

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Cirrus SR22, N147KA	
<b>No &amp; Type of Engines:</b>	1 Continental IO-550-N piston engine	
<b>Year of Manufacture:</b>	2006 (Serial no: 1944)	
<b>Date &amp; Time (UTC):</b>	21 July 2013 at 1200 hrs	
<b>Location:</b>	English Channel	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - 1 (Fatal)	Passengers - N/A
<b>Nature of Damage:</b>	Aircraft destroyed	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	36 years	
<b>Commander's Flying Experience:</b>	192 hours (of which 76 were on type) Last 90 days - 2 hours Last 28 days - 2 hours	
<b>Information Source:</b>	AAIB Field Investigation	

## Synopsis

The aircraft was flying from Blackbushe to Le Touquet when it disappeared from radar. Small sections of the aircraft recovered later from the sea surface indicated that it experienced a high-energy impact with the surface. The aircraft was being flown in conditions of low cloud or sea fog with little or no discernable horizon. The pilot did not have an instrument or IMC rating. The investigation did not determine the cause of the accident.

## History of the flight

The aircraft was on a private flight from Blackbushe Airport to Le Touquet Airport in France. The pilot arrived at the airport at 0810 hrs and spoke to the controller on duty in the ATC tower. During this conversation, he expressed concern about the weather, specifically the cloudbase. The controller advised him that at Farnborough Airport (4 nm to the southeast) the cloudbase was approximately 1,500 ft. After some discussion, the pilot stated his intention to fly some circuits to assess the weather and, if he decided it was suitable, he would then depart for Le Touquet.

The airfield fire section refilled the aircraft to full tanks at the pilot's request. All of the witnesses who spoke with the pilot described him as being alert and in good spirits.

The aircraft took off at 0914 hrs and entered the visual circuit. The air traffic controller who witnessed the circuits described them as normal and consistent and the pilot's radio transmissions as crisp, clear and correct. After he had completed seven circuits,

the pilot informed ATC of his intention to fly to Le Touquet and the aircraft departed the circuit at 0948 hrs.

The aircraft routed to the east of the Farnborough zone, south to the Midhurst VOR, then towards the Seaford VOR before setting out over the English Channel on a course consistent with a direct track towards Le Touquet. At 1020 hrs the pilot contacted London Information stating that he was crossing the coast east of Seaford. He subsequently passed an ETA for Le Touquet of 1044 hrs. No further transmissions were heard from the aircraft.

After crossing the coast, the aircraft maintained a near constant speed, height and track until 28 nm from Le Touquet. It then turned left and descended before reversing course to the right onto a track of 081°. It maintained this new track and height until just before the radar returns ceased at 1034 hrs. The French authorities initiated overdue action when the aircraft failed to arrive at Le Touquet. Search and rescue operations located wreckage on the surface of the sea in the vicinity of the last radar returns.

### **Meteorological information**

A Met Office report, at the time the aircraft was carrying out circuits, gave the cloudbase at Farnborough as broken at 1,400 ft with visibility greater than 10 km. Visual satellite images show less cloud further south and large clear areas around the coast. Figure 1 shows a visual satellite image of the area of low cloud or sea fog. The Shoreham 0950 hrs and 1020 hrs weather reports indicated few clouds at 2,000 ft. Weather reports for Lydd Aerodrome for the same times indicated CAVOK and temperature 22°C. However, satellite images showed a band of low cloud or fog extending through the Dover Straits and into the English Channel across the route of the aircraft. Weather reports for Le Touquet for 1030 hrs and 1100 hrs indicated visibility greater than 10 km, no significant cloud, temperature 27°C and dewpoint 28°C. The forecast for Le Touquet between 0900 hrs and 1800 hrs indicated wind from 090° at 7 kt and CAVOK.

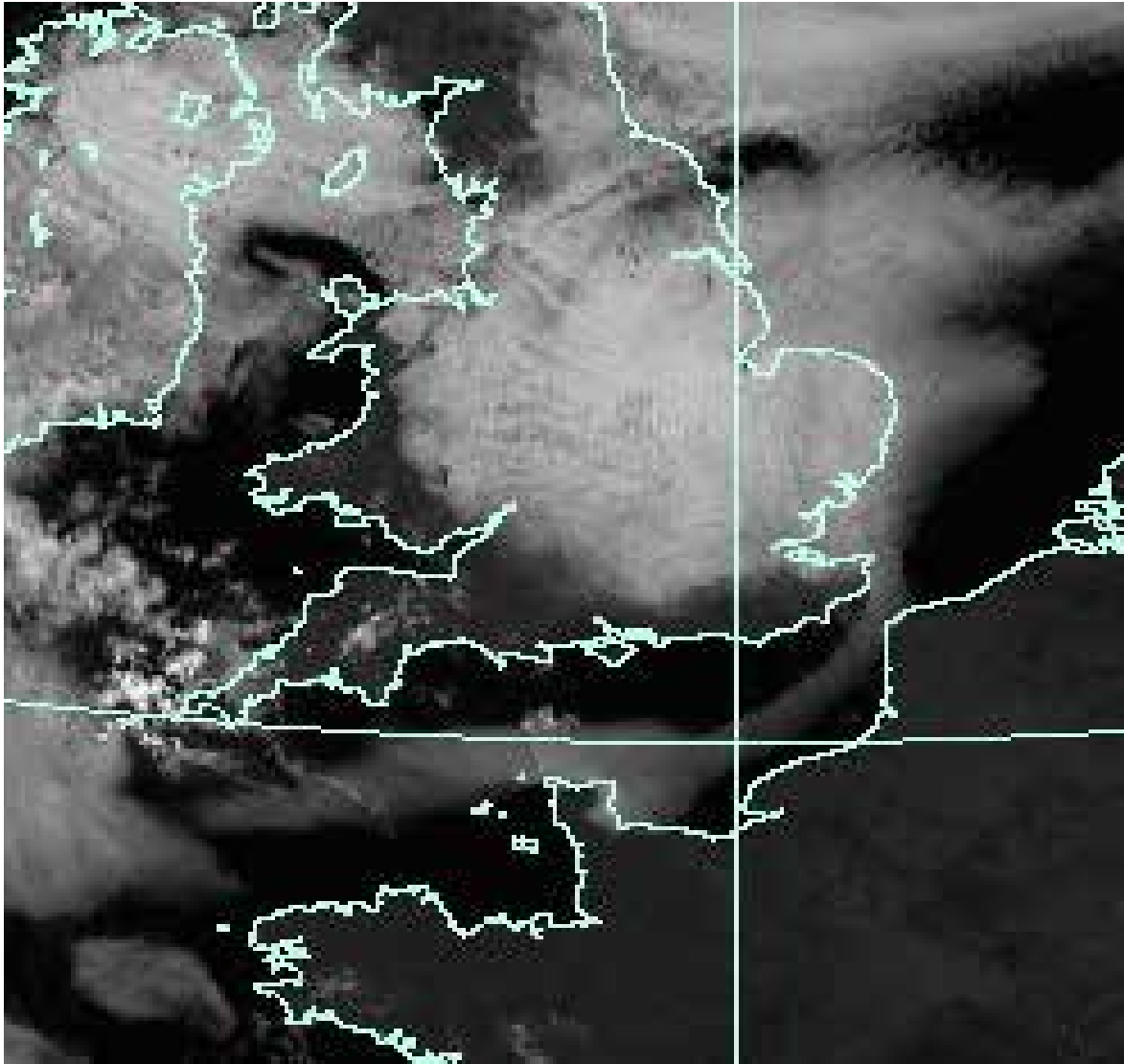
Two MetForms 215<sup>1</sup> were issued by the Met Office covering the period of the flight; the first was valid for flight between 0200 to 1100 UTC and the second for flight between 0800 hrs and 1700 hrs. Both MetForms were amended during the previous night to reflect a late forecast of low cloud and sea fog in the English Channel. The final amendment was issued at 0520 hrs.

#### *Airborne meteorological reports*

Two airborne reports were obtained from aircraft flying approximately three minutes ahead and 12 minutes behind the accident aircraft and on a similar route. Both pilots stated that, near the English coast, the weather was hazy but there was little cloud. Both also reported that, when over the English Channel, there was an area of low cloud or fog obscuring the surface accompanied by a significant amount of haze with no discernable horizon. One pilot stated that this area of low cloud or fog extended from approximately 8 nm off the English coast to about 8 nm off the French coast.

#### **Footnote**

<sup>1</sup> MetForm 215 provides a forecast of in-flight weather conditions below 10,000 ft.



**Figure 1**

Visible satellite image valid at 1030 hrs on 21<sup>st</sup> July 2013 showing a band of fog or low cloud extending into the English Channel

### **Visual Flight Rules (VFR)**

Aircraft flying under VFR outside controlled airspace at 140 kt or less and below 3,000 ft are required to maintain 1,500 m in-flight visibility, clear of cloud and in sight of the surface.

Schedule 7 of CAP 393, '*Air Navigation: The Order and the Regulations*' further restricts the holder of a Private Pilot's Licence (Aeroplanes) (PPL(A)) without any instrument rating to a minimum flight visibility of 3 km outside controlled airspace.

### **Pilot information**

The pilot gained a Private Pilot's Licence in 2010 and had flown a variety of light aircraft since then. His logbook was recovered from the sea surface and showed that he had accrued a

total of 192 hours flying time, of which 36 hours were on the Cirrus SR20 and 40 hours on the Cirrus SR22. He did not hold an instrument or IMC rating although a passenger who occasionally flew with him reported that he had, in the past, flown through cloud with the autopilot engaged. During his PPL(A) training he recorded 1.5 hours of instrument flying in his pilot's logbook. Since gaining a PPL(A), he recorded just over 4 hours of instrument flying, none of which appeared to have been under instruction.

### **General description of the aircraft**

The Cirrus SR22 is a high performance single piston engine aircraft of conventional layout. It is certified for flight in both visual and instrument meteorological conditions and is fitted with an integrated instrument system with multi-function displays and an autopilot. The multi-function displays contain non-volatile memory that record a number of aircraft parameters. Some Cirrus aircraft are fitted with a further memory device in the tail fin, but this example was not. The aircraft is fitted with dual alternators and dual batteries to ensure redundancy of the electrical system. The aircraft is of composite construction and incorporates safety features including airbags in the seat harnesses, which for the front seats are attached to the seat, and a manually initiated emergency parachute system for the whole aircraft which is deployed by a solid fuel rocket. The passenger cabin can be heated using air that is warmed by a heater muff on the engine exhaust system.

### **Wreckage recovery**

There was not a defined accident site because the aircraft impacted the sea; however, the subsequent search and rescue operations located several pieces of floating wreckage and personal items. The crew of the attending lifeboat also reported a strong smell of fuel in the area where the wreckage was found. Floating wreckage was recovered and transported to the AAIB for examination. This included both main cabin doors, a section of the rear fuselage containing the baggage door, a section of the rear fuselage containing part of the rear fuselage access panel, the top engine cowling, pieces from the top and bottom skin of both wings and a number of items of interior trim including the carpet from the front foot wells. The pilot's flight bag and a rucksack were also recovered. The high degree of fragmentation suffered by the recovered items suggested the aircraft had been subject to a high energy impact. A liferaft was also recovered; it had been torn from its cover bag but had not inflated.

Three weeks after the accident a recreational diver reported to the Coastguard that he had come across some aircraft wreckage that he believed was from the accident aircraft, approximately nine miles from where the original floating wreckage was found. Enquiries by the AAIB confirmed that this was likely to be from the accident aircraft. This wreckage reportedly consisted of the cabin floor and parts of the rear bulkhead with three seats attached; the forward port seat was missing and appeared to have been torn away from its mounting. Parts of the wings were attached but only as far outboard as the main landing gear legs, to which the wheels remained attached. The three tail surfaces were lying nearby and appeared to be connected by their control cables. There was no sign of the engine or the instrument panel and its displays. The possibility of recovering the wreckage was explored but its offshore location and the potential for the parachute deployment rocket to

be live indicated that the hazards of a recovery operation were excessive for the limited new evidence that it might provide, especially given the likelihood that it may already have been moved by currents.

The AAIB were aware of other independent search and recovery efforts but at the time of writing nothing further had been recovered.

### **Detailed inspection of the recovered wreckage**

Damage to the structure and latches of both main cabin doors indicated both were locked closed at the moment of impact.

The two larger pieces of rear fuselage contained part of the channel that enclosed the aircraft parachute straps. The cover panels were also found and appeared to have detached from the forward end rearwards, suggesting they were detached by disruption due to the impact rather than by deployment of the emergency parachute.

The front face of the top engine cowling had deep score marks consistent with firm contact against the rotating aft-face of the propeller spinner backplate.

The fragments of wing were distributed approximately equally between the left and right wings, and the pieces were all relatively small but included the fuel filler cap and neck from both wings. The largest piece, approximately 1,000 mm by 300 mm, contained the aileron trim actuator whose position indicated that some left aileron trim was applied.

### **Maintenance records**

The aircraft was maintained by a Cirrus approved service centre and had been maintained by the same facility for most of its operation. The last Annual inspection had been completed on 2 August 2012 and the only recorded work since then was a tyre change on 20 May 2013. As the aircraft was being operated on the United States (US) 'N' register, it was being maintained in accordance with Federal Airworthiness Requirements (FARs).

Examination of the maintenance records showed that the propeller, the magnetos and the cabin heater muff had exceeded the manufacturer's recommended overhaul limits. These components had been inspected and found serviceable at the last Annual Inspection in August 2012. This deferment was, however, allowable within the FARs.

A pilot who had flown the aircraft the previous day stated that the aircraft had been operating normally.

### **Recorded information**

Recorded data for the accident flight was available from several radar heads. Most of the flight was detected by the radar head at Pease Pottage in Mid Sussex as a combination of primary and secondary returns. The aircraft was fitted with a Mode S transponder that transmitted the groundspeed and true track together with altitude (with  $\pm 50$  ft resolution) for each secondary return. The sweep rate for Pease Pottage was 6 seconds. The latter part of the track was also recorded by a French radar head located near Boulogne-sur-Mer.

This track was also a combination of primary and secondary returns; however, the Mode S groundspeed and true track angle were not recorded even though the radar at Boulogne-sur-Mer was capable of receiving them.

The ground track of N147KA is illustrated in Figure 2 (Pease Pottage in green and the last 21 returns of Boulogne in red) and shows the aircraft in the circuit at Blackbushe before tracking towards the Midhurst and Seaford VORs and crossing the coast at Beachy Head.

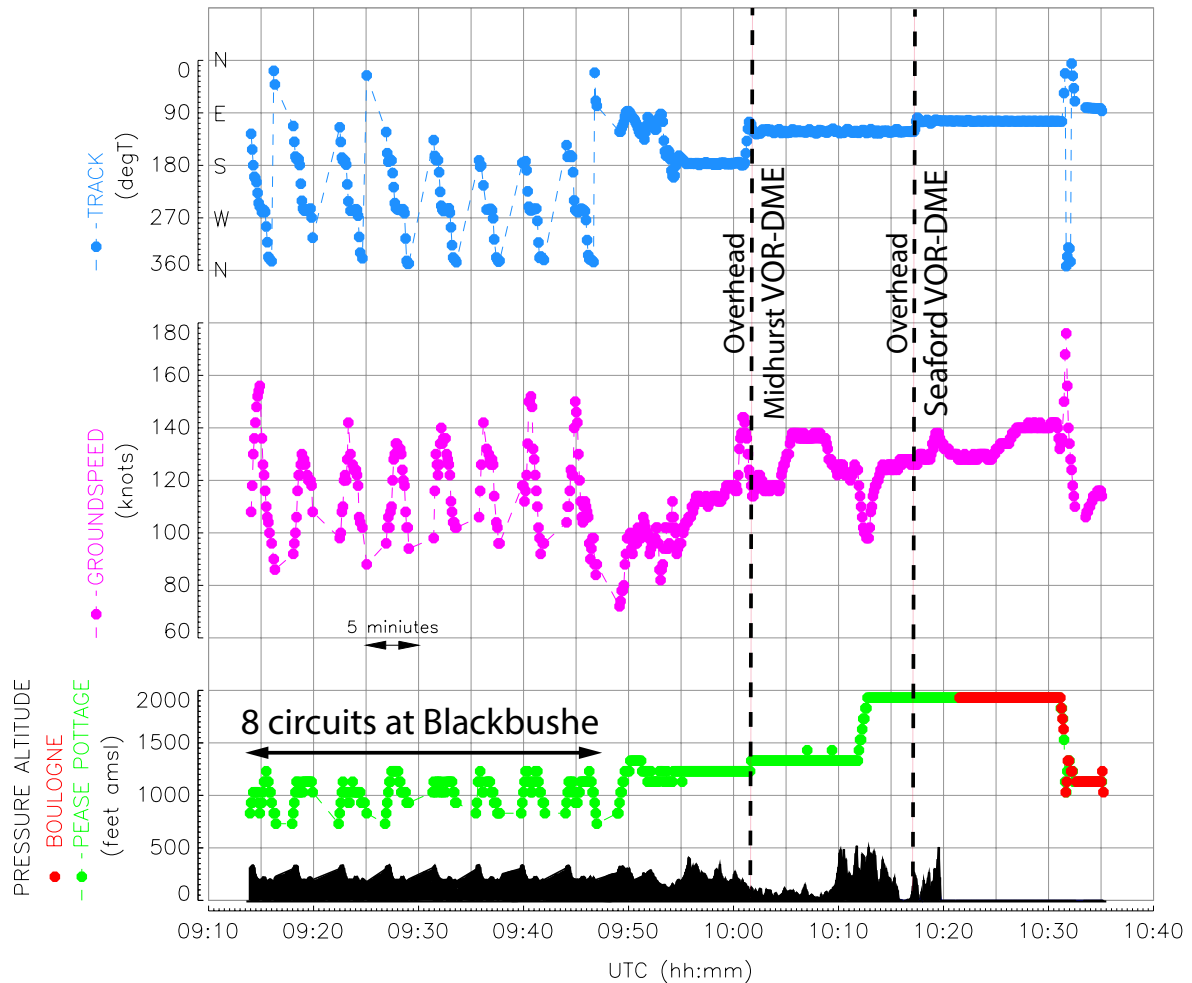


**Figure 2**

Overview of the accident flight radar tracks

Figure 3 shows the groundspeed, true track and altitude (adjusted to 1018 hPa) from the aircraft. The figure shows it in the circuit at Blackbushe where eight circuits were flown and then flying towards the Midhurst VOR at approximately 1,230 ft. It then climbed to approximately 1,930 ft amsl before flying overhead the Seaford VOR and turning toward Le Touquet, crossing the coast at 1019:29 hrs.

At 1030:45 hrs, about 25 nm from Beachy Head, the groundspeed began to reduce from a nominal 140 kt. Shortly afterwards the aircraft began to descend and, at 1031:16 hrs, turned left from a track of 105°T. The minimum altitude recorded in the turn was 1,030 ft amsl on a track of 22°T. The aircraft continued the turn to about 320°T before turning back to the right onto a track of 81°T towards Boulogne-sur-Mer. The descending turn is illustrated in Figure 4.



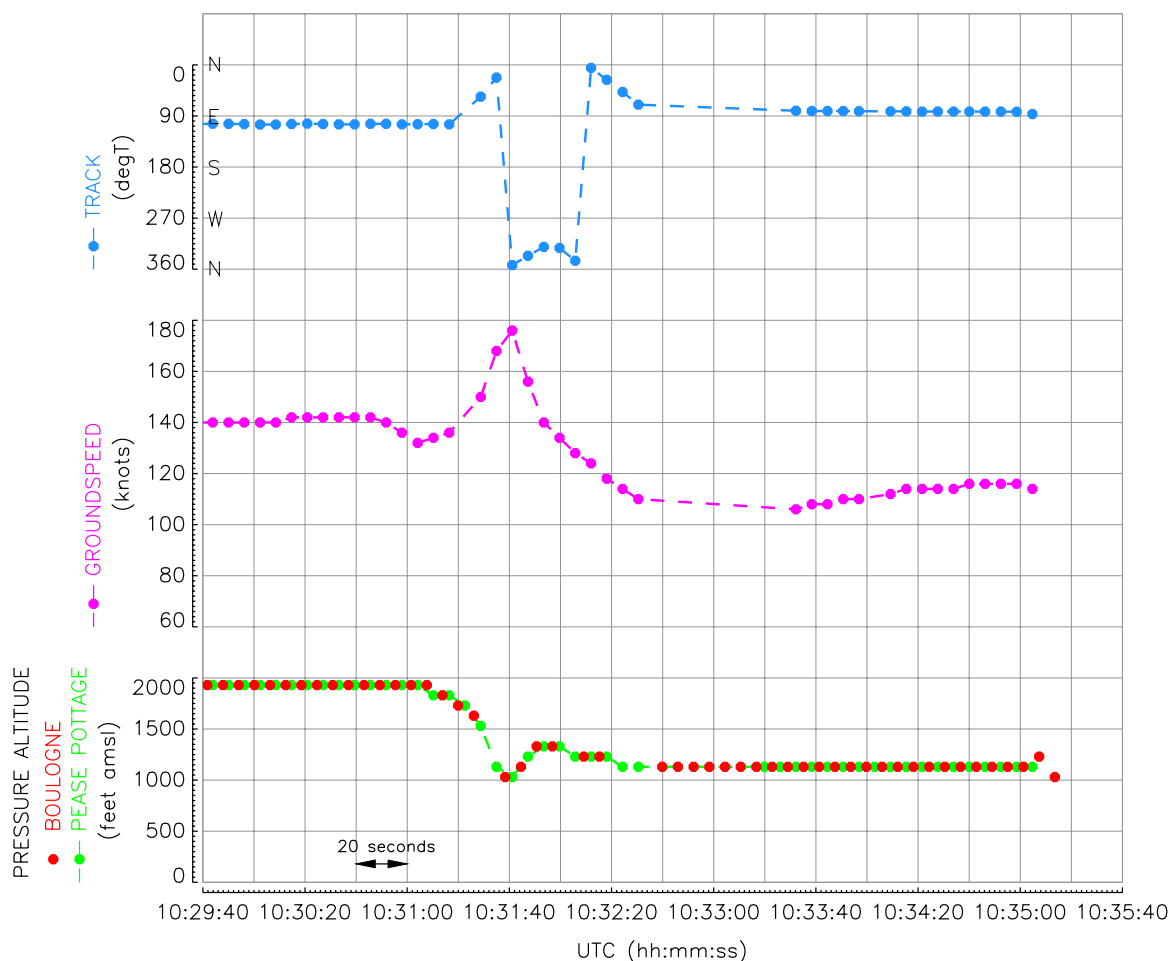
**Figure 3**

Radar Mode C & S recorded data for accident flight with terrain height below flight path

The last secondary radar return recorded by Pease Pottage, at 1035:05 hrs, indicated that the aircraft was at 1,130 ft amsl on a track of 87°T. There were two additional secondary radar returns, recorded by Boulogne radar, at 1035:07 hrs and 1035:13 hrs, with the aircraft reporting altitudes of 1,230 ft amsl and 1,030 ft amsl respectively. The position of these two returns also confirmed a change in track to the right. Radar coverage was then lost as the aircraft approached the edge of coverage of both radar heads due to line-of-sight limitations for targets at or below approximately 1,000 ft amsl.

### Analysis

The pilot was concerned about the weather before he departed and had expressed specific concern about the cloudbase. In order to assess the weather, the pilot flew several circuits before departing to Le Touquet. He flew his initial departure from Blackbushe at a height that was consistent with the aircraft operating below the cloudbase in that area. His subsequent climbs, as he flew further south, may have corresponded with improving weather. The initial track to the southeast appeared to have been manually flown, while the constant height



**Figure 4**

Recorded data showing the track, groundspeed and altitude of the aircraft during the descending turn through to the last contact.

and track indicated that he may have engaged the autopilot once tracking towards Midhurst VOR. The autopilot appeared to have remained engaged until the aircraft commenced the descending left turn, then re-engaged once the aircraft was straight and level at the lower altitude.

Although the final radar points indicated a slight change of track and variation in altitude, the absence of subsequent returns provided insufficient information to draw conclusions.

The pilot was only qualified to fly under VFR, but was flying in conditions that would have prevented him remaining in sight of the surface. Disengagement of the autopilot in the hazy conditions and lack of a discernable horizon would have made it very difficult for him to control the aircraft manually using visual flight techniques. Furthermore, as the pilot did not have an instrument or IMC rating and had only very limited experience of flying on instruments, it would have been very difficult for him to maintain manual control of the aircraft using instrument flying techniques.



The significant fragmentation of the aircraft and the reported detachment of the pilot's seat indicated that the aircraft impacted the surface of the sea with high energy. Witness marks on the top engine cowling indicated that the propeller was turning at the time. The similar damage to both wings suggested both struck the surface at the same time.

The maintenance records and a statement from the pilot who flew the aircraft the previous day indicated that the aircraft was operating normally at the end of the previous flight.

The propeller, the magnetos and the cabin heater muff exceeded their manufacturers' recommended overhaul limits. Although allowed by the regulations under which the aircraft was operating, this deferment increased the likelihood of their failure in service. A crack in the cabin heater muff might allow exhaust gases into the passenger cabin. However, in view of the warm ambient temperature at the time of the accident, it is unlikely the heater was in use.

#### **Safety action**

As a result of discussions arising from this accident and others, the CAA is considering enhancing publicity to the GA community concerning the operation of light aircraft equipped with advanced avionic and ballistic recovery systems.

#### **Conclusion**

The investigation did not determine the cause of the accident. However, immediately prior to it, the pilot was flying in meteorological conditions that were not suitable for flight under VFR and he did not have the qualifications required to operate under IFR. Disengagement of the autopilot in these circumstances would have made it very difficult for him to control the aircraft manually. The lack of evidence that the pilot used the emergency parachute system and absence of any emergency radio transmission means that pilot incapacitation could not be discounted as a factor.