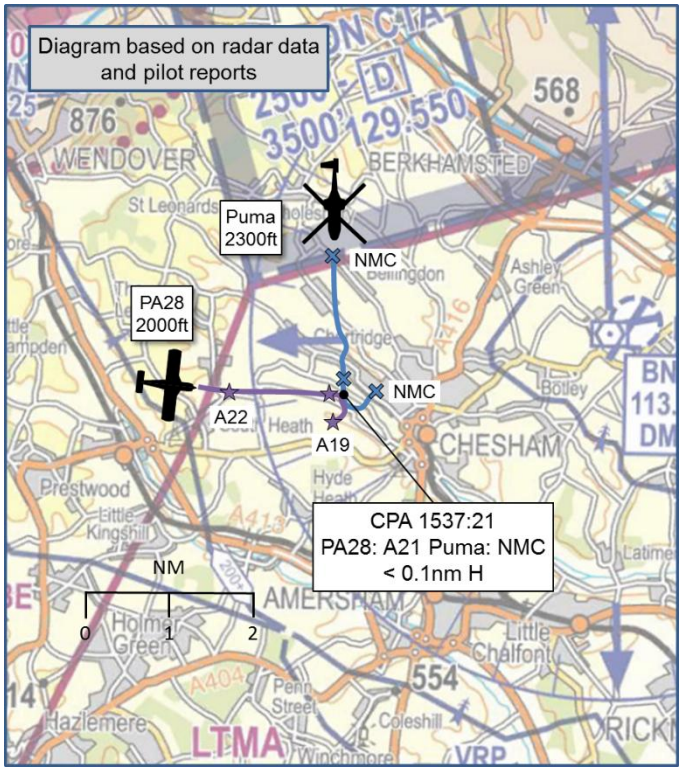
AIRPROX REPORT No 2014025

Date/Time: 24 Mar 2014 1537Z

Position: 5142N 00038W (3.5nm SW of Bovingdon)

Airspace: London FIR (*Class*: G)

	Aircraft 1	*Aircraft 2*
Type:	Puma	PA28
Operator:	HQ JHC	Civ Trg
Alt/FL:	2300ft QNH (1011hPa)	2000ft QNH (NK hPa)
Conditions:	VMC	VMC
Visibility:	25km	>10km
Reported Separation:	50ft V/100m H	0ft V/100m H
Recorded Separation:	NK V/<0.1nm H	



PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

THE PUMA PILOT reports flying a green and black helicopter, VFR in CAVOK, with HISLs and navigation lights turned on and squawking transponder Modes 3/A, C and S; the helicopter did not have an ACAS[1] fitted. The crew were flying a low-level training sortie, which required them to enter the TVAA[2], land at Beaconsfield helicopter landing-site, and then return to their base. On entering the TVAA at Tring, the HP[3] climbed the aircraft to 1300ft on 1009hPa, which was the last known RPS, in order to maintain 1000ft MSD[4], whilst the NHP[5] spoke to Northolt Approach to agree a radar service before letting-down into Beaconsfield. The crew were instructed to squawk Mode 3/A 4360, which they promptly set. The Northolt Approach controller could not see their squawk on the radar display and asked the crew to climb to 'not above' 2400ft[6] but the crew did not recall the controller passing them the QNH. The NHP verified the current QNH (1011hPa) and the aircraft was then climbed to 2300ft to aid radar identification. Within 10 seconds of levelling off, the HP looked 'low into his 3 o'clock' and saw a fixed-wing aircraft heading directly towards them, in a left-banked nose-up attitude, as if to turn behind the helicopter. The HP initiated a climbing left evasive turn with the intention of avoiding collision and to enable the NHP in the left-hand seat to reacquire visual contact with the other aircraft. During the evasive manoeuvre the HP inadvertently climbed the Puma to 2550ft, and in to controlled airspace. The crew assessed that the airspace infringement was for less than 10 seconds and, once they were clear of the other aircraft and could see it flying away, the HP descended out of controlled airspace and elected to curtail the sortie and return to base. Once in contact with ATC at their home base, the crew confirmed that helicopter's transponder was operating correctly and producing the correct information on the controller's radar screen.

He assessed the risk of collision as 'Very High'.

[1] Airborne Collision Alerting System
[2] Thames Valley Avoidance Area
[3] Handling pilot
[4] Minimum separation distance
[5] Non-handling pilot
[6] Controlled airspace begins at 2500ft in this area

THE PA28 PILOT reports flying a white and yellow aircraft, VFR in CAVOK, with 'strobes' and landing lights turned on and squawking transponder Modes 3/A, C and S. The pilot was returning from the Wescott area following a training sortie with a student, and was receiving a Basic Service from Farnborough Radar. When they were to the west of Chesham, the instructor carried out a 'good lookout' before closing the throttle to simulate an engine failure. He reports a 'medium' workload as he looked down at the engine controls to supervise the student's actions, then commenced another look-out scan and saw 'a large green helicopter' through the port window; the Puma was approximately 300ft away in his 10 o'clock position and the instructor 'immediately took control' and entered a 45° angle-of-bank descending turn to the right. The student reported that he could see the Puma turning steeply to its left, and the PA28 instructor continued his right turn to fly away on a reciprocal heading, descending to 1800ft. Once he had regained visual contact with the Puma, the instructor turned back on to his track and continued at 'a safe distance' towards his destination.

He assessed the risk of collision as 'High'.

THE NORTHOLT APPROACH CONTROLLER reports having no aircraft on frequency until the Puma pilot free-called Northolt Radar, giving the aircraft's position as near Amersham and requesting a Basic Service and entry into controlled airspace en-route to Beaconsfield. The controller instructed the pilot to change squawk but was unable to identify the aircraft on radar. The controller instructed the pilot maintain his own terrain clearance and asked if he could climb to 2400ft to aid identification before entering controlled airspace. Still unable to identify the aircraft, the controller asked the pilot to 'squawk ident'[7], but still could not identify it on radar. The pilot then reported an Airprox and the controller recalls subsequently being informed that the helicopter's evasive action had taken it inside controlled airspace for approximately 3sec. The Puma pilot informed the controller that he had changed his intentions, intended to return to base, and elected to free-call their Approach frequency. The Approach controller called ATC at the Puma's base, who could see the aircraft's Mode 3/A and C codes clearly, whereas Northolt's display showed no secondary radar information from the Puma; the equipment failure was reported.

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

Factual Background

The weather at Northolt at 1450 was recorded as:

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METAR EGWU 241450Z 18013KT 9999 SCT046 BKN250 10/M02 Q1010 BLU NOSIG
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The Luton weather at 1520 was recorded as:

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METAR EGGW 241520Z 15013KT 9999 BKN046 09/M01 Q1010=
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Analysis and Investigation

CAA ATSI

CAA ATSI had access to Farnborough RTF and area radar recording, together with the written reports from the Puma and PA28 pilot. The Airprox was not reported to Farnborough and the controller has no recollection of the event.

At 1505:15 the PA28 pilot established two-way communication with Farnborough and reported at 2000ft on QNH 1014, practising forced landings in the Westcott area, requesting a Basic Service. The PA28 pilot was instructed to squawk Mode 3/A 5034 and a Basic Service was agreed.

At 1510:02 the PA28 pilot reported, *"(PA28)c/s carrying out PFLs we'll call you when exercise complete.*"

[7] The ident feature causes the aircraft's Mode 3/A code to flash on the controller's radar display to aid radar identification.

At 1535:24 the PA28 was 6nm west-southwest of BNN[8] and having just completed a manoeuvre was tracking east and climbing through 1400ft. The Puma was 4nm northeast of the PA28 tracking south and shown only as a primary contact - Figure 1.

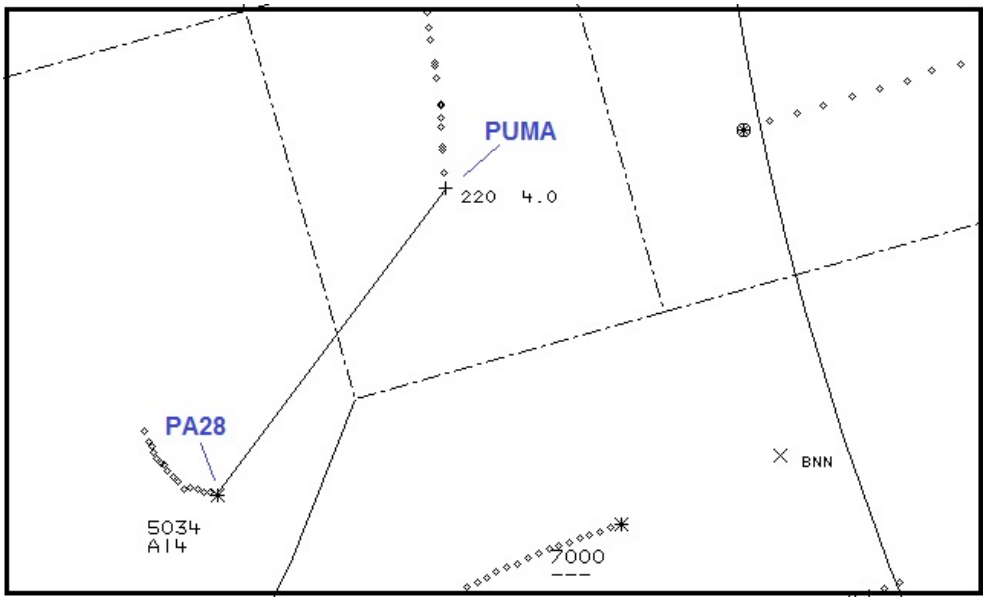

Figure 1 – Swanwick MRT at 1535:24

The PA28 climbed to 2300ft and the two aircraft continued to converge. At 1537:22 the distance between the aircraft appeared to be 0.1nm, with the PA28 indicating 2100ft. There was a degree of jitter on the Puma return so exact geometry of the encounter could not be verified – Figure 2.

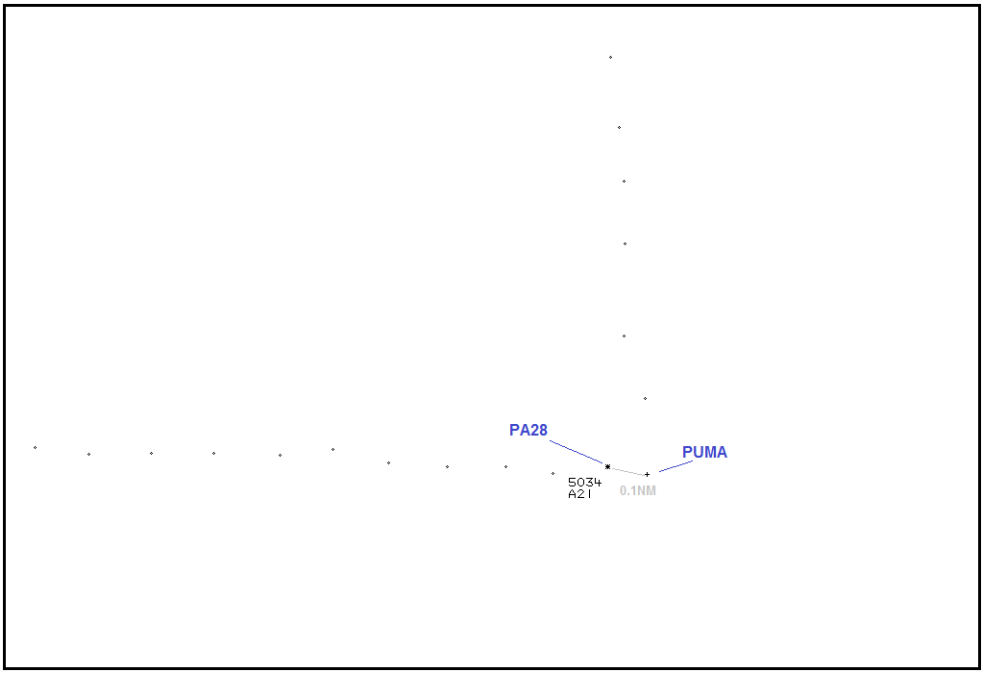

Figure 2 – Swanwick MRT at 1537:22

The returns are intermittent on the next radar update. At 1537:30 the PA28 appeared to be in a right turn, and the Puma in a left turn as the tracks began to diverge – Figure 3.

[8] Bovingdon VOR

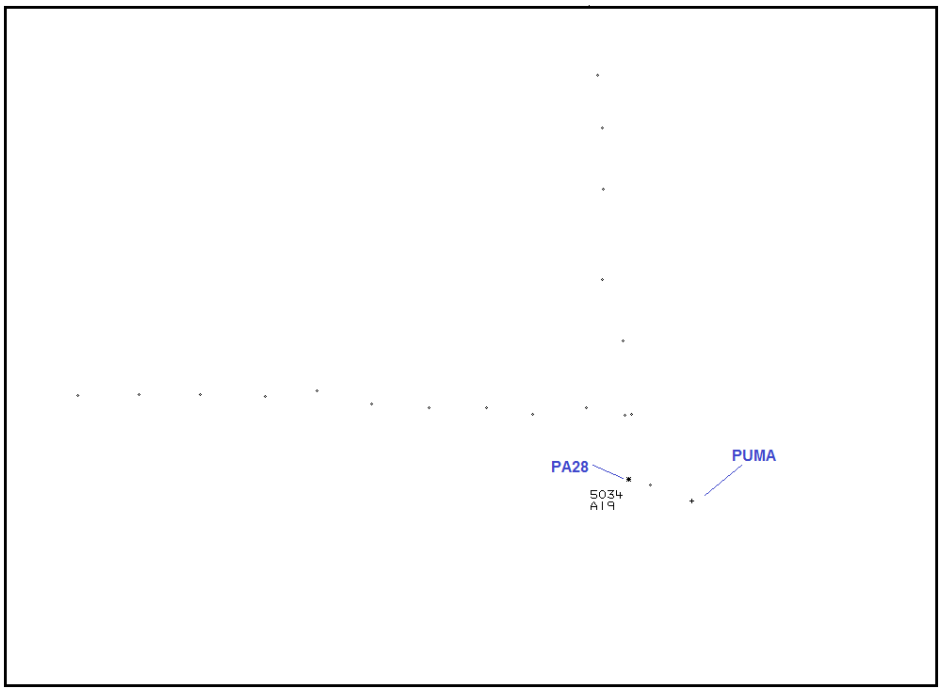

Figure 3 – Swanwick MRT at 1537:30

At 1539:13 the PA28 pilot called changing frequency to Denham and was instructed by Farnborough to change squawk to 7000. The PA28 pilot did not report an Airprox and there was no mention of other aircraft in the vicinity.

The radar returns became intermittent at CPA[9], and it was not possible to determine the exact geometry of the encounter. Farnborough were not aware of the Airprox until three weeks after the event and the controller had no recollection of the circumstances. The PA28 was in receipt of a Basic Service from Farnborough LARS(N), and had not requested an upgrade to a Traffic Service. CAP 774, UK Flight Information Services, Chapter 2, Page 1, Paragraphs 1 and 5, state:

> A Basic Service is an ATS provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights. This may include weather information, changes of serviceability of facilities, conditions at aerodromes, general airspace activity information, and any other information likely to affect safety. The avoidance of other traffic is solely the pilot's responsibility.

Military ATM

All heights/altitudes quoted are based upon SSR Mode C from the radar replay unless otherwise stated. The timings on the tape transcript and the radar replay do not match with an estimated 30 seconds discrepancy between them. The CPA on radar replay was at 1537:21; on the transcript, the Airprox was declared at 1536:49.

The tape transcript for the conversation between the Puma pilot and Northolt Approach is at Table 1 below:

[9] Closest Point of Approach

To	From	Speech transmission	Time
NLT APP	Puma	[Puma callsign] squawking 4360, Puma helicopter, 3 POB, currently 6 miles north of Amersham at 1300 feet 1009, squawking 4360 inbound to Beaconsfield HLS requesting a ……	1535:18
Puma	NLT APP	[Puma callsign] ahh, you're not identified on radar confirm your squawk 4360	1535:35
Puma	NLT APP	[Puma callsign] I've got nothing in the Amersham area, umm, maybe you are below my radar coverage, umm, I can only suggest taking terrain, taking your own terrain clearance, suggest a climb not above 2400 feet	1535:46
NLT APP	Puma	[Puma callsign] Uhh, height 2400 feet, uhh, we are just at Chesham now, amm, estimating Beaconsfield HLS in approximately 5 minutes."	1536:01
Puma	NLT APP	"[Puma callsign] unfortunately, I do need to identify you on radar to give you entry into controlled airspace.	1536:10
NLT APP	Puma	[Puma callsign] is climbing.	1536:15
NLT APP	Puma	[Puma callsign] we just got an Airprox there, in Chesham, light aircraft, yellow and white.	1536:49

Table 1: Tape transcript from Northolt ATM.

The radar replay at 1536:44 shows a closing distance of 1.5nm and a Primary radar return only for the Puma, as per Figure 4.

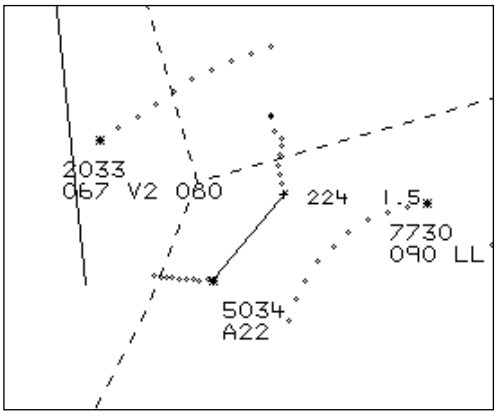

Figure 4: Aircraft geometry at 1536:44 (PA28 squawking 5034).

As per Figure 5, at 1536:57, the aircraft are on a converging heading with no height information available for the Puma.

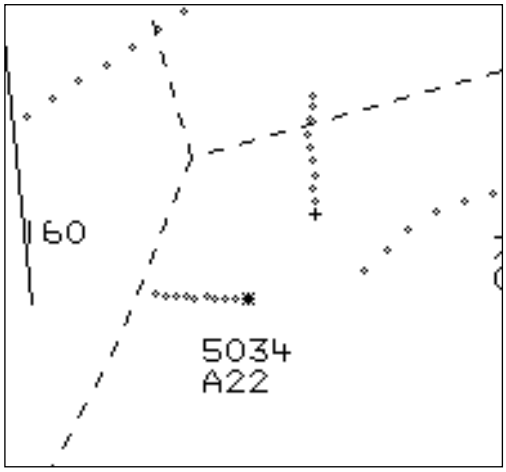

Figure 5: Aircraft geometry at 1536:57.

At 1537:21, as per Figure 6, the aircraft are about to merge on radar. Radar analysis places the CPA between 1537:21 to 1537:25, with a lateral separation of 0.1nm, prior to the Puma disappearing from radar; no height information was available from radar replay.

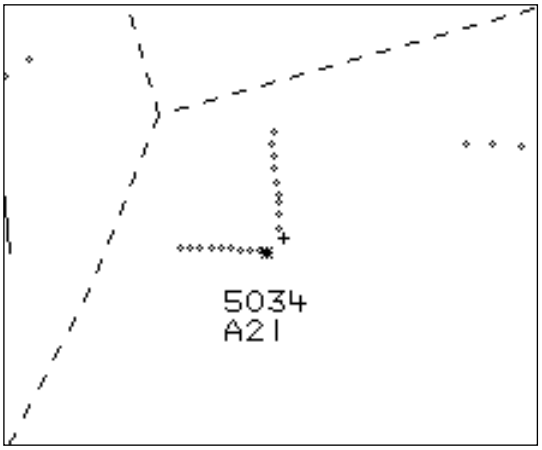

Figure 6: Aircraft geometry at CPA at 1537:21

The Puma was not identified on radar by Approach. Following the CPA, the Puma pilot changed his intentions and returned to his base.

The Northolt controller attempted to identify the Puma, prior to its entering controlled airspace, by climbing it into radar coverage. The Puma was seeking a Basic Service, but the Northolt controller could not identify the aircraft on radar until after the Airprox and with help from Benson ATC; no ATC service was agreed. The controller reported searching the radar display to identify the Puma. As the PA28 was in the vicinity of the Puma's reported position, it may have been possible to pass speculative Traffic Information, but it is not possible to be certain if the PA28's secondary radar information was being displayed to the controller at the time. The controller could have elected to use another means of identification but, in this case, it is not possible to tell if the use of turns would have improved or exacerbated the situation.

In terms of barriers, neither of the aircraft crews were under a radar service and neither had an Airborne Collision Avoidance System fitted. Pilot lookout was the major barrier left to avoid collision.

UKAB Secretariat

The aircraft were converging, and the PA28 was on the right of the Puma, so the Puma pilot was required to give way.[10]

Comments

JHC[11]

A late sighting in Class G Airspace whilst under a Basic Service, which emphasises the requirement for the maintenance of effective lookout at all times. The Puma crew were in the process of obtaining a suitable radar service for their position. The Puma fleet is due to be fitted with ACAS in the near future which would have provided a further barrier on this occasion. Airprox is the subject of the June edition of the "JHC Flash" publication to highlight this.

[10] Rules of the Air 2007, Rule 9, Converging
[11] Joint Helicopter Command

Summary

An Airprox was reported by the pilot of a Puma helicopter when he came into close proximity with a Piper PA28 Cherokee Warrior III 3.5nm to the southwest of Bovingdon VOR, within Class G airspace. The PA28 was under a Basic Service with Farnborough Radar North; the Puma had called Northolt Radar for a Basic Service and was in the process of being identified.

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 photographs/video recordings, reports from the air traffic controllers involved and reports from the appropriate ATC and operating authorities.

The Board first discussed the actions of the PA28 pilot who reported carrying out simulated engine failure drills, which require additional attention inside the cockpit and monitoring of the student's activities. The Board noted that the two aircraft had been mostly on constant closing bearings for some time before the encounter, which can make make it harder to visually acquire the other aircraft; given the fact that his focus was likely to be more inside the cockpit, the Board opined that the PA28 pilot may have been better served if he had requested a Traffic Service, even if only to cover the portion of the flight with the higher workload. Nevertheless, the Board agreed that the avoiding action taken by the PA28 pilot had proven effective, even though it had been taken very late.

In considering the actions of the Puma pilot, the Board noted that, laudably, he was attempting to supplement his lookout by seeking an ATC service but was experiencing delays in achieving this due to a technical issue concerning the Puma's SSR display on the NATS radar equipment. The Board opined that the subsequent climb to aid identification may have acted as a distraction in itself, alongside the fact that the Puma crew would have suffered the same issues as the PA28 pilot in visually acquiring another aircraft on a constant bearing. Notwithstanding, the Board agreed that the Puma crew's late avoiding action had also increased the final CPA.

Turning to the actions of the Northolt controller the Board wondered if a different method of identification could have been used to identify the Puma, or if the controller could have passed generic Traffic Information based on the Puma pilot's initial position report. The Board noted that the controller was based remotely at Swanwick, not at Northolt, and may not have had a detailed local geographical knowledge with which to assist him when pilots used local features for position reports. Furthermore, the Board also noted that the Northolt controller does not have access to Direction Finding equipment or VRPs[12] displayed on his radar map. Consequently, although the controller may have known roughly where Amersham was, that information was not accurate enough to pick out a single primary radar return in busy airspace. In any case, the pilot had simply called that he was 6nm north of Amersham, which meant that there was even more uncertainty in this position report given the size of Amersham town. Finally, there was less than a minute between the Puma pilot's initial call and the Airprox. The Board noted that in that time the controller had had to check and transmit the QNH and control another aircraft, which was in controlled airspace and consequently had priority. Members agreed that, given the circumstances, the controller's decision to climb the Puma in an effort to get stronger radar coverage was reasonable, and that he would have had other tasks to complete alongside that of trying to overcome the lack of Puma SSR display that would likely have absorbed his attention beyond the ability to give Traffic Information to the as yet unidentified Puma.

Turning to the cause and the degree of risk, it was clear that this was a late sighting by both pilots but there was some discussion about whether this was a category A or a B event. The encounter had been very close and safety margins had been very much reduced; however, the Board agreed that both pilots had seen the other aircraft just in time to take some effective action, albeit very late, and so the degree of risk was agreed as a B. With regard to the Puma transponder, the Board was informed that there had been occasional technical issues reported in the past between Puma

[12] Visual Reporting Point

transponders and NATS radars and that a trial had just been completed to attempt to ascertain the reason. However, the results were not yet known and the Board agreed to recommend that JHC should continue to pursue this work with some priority.

PART C: ASSESSMENT OF CAUSE AND RISK

Cause: A late sighting by both pilots.

Degree of Risk: B

ERC Score[13]: 20

Recommendation(s): JHC consider investigating Puma SSR and NATS radar compatibility.

[13] 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.