AAIB Bulletin No: 10/94 **Ref: EW/B94/4/1** **Category: 1.3**

Aircraft Type and Registration:	Piper PA-28-180 Archer, F-BVOC	
No & Type of Engines:	1 Lycoming O-360-A4A piston engine	
Year of Manufacture:	1974	
Date & Time (UTC):	28 April 1994 at 1144 hrs	
Location:	English Channel, 44 nm south east of Southampton	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - Missing	Passengers - N/A
Nature of Damage:	Aircraft missing	
Commander's Licence:	Private Pilot's Licence with Night Rating	
Commander's Age:	47 years	
Commander's Flying Experience:	Total - Approximately 150 hours Last 6 months - 18 hours	
Information Source:	AAIB Field Investigation in conjunction with the French Accident Investigation Bureau	

Introduction

Responsibility for the investigation of this accident rests with the French 'Bureau Enquêtes-Accidents' based in Paris. The AAIB, however, have assisted the French authorities by investigating those elements of the accident that relate to the UK with particular emphasis on ATC and the subsequent search and rescue alerting procedures. A full report may be published by the French Authorities in due course. The AAIB factual account is reproduced below in the interests of flight safety.

History of the flight

The pilot was carrying out a solo VFR flight from Rouen, north west France, via the Southampton VOR (SAM), to Cardiff, South Wales. He had flown the route on three previous occasions each time accompanied by an instructor. Although the pilot had been checked in his competency to conduct RT transmissions in English, the instructor had operated the radio during these flights.

The synoptic weather situation at 1200 hrs on 28 April 1994 showed a ridge of high pressure established over northern France with a south-westerly airflow over the Channel and southern England. The weather was 'NIL' over France with fog banks on the English side of the Channel. Visibility was 10 km or more over France but deteriorating northwards reducing to 300 metres or less on the English side of the Channel. Cloud was scattered to broken cumulus with a base of approximately 3,000 feet, tops 5,000 feet over France with stratus and fog on or near the surface on the English side of the Channel with patches of stratocumulus above 4,000 feet. Wind and temperature conditions on the surface were 230°/05 kt +10°C: at 2,000 feet; 250°/15, +10°C and at 5,000 feet; 250°/20 kt, +8°C. The sea state was smooth with a water temperature of between +9 and +10°C.

The pilot arrived at Rouen at 0900 hrs on 28 April 1994 to plan for his flight to Cardiff. Initially he visited the meteorological centre, where he collected information on actual and forecast weather conditions for his route. He was advised by meteorological staff to delay his departure for several hours due to low cloud and fog over French coastal waters. No mention was made, however, on conditions along the north Channel coast. Using a 'Minitel' terminal, he filed a VFR flight plan to Cardiff, using Southampton as the nominated alternate, with an estimated departure time from Rouen of 0945 hrs. This flight plan, sent to the Paris ATCC, was re-transmitted to the London ATCC and Cardiff. It was not, however, addressed to Southampton since, in accordance with standard ICAO practice, this is not required.

Having collected a fuel carnet from the flying school, the pilot went to start the aircraft, (fitted with VOR, transponder, ADF, 2 x Comms, and an Emergency Locator Transmitter (ELT)), in order to taxi to the refuelling pumps. It is believed that during the start he flooded the engine and, as a result of further unsuccessful attempts, he flattened the aircraft battery which then had to be replaced. At 1000 hrs he revisited the meteorological centre to update his briefing material. At 1012 hrs, after a successful engine start, the pilot called for a radio check. ATC at Rouen, which is not manned between 1000 and 1200 hrs to allow staff a lunch break, was closed. Another aircraft, however, replied saying that his transmissions were 'Strength 5'. At 1034 hrs he taxied for Runway 22 and, at 1040 hrs, transmitting blind, he advised that he was 'lining up and taking off for Cardiff'.

The French AIP requires pilots on cross Channel flights to fly at levels that allow uninterrupted radio contact with an ATCC and transmit position reports to the Paris or Brest FIR, or, if neither is available to one of the following aerodromes: Brest, Calais, Cherbourg, Deauville, Dinard, Landivisiau, Lannion, Le Havre, Le Touquet, Lille, Morlaix or St Brieuc. Position reports are to be made when crossing the French coast and the FIR boundary.

Investigations have shown that once airborne the pilot did not transmit to any French ATC unit. ATC personnel at Rouen were not aware that the aircraft had departed and, as the pilot had not contacted any French ATC unit, his flight plan was not activated.

At approximately 1130 hrs the pilot contacted Southampton Aerodrome Control on 118.2 MHz. The first transmission was poor and the aircraft was asked to "SAY AGAIN". On the second transmission the controller ascertained that the pilot wished to overfly Southampton. He was instructed to contact Southampton Zone on 120.225 MHz. At 1131 hrs the pilot transmitted to the Zone controller that he was a "PA-28 FROM ROUEN TO CARDIFF PRESENT POSITION TEN MINUTES OFF SOUTHAMPTON ON RADIAL THREE TWO ZERO SOUTHAMPTON FLIGHT LEVEL FOUR FIVE". The controller instructed the pilot to select a discreet transponder code and this was acknowledged by the pilot. At 1133:47 hrs the transponder reply from the aircraft was received and recorded by the Pease Pottage and Ventnor radars indicating a position approximately 53 nm from Southampton on the 137° radial. At 1139:30 hrs the pilot transmitted that he was descending to 2,500 feet. The Southampton controller replied "REPORT WHEN YOU HAVE TWO ZERO DME TO RUN TO SOUTHAMPTON". The pilot acknowledged this instruction. At 1152 hrs the Southampton Zone controller, having heard no further transmissions from the aircraft, made three attempts to contact F-BVOC but no reply was received.

Search and rescue operations, delayed for several hours for the reasons described below, were commenced later that evening and continued until 2320 hrs. They were resumed at 0755 hrs the following day and called off at 1150 hrs. No trace of the aircraft or pilot was found by the rescue services. The following day a ship spotted and recovered an aircraft nosewheel and tyre which were later identified as belonging to the accident aircraft. Because the position of the recovered wheel was close to the UK Danger Areas EGD 053-056, 057 and 058, a check was made with the appropriate sponsor for the Areas as to the range activity on the date of F-BVOC's disappearance. The Flag Officer Naval Aviation Royal Naval Headquarters Yeovilton confirmed that no live firings had taken place on that date.

ATC aspects

The initial radio call from F-BVOC was on the Southampton Aerodrome Control frequency and was difficult to decipher. When the message was repeated it was ascertained that the aircraft wished to overfly the SAM VOR. The Aerodrome controller (designated here as Controller B) therefore instructed the pilot to contact the Southampton Zone frequency and then liaised with his colleague (Controller A), who was manning the Zone position, in order to warn him of the call. At the time, the Southampton Approach/Approach Radar and Southampton Zone positions were being manned by a single controller (Controller A) who had been validated on the position for some two months. A colleague, recently recruited, was observing the position to gain experience and not conducting operational duties. No operational support was available to Controller A at the time as the Air Traffic Control Assistant (ATCA) was taking a lunch break, leaving that position unmanned. This was in accordance with standard practice at the unit at the time.

The initial call from F-BVOC to Controller A was not clear, however, eventually the message was acknowledged by the controller and the pilot was asked to 'STANDBY'. Controller A recorded the details of the flight on a flight progress strip (fps) and made two assumptions. Firstly, that the aircraft was operating under VFR and secondly, that the aircraft was on the reciprocal radial to that reported and was to the south east rather than the north west of the airfield. No times were recorded on the fps and the departure airfield was recorded as 'SIF' (somewhere in France). Furthermore, the controller did not record the aircraft's estimate for Southampton thus depriving himself of a reminder as to when the aircraft was due to transit Southampton's airspace.

After dealing with other aircraft Controller A contacted F-BVOC to instruct the pilot to select a discreet SSR (transponder) code and this was correctly read back by the pilot. Moments later the SSR return was received by the Pease Pottage radar (radar information that is displayed at the Southampton zone position) showing that the pilot had correctly set the transponder code but no evidence of any height information was present. One and a half minutes later F-BVOC was instructed to report at 20 miles from Southampton but no acknowledgement of this message was received. The controller reported that at this stage he first observed the aircraft's transponder code showing intermittently on the periphery of his radar display at a range of some 55 nm from the airfield. Although the range and bearing of the observed code were not consistent with the pilot's earlier estimate for the VOR the controller did not challenge them. The controller was also unsure as to whether he was providing a Flight Information Service or 'listening watch' to the aircraft. The minimum level of service that should be provided by an Approach Control Unit is a Flight Information and Alerting Service. The term 'listening watch' has no defined meaning within UK civil aviation terminology even though its use is not uncommon. Furthermore, the radar equipment at Southampton is capable of displaying a series of 'trail dots' from SSR returns thus displaying a short term history of aircraft track and allowing an assessment of ground speed for the aircraft outside primary radar cover. Controller A followed standard unit practice, however, and did not have this facility selected.

The controller continued to monitor F-BVOC's SSR return during the routine scan of his display but had no need to contact the aircraft as it continued towards Southampton. Just after 1138 hrs the pilot reported descending to 2,500 feet but without reference to which pressure setting was to be used. The controller had no recollection of any descent by the flight and nothing was recorded on the fps. No QNH or QFE information was passed but instead a response to report at 20 nm from Southampton was given. The pilot acknowledged this instruction. The radar recording indicates that shortly afterwards the aircraft commenced what would appear to be a series of controlled manoeuvres, including a right-hand orbit, before settling onto a westerly heading then disappearing from radar cover at 1143:22.2 hrs at a position some 44 nm south east of Southampton. The controller was not aware of the changes to the aircraft's track and was not aware of its disappearance from the radar display until 1147 hrs, a time he recorded on the fps as '47'. Having lost the response, Controller A attempted to contact the aircraft, using three separate transmissions between 1151:30 and 1152:30 hrs. Upon receiving no reply, Controller A took no further action regarding the aircraft until he handed over the position at approximately 1213 hrs to Controller B.

During the handover Controller A mentioned the fact that he believed that F-BVOC had routed around Southampton's airspace and changed frequency. The on-coming controller (B), who had been in the Aerodrome Control position when the pilot had made his initial call, accepted the handover in the belief that the flight had diverted around Southampton's airspace, although he was aware that radio and radar contact had been lost. He was also aware of the last known position of the aircraft. As the aircraft had never been within 40 nm of the airfield, the flight's fps was left in the 'pending' bay. At no time did it occur to either controller that F-BVOC could have crashed and both were of the opinion that it had descended below radar cover and left the frequency, re-routeing around Southampton while continuing to its destination. However, some ten minutes after the handover, Controller B decided to contact a number of radar units, including Cardiff, in an attempt to locate the aircraft. He did not contact Goodwood or Shoreham even though they were airfields that the pilot would fly close to if he had avoided Southampton to the east as believed. No further action was taken before the arrival of the afternoon watch controller (Controller C) who took over the position at approximately 1240 hrs.

The reports from Controllers B and C regarding the handover differ regarding details that were given on F-BVOC. Controller B recalls giving full information and the suggestion that further enquiries on the flight might now be appropriate. Controller C, however, recalls that she was merely advised that contact had been lost and that if any further information came to light then it was to be passed to Cardiff.

Controller B returned to provide a relief break one hour and thirty minutes later and, as the fps was no longer on the display, he neither enquired of any further developments nor took any action. Controller B departed from the unit at 1600 hrs at the end of his duty. Controller B's departure left only two controllers available until the airfield closed. Controller C remained in the radar room, without a break, until the radar service was closed just under four hours later. During this time, at approximately 1730 hrs, Cardiff became aware that F-BVOC had not arrived and contacted Southampton. Controller C retrieved the fps from the storage area for completed strips and advised Cardiff on the flight details. She then contacted Controller A, who was at home, to confirm that her recollection of events was correct. Cardiff ATC, who had become concerned regarding F-BVOC's whereabouts, contacted the London Air Traffic Control Centre Supervisor and this led to the instigation of tracing action and Search and Rescue Operations. Despite this, Southampton Controller C made no entry in the ATC Watch Log and did not advise her ATC Management of the occurrence at the time as no requirement existed in Southampton local orders for such action to be taken. Furthermore, no incident report forms were submitted by any of the controllers involved until some days later and no accident signal was dispatched.

Overdue action

The Manual of Air Traffic Services (MATS) Part 1, Section 5 gives controllers guidelines on how emergency situations should be handled and details overdue actions etc. Chapter 1.3 states that, amongst other indications, a controller may suspect that an aircraft is in an emergency situation when radio contact is lost or erratic behaviour of a radar return is observed. The unexplained disappearance of a radar return should also cause controllers significant concern. MATS Part 1, Section 5, Chapter 3 gives details of overdue action to be taken by ATC. This requires that, where a radio equipped aircraft fails to make a position report when expected, preliminary overdue action shall be taken not later than the estimated time for the reporting point plus thirty minutes. This action shall include advising the supervisor of the parent ATCC that the aircraft is overdue, confirming the aircraft's actual time of departure by the quickest possible means and taking action to obtain the supplementary flight plan which will include details of persons on board, endurance, safety equipment carried etc. If the above action fails to explain the situation and a maximum of one hour has elapsed since a scheduled position report should have been received, or it is considered that the aircraft's fuel has been exhausted, the controller at the destination airfield shall alert the ATCC supervisor that the aircraft is fully overdue. This leads to the appropriate Search and Rescue action being taken. The times quoted are maximum duration times for the various phases of emergency and a controller has the discretion to make earlier declarations.

Follow-up action

Following the accident Southampton ATC was inspected by the Principal Inspector of Air Traffic Services (South) who reported to the Head of Air Traffic Standards Department, Safety Regulation Group, CAA. As a result of his inspection a number of measures have been taken by Southampton Airport management to address local reporting action and other concerns regarding ATC performance on the day of the accident.

VFR Flight plans

The CAA have issued a leaflet to outline the simplified procedures for VFR Flight Plans (FPLs) which took effect from 11 April 1994. Relevant extracts are reproduced below:

> 'If you operate from an airfield or airport which has an Air Traffic Service Unit (ATSU) but your operations are outside their normal hours of operation, or you operate from an airfield without an ATSU or you operate from a private strip. The responsibility for filing, activating and closing a FPL rests with the pilot.

To file a FPL, telephone or Fax the Flight Briefing Unit at the parent ATSU associated with your departure airfield at least 60 minutes before the intended flight. Prior to departure, arrange for some responsible person on the ground to telephone the Flight Briefing Unit as soon as you are airborne in order to pass the departure time. This will activate the FPL. Passing an airborne time over the RT may lead to a delay due to controller workload. If it is not possible to file a FPL on the ground, it can be filed in the air with an ATSU through the FIR controller responsible for the area in which the aircraft is flying.

The procedure differs when returning to the UK to an airfield without an ATSU or to a private strip. Prior to departure the pilot is responsible for informing a responsible person at his destination of his estimated time of arrival. The responsible person is required to notify the parent ATSU if the aircraft fails to arrive within 30 minutes of the ETA. This action will then trigger the parent ATSU into alerting, overdue and Search and Rescue action.'