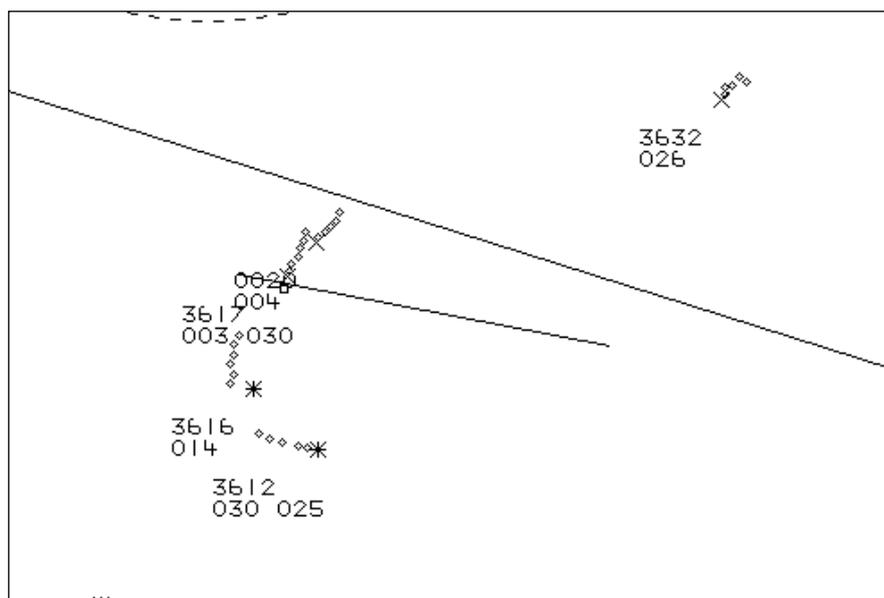


Figure 2: Aircraft geometry at 1546:54

At 1546:54, the DIR called the ADC to pass the 8nm liaison call; the conversation was protracted as the ADC was transmitting to aircraft in the visual circuit; the conversation was terminated at 1547:19, to answer the landline from ZONE. Upon answering the ZONE line, the DIR passed Traffic Information to the BAe146 pilot, at 1547:25, as per Figure 3. “[BAe146 C/S] *traffic north west three miles, tracking south west indicating similar level climbing*”. At this point, it is uncertain which track the Traffic Information related to. At the time of the information the C172 was on a bearing of 045° at 5nm from the BAe146 and therefore on a north easterly bearing.

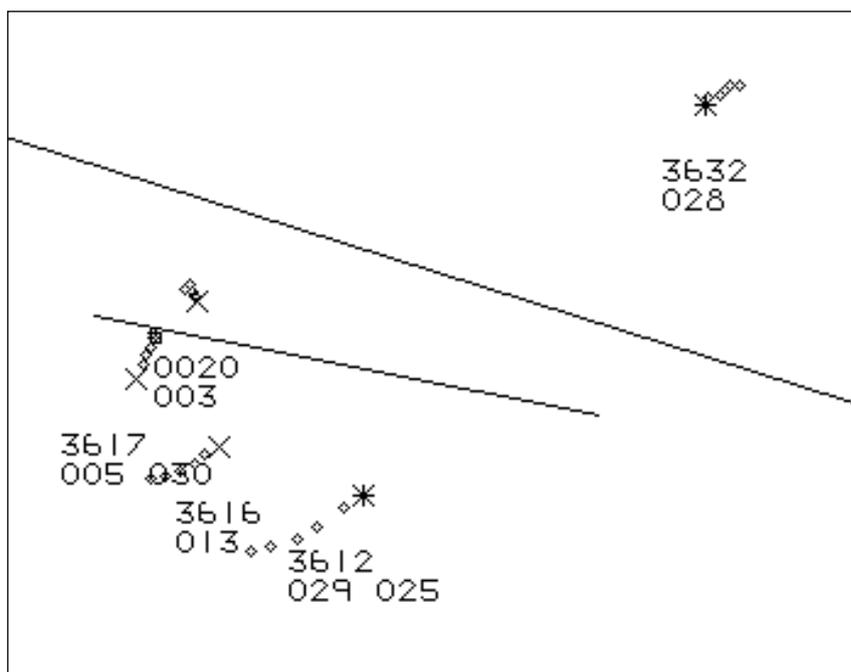


Figure 3: Traffic Information at 1547:25

At 1547:33, the DIR amplified to the BAe146 pilot, “that’s inbound to Waddington, turn right heading 090 degrees”.

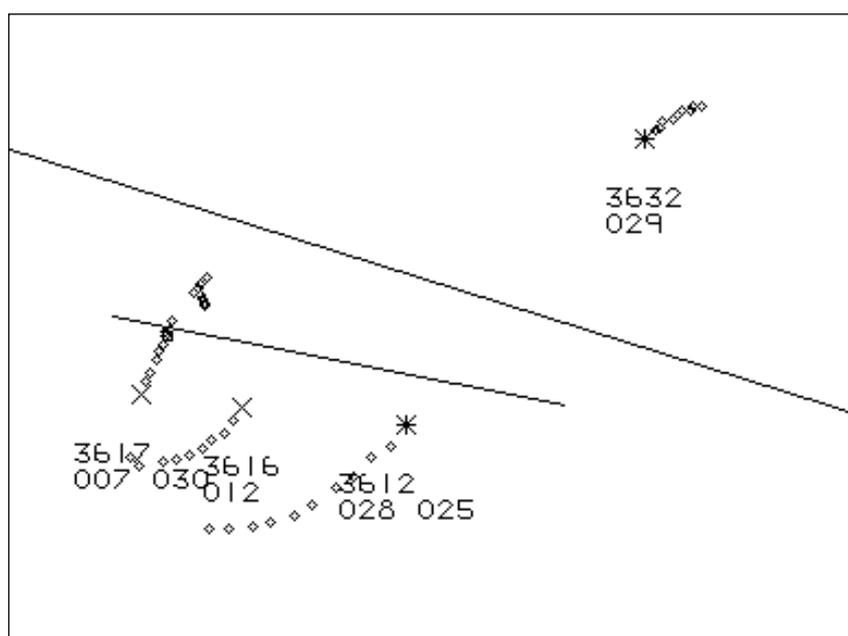


Figure 4: Aircraft geometry at right hand turn 090 degrees at 1547:33

At 1547:45, the DIR called ZONE and received Traffic Information on the C172 at not below 2500ft QFE. As the DIR was reading back the information the BAe146 pilot declared at 1547:53, “TCAS RA climbing”. Figure 5 displays the geometry as the BAe146 pilot announced the TCAS RA climb; the Mode S on the radar replay demonstrates that the BAe146 was still heading 045°.

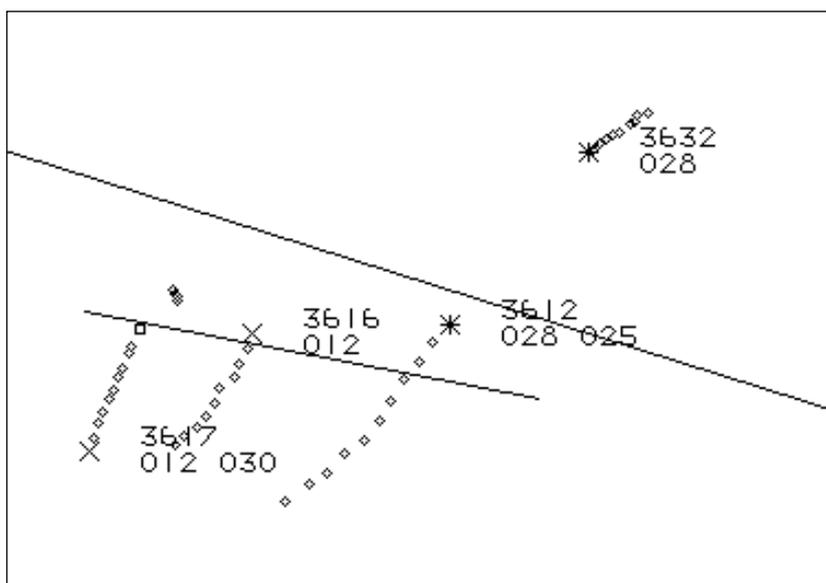


Figure 5: Aircraft geometry at TCAS RA at 1547:53

At 1547:59, the ZONE transmitted, “[C172 C/S] traffic south west, one mile, tracking north east, two hundred feet above”. The C172 pilot reported visual with the BAe146, as per Figure 6, with 1.9nm between aircraft and the BAe146 maintaining a heading of 045°.

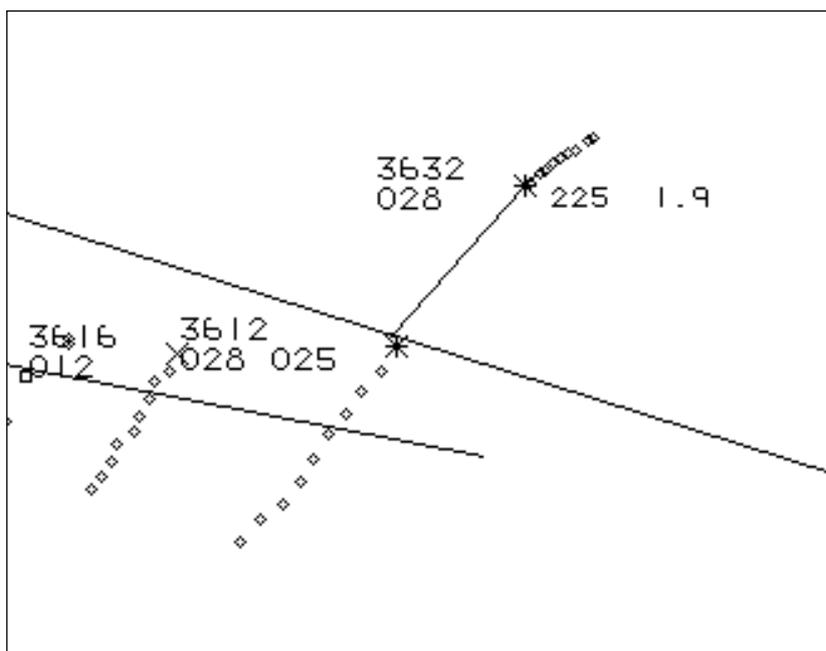


Figure 6: Zone Traffic Information at 1547:59

At 1548:03, the BAe146 pilot began a right hand turn and a climb from 2500ft Waddington QFE (replay taken from Claxby radar on London QNH 1010hPa). Figure 7 depicts the geometry from the radar replay at 1548:17, just prior to the CPA at 1548:24, with 0.2nm horizontal and 700ft vertical separation between aircraft. By the time of the CPA the BAe146 was at a height of 3800ft on the radar replay and a heading of 076°.

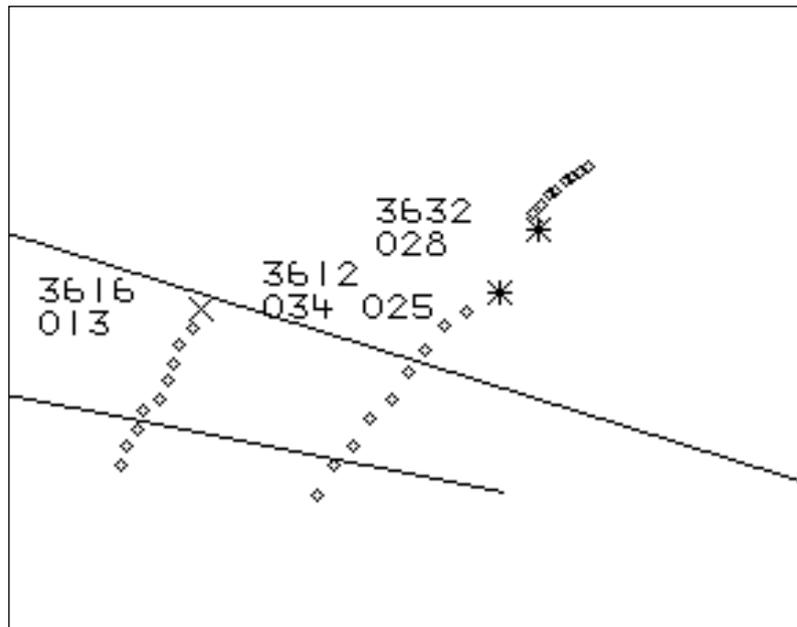


Figure 7: Aircraft geometry at 1548:17

The ZONE passed accurate Traffic Information to the C172 pilot, which assisted his visual acquisition of the BAe146, with both aircraft on a reciprocal heading. The ZONE attempted to pass Traffic Information to DIR and also demonstrated duty of care to aircraft under a Basic Service. The DIR provided Traffic Information and, from the occurrence report, it is evident that the information was intended to provide information on the C172. The BAe146 pilot had not reported 'steady and level' and therefore DIR correctly passed cardinal directions; however, the C172 was to the northeast, not to the northwest, and the range was 5nm, not 3nm. As the aircraft were on a reciprocal heading at the same height, the DIR acted with a turn onto 090°, in association with information that the C172 was inbound. It took the BAe146 pilot 30sec to initiate the turn but in the meantime, the crew had to contend with a TCAS RA and an aircraft engine re-configuration following the termination of the simulated engine emergency. As the DIR was agreeing a course of action with ZONE, the BAe146 pilot declared a TCAS RA. The Manual of Military Air Traffic Management, Chapter 13 states:

'On being informed that an aircraft is manoeuvring in accordance with a RA, a controller should not issue control instructions to that aircraft which are contrary to the RA communicated by the pilot. Once an aircraft departs from an ATC clearance in response to a RA, the controller ceases to be responsible for providing standard separation between that aircraft and other aircraft affected as a direct consequence of the RA manoeuvre. However, where possible, controllers should provide traffic information to aircraft affected by the manoeuvre.'

The BAe146 pilot was at 2500ft, the standard height for the instrument pattern; the previous co-ordination would not have been practical because the C172 was at the same height and the RVC limited options to descend the BAe146. The turn was a suitable option for the DIR and demonstrated duty of care under a Traffic Service.

When taken in context, the DIR had one speaking unit on frequency but also had multiple landlines to answer and an Approach Room re-configuration for the TDN console that would have proved a distraction. At 1547:53, the TCAS RA was transmitted (the turn was provided at 1547:33 and the CPA was at 1548:24) and the controller was no longer responsible for separation but updated Traffic Information may have assisted the crew. The BAe146 pilot did not take the turn immediately but the crew were terminating their simulated emergency when their attention would have been drawn to the TCAS TA followed by a visual scan and then the RA climb.

All of the barriers combined to help build in separation. Both crews were visual and the TCAS RA provided the BAe146 pilot with a climbing action; the C172 was not fitted with ACAS. The Traffic Information aided the C172 pilot in getting visual; DIR's Traffic Information was slightly inaccurate

but the right turn onto 090° degrees would have built in more separation had the BAe146 pilot been able to act upon it immediately.

UKAB Secretariat

Both pilots shared an equal responsibility for collision avoidance and for not flying into such proximity as to create a danger of collision¹.

Comments

HQ Air Command

The BAe146 pilot's delay in initiating the right turn onto 090° compounded what should have been a benign situation. Prioritisation of training elements of a sortie (the EFATO, on this occasion) must be balanced against the very real need to preserve adequate separation from other traffic.

Summary

An Airprox was reported when a BAe146 and a C172 were flown into proximity at 1548 on 24th March 2014. Both pilots were in VMC, the BAe146 pilot operating under IFR, in receipt of a Traffic Service from Waddington DIR and the C172 pilot under VFR, in receipt of a Basic Service from Waddington ZONE.

PART B: SUMMARY OF THE BOARD'S DISCUSSIONS

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

The Board first considered the actions of the C172 pilot who had been conducting a local sortie before then returning to Waddington. He had been held clear to the northeast of the MATZ at 2500ft by ZONE and was in a left-hand turn when he was given Traffic Information on, and saw, the BAe146 to the south. Although he tightened his turn to increase separation as a result, the Board estimated that the BAe146 TCAS RA had already occurred at that point. The Board noted that the C172 pilot was not overly concerned by the proximity of the other aircraft.

Turning to the BAe146 pilot, the Board noted that he had performed a touch-and-go from his first GCA and then complied with the previously passed instructions for a climb-out heading and level of 045° and 2500ft. Whilst doing so, the Board noted that the crew had conducted an EFATO which occupied their attention after getting airborne and may have delayed their establishment of contact with DIR. On contacting DIR in the latter stages of the climb-out phase they were then given Traffic Information and a turn onto east as DIR attempted to maintain separation on the C172. An airline pilot member noted that the EFATO configuration would affect aircraft performance such that the BAe146 would have a reduced climb rate. It was also noted that EFATO were commonly associated with reduced angle of bank limits and hence turn rate. The Board agreed that by not communicating this information to ATC, the BAe146 pilot had not given DIR the opportunity to include the change in performance in her planning, and that this was contributory to the Airprox. An airline pilot member also pointed out that EFATO performance was limited to the extent that in some airliner configurations the TCAS RA function was selected off, thereby preventing RA commands that could potentially exceed the aircraft's performance limits. The Board noted that there appeared to be a significant delay between DIR requesting the right turn onto east and the BAe146 complying. Members were agreed that this delay had had a significant impact on the reduction in separation, and that had the turn been taken promptly, the separation would have been significantly greater. The Board therefore considered this delay also to be contributory to the Airprox. Finally, it was noted that

¹ Rules of the Air 2007 (as amended), Rule 8 (Avoiding aerial collisions), and as reflected in Military Flying Regulations.

for events such as EFATO, that may require a significant increase in time spent 'heads-in' the cockpit, a Deconfliction Service may be more appropriate.

When considering the ATC aspects of the Airprox, the Board felt that, from the available reports, DIR was most likely coping with the repercussions of the mis-configured SRA console to the extent that her attempts to help other controllers had resulted in distraction: the Board agreed that this distraction was contributory to the Airprox. That being said, once DIR recognised the impending conflict, she gave Traffic Information to the BAe146 pilot (which unfortunately was not initially correct in bearing in relation to the C172) and then issued the corrective right turn onto east. More fundamentally, the Board felt that DIR may have given the initial climb-out clearance without due consideration of the C172 which was closing towards Waddington from the east at the time, and they felt that better coordination between ZONE and DIR was required in order to achieve safe, efficient and expeditious control of this situation. Members reflected that, overall, provision of control from an ATSU required a coordinated team effort in order to ensure successful delivery: this coordination had not been achieved in this case; ATC members questioned why the SUP did not assist DIR directly when he saw the developing conflict, and also felt that the mis-configured console could reasonably have been detected earlier by the ATC team.

Considering the cause and risk, the Board agreed that DIR had given a climb-out clearance in the direction of known traffic but that it was the SUP who ultimately bore the responsibility for ensuring that sufficient coordination occurred to prevent conflict. The Board therefore agreed that the cause of the Airprox had been that Waddington ATC had vectored the BAe146 pilot into conflict with the C172. As for the risk of collision, the BAe146 pilot had responded to his TCAS RA, and the C172 pilot tightened his left turn to increase separation; the Board therefore considered that effective and timely action had been taken to prevent collision.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: Waddington ATC vectored the BAe146 pilot into conflict with the C172.

Contributory Factor(s):

1. The BAe146 pilot did not communicate his EFATO plan to ATC.
2. The BAe146 pilot did not make the turn on to east in a timely fashion.
3. DIR was distracted by the mis-configured SRA console.

Degree of Risk: C.

ERC Score²: 10

² Although the Event Risk Classification (ERC) trial had been formally terminated for future development at the time of the Board, for data continuity and consistency purposes, Director UKAB and the UKAB Secretariat provided a shadow assessment of ERC.