

## AIRPROX REPORT No 2011120

Date/Time: 7 Sep 2011 1521Z

Position: 5006N 00508W (5nm E of Culdrose - Helford River)

Airspace: CMATZ (Class: G)

Reporting Ac Reported Ac

Type: Merlin HM Mk1 Hawk T Mk1

Operator: HQ Navy Cmd HQ Navy Cmd

Alt/FL: 500ft NR  
QFE (1007hPa) NR

Weather: VMC CLBC NR

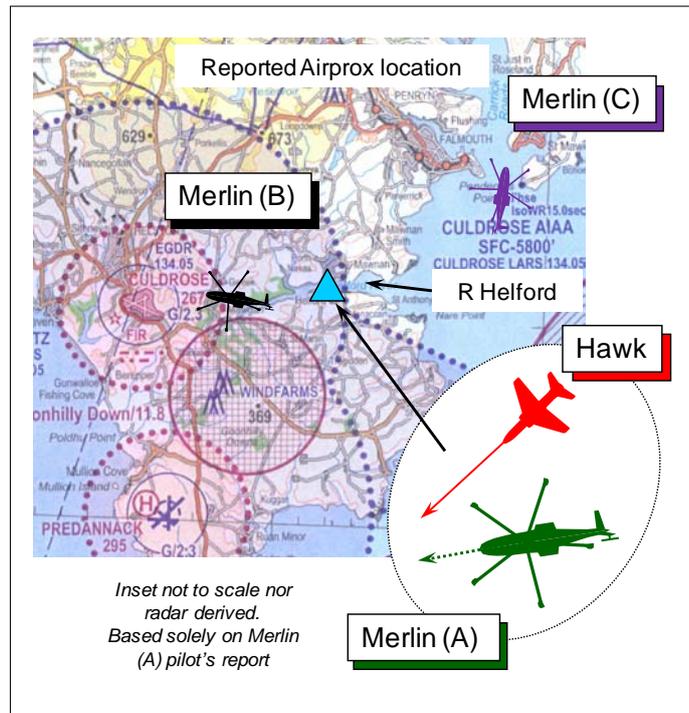
Visibility: 8km NR

Reported Separation:

Nil V/100ft H ½nm H

Recorded Separation:

Not recorded



## PART A: SUMMARY OF INFORMATION REPORTED TO UKAB

**THE AGUSTA WESTLAND MERLIN HM Mk1 PILOT [MERLIN (A)]** reports that he was recovering to Culdrose on completion of a maintenance test flight in Falmouth Bay. Flying in VMC some 1300ft clear below cloud, he was following the published local VFR procedure at 120kt along the S bank of the River Helford at 500ft Culdrose QFE (1007hPa). He was in 2-way RT with Culdrose TOWER on 297.775MHz and a squawk of A7030 was selected with Mode C. Mode S is fitted, TCAS is not. Inbound 5nm E of the A/D, heading about 250°, approval to join had been passed by TOWER when a Hawk ac was seen in his 2 o'clock 150ft away at the same height. The Hawk appeared to come from a relative bearing of 'Green 135' – the 4:30 position - crossing ahead from R – L through an estimated heading of S in a 10° AoB L (sic) turn with 100ft horizontal separation and a 'very high' Risk of collision. No avoiding action was taken due to the time available, but given the possibility that the ac might be part of a formation, he descended his Merlin to a height of 200ft QFE, but it rapidly became apparent that the Hawk was a singleton. Once it was clear that there was no further conflict, he climbed back to 500ft QFE and completed the sortie without further incident. The Airprox was reported to TOWER on RT and to SATCO after landing by landline.

**THE BAe HAWK T MK1 PILOT** reports he was inbound for a visual recovery to Culdrose from E of the A/D and had been advised by ATC of a Merlin helicopter – Merlin (C) - operating over the Falmouth docks area that he reported visual with. He was also advised of another Merlin - Merlin (B) - joining via the River Helford, which he saw and reported that he was visual with the helicopter. Passing behind this traffic, he requested a 'low-break', which was approved by the Aerodrome Controller (ADC). At the IP for RW30, the previously reported Merlin [Merlin (B)] was to the N of his Hawk, approximately overhead Gweek, where he thought ATC had requested the pilot of Merlin (B) to hold, whilst he made his turn onto finals to land on RW30. When on the 'break' into the cct, the pilot of Merlin (A) advised TOWER that he would be filing an Airprox against the Hawk that had just joined the cct. However, he was at all stages visual with the Merlin helicopter, he thought [it seems he was unsighted on Merlin (A)] and never flew closer than ½nm; therefore at no stage was there a flight safety hazard.

**THE CULDROSE DUTY AIR TRAFFIC CONTROL OFFICER (DATCO)** reports that the subject Merlin helicopter [Merlin (A)] was on recovery to Culdrose via an established VFR route along the S bank of the River Helford (that runs to the NE of Culdrose) at 500ft QFE (1007hPa), with Merlin (B)

ahead, also on the VFR route. The Hawk pilot was executing a visual recovery from the NE to RW30 via the IP, which is positioned at 3nm on the extended centre line to RW30 at 1500ft QFE. Whilst joining, the Hawk pilot was only told by the ADC about the Merlin already on the VFR route - Merlin (B), as Merlin (A) was not yet on frequency. The crew of Merlin (A) called on the TOWER frequency and reported established on the River Helford route. The Hawk pilot was given approval by TOWER for a low break. Shortly after the Hawk joined through the IP, the pilot of Merlin (A) reported an Airprox with the Hawk, alleging that the Hawk pilot had flown at a similar height within 100ft of Merlin (A).

The Culdrose weather: sfc wind 280°/15kt; Vis 12km; SCT @ 1700ft; QFE 1007hPa; CC WHITE.

**RNAS CULDROSE** reports that a full Defence Aviation Error Management System (DAEMS) investigation was conducted into this Airprox. The following is a summary of the investigation report with additions from the RT transcript provided.

Prior to either ac involved calling for recovery APP, which was manned by a trainee controller screened by a mentor, was working several ac on two other UHF channels (#8 & #10) in addition to operating the UHF and VHF APP frequencies – four frequencies in total. Significantly, up to 4 Merlin helicopters were operating in the Falmouth Bay area; those relevant to the incident were, Merlin (B) that was recovering along the R Helford VFR route ahead of the subject Merlin (A) and Merlin (C) that transited from Predannack to operate in the vicinity of Falmouth Docks.

#### Sequence of events:

At 1514:40 the crew of Merlin (B) call APP on #8 returning to Culdrose via the S bank of the R Helford: a published VFR helicopter route. APP passes the A/D details and informs the crew to report coasting in.

At 1515:35 Plymouth MILITARY pre-noted the Hawk to the SUPERVISOR (SUP). Following discussion on the landline the Hawk is then handed over to APP, at 2000ft QNH under a BS initially requesting an ILS.

At 1515:55 TOWER is informed by APP of Merlin (B) returning via the S bank of the Helford.

At 1516:40 the crew of Merlin (A) call APP on #8 returning via the S Bank of the R Helford. APP passes the A/D details and informs the crew to report coasting in. As APP is informing the crew of Merlin (A) about Merlin (C) transiting to Falmouth Docks, the Hawk pilot calls APP on UHF. Whilst APP was speaking to the Hawk pilot, the crew of Merlin (B) called coasting in S bank of the Helford.

At 1517:01 TOWER is informed of Merlin (A) returning via the S bank of the Helford by SUP.

At 1517:20, the Hawk pilot is passed the A/D details and informed that it is Radar to Visual recoveries. The Hawk pilot had originally requested an ILS recovery having been informed by Plymouth MILITARY that the weather was worse than it actually was. However, the Hawk pilot deemed that it was suitable for a visual recovery and requested such from APP.

At 1517:35, APP approved the visual recovery, gave the Hawk pilot 'own navigation' and told him to report A/D in sight.

At 1518:08 APP informed the Hawk pilot, "*..be advised got multiple rotary wing operating not above 1300 feet altitude [QNH 1016hPa] in the Falmouth Bay region*". At 1518:30, APP informs TOWER that the Hawk pilot is making a visual recovery.

At 1518:59 the Hawk pilot calls, "*..visual with the field and also visual with the rotary in the Falmouth Bay area*" and switches to Culdrose TOWER.

At 1519:09 the Hawk pilot calls TOWER to join who reply “...join runway 3-0 Q-F-E 1-0-0-7 1 Merlin inbound on the Helford”. The Hawk pilot has been informed of Merlin (B) inbound via the Helford.

At 1519:30 Merlin (A) (the PIC and PNF) calls APP coasting in S bank of the Helford on #8.

At 1519:38 Merlin (A) (PF) calls TOWER to join, “..coasting in the Helford, 5 hundred feet 1-0-0-7, squawking 7030. Merlin (A) is told, “..roger report at Gweek for runway 3-0, Q-F-E correct 1 ahead” – Merlin (B). The crew of Merlin (A) was informed of Merlin (B) ahead on the Helford route as they were operating at the same height; they were not informed about the joining Hawk as the VFR Fixed Wing recovery procedure is to join via Initial Point at 1500ft QFE. Therefore, the Hawk should have been 1000ft above the Merlin.

At 1520:09, TOWER informs the crew of Merlin (B) about the Hawk inbound for RW30, “...1 Hawk inbound for 30, are you happy to join for 25? Surface wind 280 14 knots”. The crew of Merlin (B) reply, “affirm..” and at 1520:14 TOWER tells Merlin (B) to join for RW25, which is acknowledged with the QFE of 1007hPa set.

At 1520:46 the Hawk pilot requests a low break, then at 1520:50, the crew of Merlin (B) calls at Gweek and final RW25 request long and left. At 1520:58, TOWER approves the Hawk pilot’s request “..low break approved”, which the Hawk pilot acknowledges, “..initial” and calls at the IP.

At 1521:03 TOWER acknowledges this and updates the Hawk pilot on the circuit state, “[Hawk C/S] roger it’s just the Merlin short finals for 25..”.

At 1521:05, TOWER issues the pilot of Merlin (B) with clearance to land short for RW25, which is acknowledged.

At 1521:30, the Hawk pilot calls, “...on the break to land”, which TOWER acknowledged.

At 1521:39, TOWER requests the pilot of Merlin (A) carry out 1 orbit to allow the Hawk to land. However, the pilot of Merlin (B) incorrectly acknowledges this transmission at 1521:43, “..we’re orbiting at Gweek, visual with the Hawk”. Although Merlin (B) had been given clearance to land short on RW25, the pilot incorrectly acknowledged the transmission addressed to Merlin (A) and believed TOWER was requesting they conduct one right hand orbit.

At 1521:53, the PIC of Merlin (A) informs TOWER that they have had an Airprox with the Hawk that just joined.

All 3 ac subsequently land. Once Merlin (A) had landed TOWER requested the pilot to confirm that he had called an Airprox against the Hawk that joined. The PIC of Merlin (A) confirms this informing TOWER at 1525:58, “..affirm as we were coming up the Southbank of the Helford he came across about 100 feet in front of us, same level”.

#### Observations from interviews with the personnel involved

Both the PIC and PF of Merlin (A) each confirmed they were a third of the way along the Helford route when the Hawk passed them. The PIC in the left hand seat spotted the Hawk first. The pilots had begun their pre landing checks and as the PIC read from the flight reference cards he glanced across to the PF in the RHS and saw the Hawk through the window behind him. The PIC of Merlin (A) shouted ‘Hawk’ and ordered the PF to descend; he believed that the Hawk was part of a formation as the Hawk pilot’s callsign was ‘[C/S Hawk] 3’, his initial thought being ‘where are 1 and 2’. The PIC of Merlin (A) noted as much information as he could about the Airprox, but explained that the initial descent, re-establishing on the route and attempting to construct the initial report caused a delay with reporting the Airprox to ATC on the RT.

Whilst interviewing the Hawk pilot it was established that he was fully aware of the VFR Fixed Wing recovery procedure and he acknowledged that he was flying below the prescribed height of 1500ft

QFE. He was visual with a Merlin at Falmouth Docks - Merlin (C) - and with a Merlin returning along the S bank of the Helford - Merlin (B). Believing that this was the only traffic to affect him, he began descending to join the A/D. When asked at what stage he was aware of the other Merlin on the Helford route - Merlin (A) - the Hawk pilot said he was first aware of it when the pilot declared the Airprox. The Hawk pilot explained that having received his joining instructions he focused on maintaining separation against the Merlin he had been told about on the Helford route - Merlin (B) - and then concentrated on his approach to the A/D.

In subsequent discussion, the Hawk pilot indicated potential for current procedures to be sub-optimal, or where good airmanship might require deviation. Although these were not felt to be germane to the incident in question, it suggested that a review of Culdrose procedures would be appropriate to re-assure their efficacy.

### Findings

The Hawk was not flying in accordance with the Culdrose VFR Fixed Wing recovery procedure. The Hawk pilot should have joined via the Initial Point (3nm on the extended centre line at 1500ft Culdrose QFE) and avoided the VFR Helicopter routes. The Hawk pilot admitted that he was flying below 1500ft and did not come through the Initial Point as prescribed. Both the PIC and PF of Merlin (A) believed the Hawk was at 500ft QFE crossing the Helford route as that is the height they were flying inbound on the VFR route.

### Contributing Factors

The Hawk pilot considered that it was normal practice to descend below 1500ft before the Initial Point to establish the centreline allowing pilots to enhance situational awareness and visualise cct traffic at the earliest opportunity.

When on recovery the Hawk pilot was informed that there were multiple rotary wing ac operating in Falmouth Bay. Once on the TOWER frequency he was informed of 1 Merlin on the route – Merlin (B). At no stage was he informed that there was another Merlin – Merlin (A) - about to join the route.

The Hawk pilot believed that the Merlin helicopter he was visual with in Falmouth Docks was the rotary wing aircraft APP informed them about. The Hawk pilot was visual with 1 Merlin on the Helford route that TOWER had informed him about. However, as the Hawk pilot was not aware of Merlin (A), he was not fully aware of the situation. The Hawk pilot said that the first point he was aware of another Merlin was when the PIC of Merlin (A) informed TOWER that they had experienced an Airprox with the Hawk.

### Observations

Whilst interviewing the crew of Merlin (A) it became apparent that the rear seat crew were not encouraged to keep a lookout whilst on recovery to the A/D. Also it was apparent that the front seat crew did not expect them to lookout. It was observed that the Crew Resource Management was lacking whilst on recovery, which was referred to as a 'pilot's procedure' with the rear crew somewhat detached and uninvolved.

Whilst listening to the ATC RT recordings it was observed that the controller was operating several frequencies at once, and at one point operating 6 speaking units between the frequencies. It was noticed that aircraft had to be asked to repeat information several times and that some calls from aircraft had been missed completely. It was also noticed that there was confusion over the Hawk's call sign. On 2 occasions it was referred to by its formation C/S, instead of the individual element C/S.

It was understood how the Hawk, although flying independently as a singleton, could have been mistaken as part of a formation from its RT C/S.

Whilst interviewing the Hawk pilot it became clear that at no stage had any of the crew of Merlin (A) spoken to him regarding the Airprox. The Hawk pilot knew an Airprox had been called from hearing it on the RT but did not know the full details until he read the DFSOR.

Due to the investigation not being officially initiated until 2 days after the event and personnel not being available to be interviewed until 5 days after the event it was sometimes difficult for them to accurately recall all the information. Fortunately, the Merlin involved had not flown since the event due to weather. Therefore, the Cockpit Voice Recorders were able to be downloaded. However, if the ac had flown there would have been no possibility of capturing this data.

### Recommendations

As a result of this Unit investigation 8 recommendations were made, the most significant were:

All aircrew, both Fixed and Rotary Wing, re-familiarise themselves with the current Fixed Wing VFR recovery procedures.

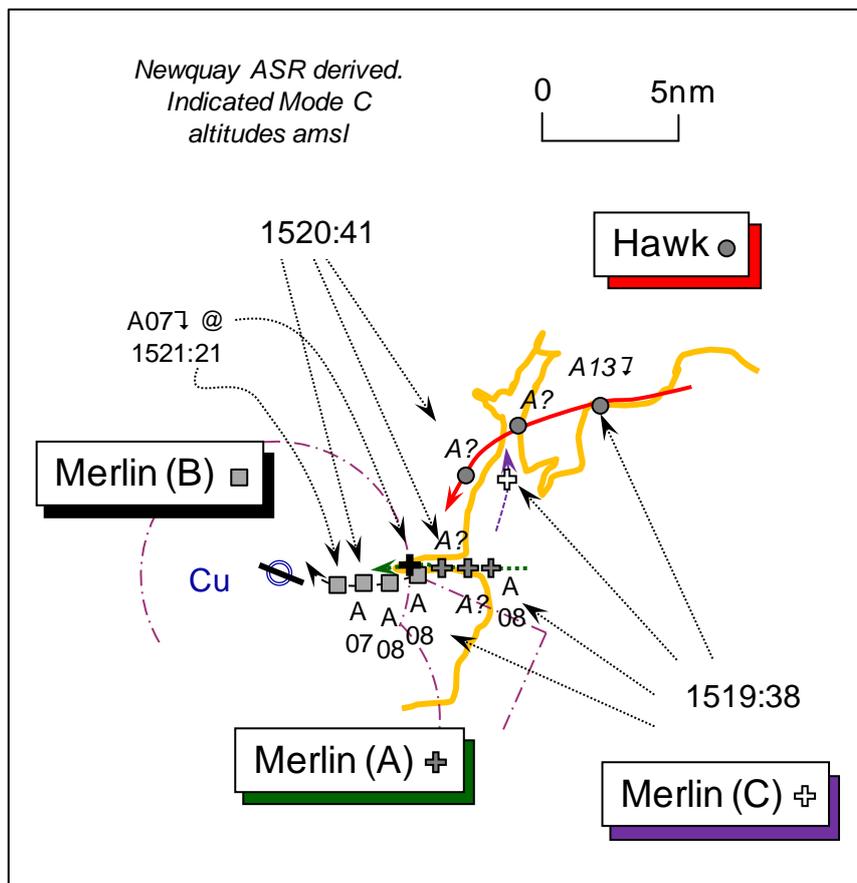
The current Fixed Wing VFR recovery procedures are reviewed with reference to position and run in height to the Initial Point in order to enhance situational awareness.

Crews highlight the importance of whole crew involvement in lookout and Crew Resource Management when close to a high traffic density environment.

The number of frequencies monitored by a single controller is reduced to prevent aircraft having to repeat messages due to the initial message being missed and to prevent calls being missed completely. Also, ensure that standard phraseology is employed when referring to Hawk call signs to prevent confusion and the perception of the presence of a formation.

Procedures for the post incident recovery of Cockpit Voice Recorders/ATC transmission tapes should be established to give investigators maximum information available.

UKAB Note (2): A copy of the Newquay Cornwall Airport ASR recording was helpfully provided for the investigation of this Airprox; however, the incident is not captured at the CPA. The Hawk is shown approaching Culdrose from the NE descending through 1300ft passing to the N of Merlin (C), which is operating between Pendennis Point and Falmouth at 700-800ft ALT. However, the Hawk's contact fades just after 1520:41, 3nm N of Merlin (A) before the Hawk arrives in the vicinity of the Helford River. Both Merlin (A) and the preceding Merlin (B) are shown inbound along the S bank of Helford River between 700-800ft ALT. Merlin (A) is shown at the reported Airprox location 5nm E of the A/D at 1521:21, the helicopter's Mode C indicating a descent through 700ft ALT. Thereafter no Mode C is shown and perhaps indicative of the pilot's reported descent. Merlin (A)'s Mode C is next shown at 800ft ALT climbing and then levelling at 900ft ALT about 3nm E of the A/D.



UKAB Note (3): Culdrose Standing Orders (CSOs) Article 2240 promulgates the A/D fixed-wing cct rules for circuit traffic after passing the IP:

1. All fixed-wing flying from Culdrose is to be conducted in accordance with Military Aviation Authority Regulations except as specifically amended by these Orders.
2. The fixed-wing circuit height is 1000ft. With prior approval of the DATCO low-level circuits down to a minimum of 500ft may be flown.
3. The weather minima for visual circuits are: Visibility 5.0km, Cloudbase 3/8 or more at or above 1200ft.
4. The circuit direction will vary according to the runway in use and a/c type. There is no Deadside.
5. A maximum of 4 aircraft are allowed in the circuit.
6. When intending to circuit to the non-Duty Runway, permission for visual circuits is to be obtained prior to entering the final recovery phase.
7. Pilots of twin-engine aircraft wishing to carry out single engine landing practice are to request permission before joining the circuit.
8. The normal break positions for fixed wing aircraft is south of RW12/30 aligned with the Tower, when over the upwind runway intersection.

9. Fixed Wing run and breaks are to be conducted at 1000ft. However if the circuit is reported as clear, pilots may request a low break (not below 500ft). This may be approved at the DATCO's/Aerodrome Controller's discretion.

**HQ NAVY CMD** comments that a very thorough investigation was conducted utilising the DAEMS construct recently implemented at Culdrose. CSOs stipulate the VFR recovery routes for helicopters and it is noted that the Merlins were operating iaw this instruction. Article 2245 of CSOs details the procedures for VFR FW recoveries and states that on a visual recovery a FW pilot must join through the IP (3nm/1500ft) 'avoiding the VFR Helicopter Routes' (2. a. (2)). The onus is very much on the FW pilot to comply with this instruction, it is not normal, or required, for helicopters on the VFR routes to be identified to FW aircraft. It is noted in the report that the Hawk pilot is quoted as being fully aware of the VFR Fixed Wing recovery procedure and that he knew he was flying below the prescribed height of 1500ft QFE, furthermore the report also states that this non-compliance was considered normal practice. The Hawk pilot called Tower to join, then 29 seconds later Merlin A called Tower to report on the standard route. Tower subsequently called the two Merlins to each other on frequency as they were co-alt on the same route (the same frequency that the Hawk was operating on). It is after this that the Hawk pilot requested the low break. The Culdrose recovery procedures were reviewed as a result of the DAEMS recommendation, no changes were made. The report confirms that the Hawk pilot was not flying iaw laid down procedures, with which he was most certainly familiar with, having been flying at the station for a significant number of years. I am assured that the Squadrons at Culdrose have re-familiarised themselves with their local orders.

## **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, together with a report from the Unit and appropriate operating authority.

The Unit investigation revealed that the Hawk pilot had focused his attention on remaining clear of the preceding helicopter on the route - Merlin (B) – after being given TI about it by the ADC, “..1 Merlin inbound on the Helford”. After this call, the crew of Merlin (A) called TOWER and from this point all the pilots involved were operating on the same frequency, thus the Hawk pilot should have heard Merlin (A)'s 'coasting in' call alerting him to this second helicopter on the Helford River route, but which he remained unaware of and did not see. Merlin (A) was flying at 500ft QFE and concern was expressed that TI had not been given by TOWER about it. However, Members familiar with the nature of operations at this busy helicopter training aerodrome emphasised the implicit responsibility placed on fixed-wing pilots to avoid the Culdrose helicopter patterns. It was stressed that TI is not normally provided by TOWER to recovering fixed-wing pilots about VFR helicopter route traffic as they are procedurally separated by the heights stipulated for the various recovery procedures in local orders. It was evident from the comprehensive Unit report into this Airprox that the Hawk pilot had elected not to fly through the IP to RW30 at the height prescribed for the procedure - 1500ft QFE – whilst inbound for his visual recovery. Furthermore, fixed-wing ac returning for a 'low-break' are not permitted to descend from 1500ft QFE until they have crossed the A/D boundary the Board was advised. It was plain to the Members that this Airprox would not have occurred if the Hawk pilot had complied with the procedure, which afforded 1000ft vertical separation above inbound helicopters established on the Helford River VFR Helicopter Route that were restricted to 500ft QFE (500ft is provided against outbound helicopters that fly at 1000ft QFE). The Command had explained that it was incumbent on the fixed-wing pilot to avoid the VFR Helicopter Routes, and as the Hawk pilot was based at Culdrose he was fully aware of the requirements specified in CSOs. A civilian controller Member was concerned that it had been suggested that such disregard for procedure might be widespread at the unit, but the Board was advised that such deviations as occurred here are rare. The Board agreed unanimously that the Cause of this Airprox was that the Hawk pilot did not follow Culdrose recovery procedures and flew into conflict with Merlin (A), which he did not see.

Turning to the inherent Risk, it would have been difficult for the two pilots flying Merlin (A) to see the Hawk any earlier than they did because it approached his helicopter from abaft the starboard beam. The absence of lookout by the rear cockpit crew had been addressed by the unit, but it was not clear

to the Board whether the small black jet could have been detected by them, given their restricted field of view, or whether the relatively slow moving helicopter would have had time to manoeuvre away from the faster Hawk. Therefore, without any form of TCAS to assist their lookout, the pilots of Merlin (A) were poorly placed and unable to affect the outcome. Similarly, the Hawk T Mk1 did not have any form of TCAS to warn the pilot of any other transponding ac in close proximity. Therefore, in the erroneous belief that Merlin (B) was the only helicopter in the vicinity the Hawk pilot disregarded the stipulated procedure height. Once the procedural safety barrier of vertical separation was breached 'see and avoid' was the only means of averting a conflict with other traffic on the Helford River VFR route. Although the radar data did not illustrate this close quarters encounter, in the Board's view, the Hawk pilot should have been able to see the large helicopter. As it was, the Hawk pilot was unaware of Merlin (A) as he flew past and the separation that did exist – reported as 100ft horizontally at the same height – was fortuitous. The Board concluded unanimously that an actual Risk of collision had existed in these circumstances.

### **PART C: ASSESSMENT OF CAUSE AND RISK**

Cause: The Hawk pilot did not follow Culdrose recovery procedures and flew into conflict with Merlin (A), which he did not see.

Degree of Risk: A.