

ACCIDENT

Aircraft Type and Registration:	P&M Aviation QuikR, G-DALI	
No & Type of Engines:	1 Rotax 912ULS piston engine	
Year of Manufacture:	2009	
Date & Time (UTC):	18 January 2010 at about 1300 hrs	
Location:	English Channel, approximately 20 nm west of Le Touquet, France	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers - N/A
Nature of Damage:	Aircraft missing	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	49 years	
Commander's Flying Experience:	Estimated 700 hours (of which about 500 were on flex-wing microlights)	
Information Source:	AAIB Field Investigation	

Synopsis

Contact with the microlight was lost whilst it was over the English Channel en-route to Le Touquet Airport in France. The body of the pilot was recovered later the same day, but none of the aircraft or its equipment was found. With no aircraft wreckage to examine, the cause of the accident could not be positively determined, although adverse weather was a probable contributory factor.

Background to the flight

The accident occurred during the first leg of a planned charity flight from Gloucestershire Airport to Sydney, Australia. The whole journey was expected to take between six and twelve weeks and the first intended stop was at Le Touquet Airport. The aircraft was being flown

by an experienced microlight pilot who had already completed a number of long distance flights.

History of the flight

The pilot arrived at Gloucestershire Airport at about 0800 hrs for a planned 0930 hrs departure. Although the majority of the pre-flight planning and aircraft preparation had already been completed, the pilot visited the airport briefing unit to check the latest weather information. With considerable media interest in the flight, he spent most of his time before departure dealing with the press.

A flight plan had been filed for the flight to Le Touquet, with Calais Dunkerque as the nominated alternate

airport. However, meteorological reports were unavailable for either destination. The forecast for Lille Airport, 57 nm to the east, showed fog (which the pilot remarked upon), with possible temporary improvements in visibility of up to 7 km during the period of the intended flight. The general area forecast gave areas of low cloud with isolated mist and fog at the surface.

The aircraft departed at 1041 hrs for the two hour flight to Le Touquet. It was fully fuelled, with an endurance of five hours listed on the flight plan. As the aircraft approached the London area, the pilot contacted Farnborough ATC who provided him with navigational assistance as he negotiated the airspace around Heathrow Airport. The aircraft then routed to the south of London, between the Heathrow and Gatwick control zones.

At 1215 hrs, when the aircraft was about 15 nm from the south coast, the pilot contacted the London Flight Information Service controller and requested a weather report for Le Touquet. The controller replied that visibility at Le Touquet was 500 m in fog, and that the airfield was not accepting VFR traffic¹. The pilot responded by asking if the weather was the same at Lille. After a short pause, the controller passed the Lille weather report to the pilot: it gave a visibility of 7 km, with FEW clouds at 600 ft. The pilot acknowledged this information but did not declare any intended change of route or destination.

Communications between the pilot and the London controller then became intermittent. Eventually, at 1232 hrs the pilot contacted Lille ATC. He was allocated a transponder code and the aircraft first appeared on

French radar, over the sea, about 6 nm from Dungeness. The Lille controller asked the pilot for his intentions, to which he replied that he was “INTENDING TO DIVERT TO ABBEVILLE”. The controller asked the pilot to confirm that he was VFR, which he did. At 1253 hrs the controller asked the pilot to confirm his position, as radar contact was intermittent. The pilot replied to the effect that he was diverting around Le Touquet airspace and was taking up a heading towards Abbeville. The pilot was asked to call again when he was approaching Abbeville, to which he replied “WILCO”. At 1314 hrs the Lille controller attempted to contact the pilot, without success. At her request, another aircraft also attempted to make contact with G-DALI, but again without success.

Search and rescue operations (SAROPS)

SAROPS were initiated by the French authorities. Two French surface craft, one a Customs patrol vessel and the other an oceanographic research vessel, were joined in the search by a maritime helicopter from Le Touquet. Poor weather hampered search operations and forced the helicopter to withdraw from the search. The pilot's body was found at 2200 hrs by a Portuguese tug, which had joined the search, and was transferred to the Customs patrol vessel. The reported location was less than half a mile from the last known radar position. No wreckage or any equipment from the aircraft was found.

Pilot information

The pilot first became involved in sport aviation through paragliding. In 1998 he started flying helicopters, and gained a Private Pilot's Licence (Helicopters) in 1999. His last helicopter logbook entry showed that he had accrued 208 hrs in light helicopters. In about 2000, he started training on flex-wing microlights. Although he kept a flying logbook, this was presumed lost in

Footnote

¹ Visual Flight Rules, under which the pilot of G-DALI was operating.

the accident and his total microlight flying time was estimated at 500 hrs.

The pilot had owned or part-owned a number of flex-wing microlights, and had previous experience of long journeys by microlight. It was reported that he had flown to Portugal and had crossed the Channel on numerous occasions, becoming familiar with both Le Touquet and Abbeville Airports. He had also taken part in a round-UK event on several occasions, most recently in 2009. The pilot was described as a regular flyer and in current flying practice. Family and friends of the pilot were of the opinion that his actions on the day would not have been influenced by the status of the flight or the considerable media attention it attracted.

Aircraft information

The QuikR is an advanced flex-wing microlight, of a high-speed touring design, capable of cruising at 90 kt. G-DALI was purchased new by the pilot in 2009: it was supplied in standard form and there had been no recorded modifications. It was equipped with basic flight instruments - an altimeter, a vertical speed indicator, an air speed indicator and an E2 type compass – but no gyro flight instruments. A GPS navigation unit, radio and ATC transponder were also fitted. In preparation for the charity flight, the pilot had an additional fuel tank manufactured and installed in place of the rear seat. The tank had a capacity of 80 litres. A photograph showing the aircraft's trike unit is at Figure 1.

The aircraft had been fitted with a portable satellite tracking system. This was intended to allow the flight's progress to be monitored via an internet web-site, as well as providing

position information in the event of an emergency. The system was wired directly into the aircraft's electrical system, so that it was operational any time the electrical system was energised. The system included two aerials secured behind the pilot; one received GPS signals for positional computation and the other transmitted the unit's position to the satellite constellation three times every ten minutes.

The tracking system featured an emergency pushbutton which, when pressed, generated an additional position return. The return so created was indistinguishable from the other returns, except as an additional point in the data stream. The pushbutton had been located on the forward left of the fuselage, near the pilot's left knee, so that inadvertent operation was unlikely. The system operating company advised that a temporary loss of signal could occur if the aircraft was manoeuvring at the moment the unit transmitted its position, so blanking the aerial or interfering with the line of sight to a satellite. Similarly, the signal could be affected by turbulence or an aerial becoming dislodged.



Figure 1

Trike unit of G-DALI, showing auxiliary fuel tank with life-raft secured above

Recorded information

Radio transmissions

At 1231:51 hrs the pilot contacted the Lille ATC Approach controller and shortly afterwards announced his intention to divert to Abbeville. The controller asked for an estimate for Abbeville, to which the pilot replied “FORTY FIVE MINUTES”: at this point Abbeville was 50 nm distant. The controller had only intermittent contact on her radar display and asked the pilot for his position. He replied “...ELEVEN MILES TO RUN TO THE FIR² BOUNDARY AND AT TWO THOUSAND FEET...”. The controller asked the pilot to call approaching Abbeville, which he acknowledged. Cross referencing with the radar data showed that the pilot was actually 11 nm from the Lille Terminal Manoeuvring Area (TMA) at this stage (which protrudes into the London FIR), and not the FIR boundary itself.

At 1252:33 hrs, the controller had again lost radar contact and asked the pilot for his position from Abbeville. He replied “... I’VE JUST DIVERTED AROUND LE TOUQUET AIRSPACE, I’M ON THE SOUTH WESTERN CORNER OF LE TOUQUET AIRSPACE, I’M HEADING INTO ABBEVILLE...”. The controller replied “... CALL ME BACK FOR ANY CHANGE OR APPROACHING ABBEVILLE...”. The pilot replied with “WILCO GOLF LIMA INDIA”. This was his last known transmission and it was timed at 1253:05 hrs.

Radar and satellite data

Figure 2 shows a composite picture of the final stages of the flight, using data from French radar and the satellite system. The aircraft was equipped with a transponder but no Mode C altitude information was observed. However, each satellite position included GPS derived altitude information.

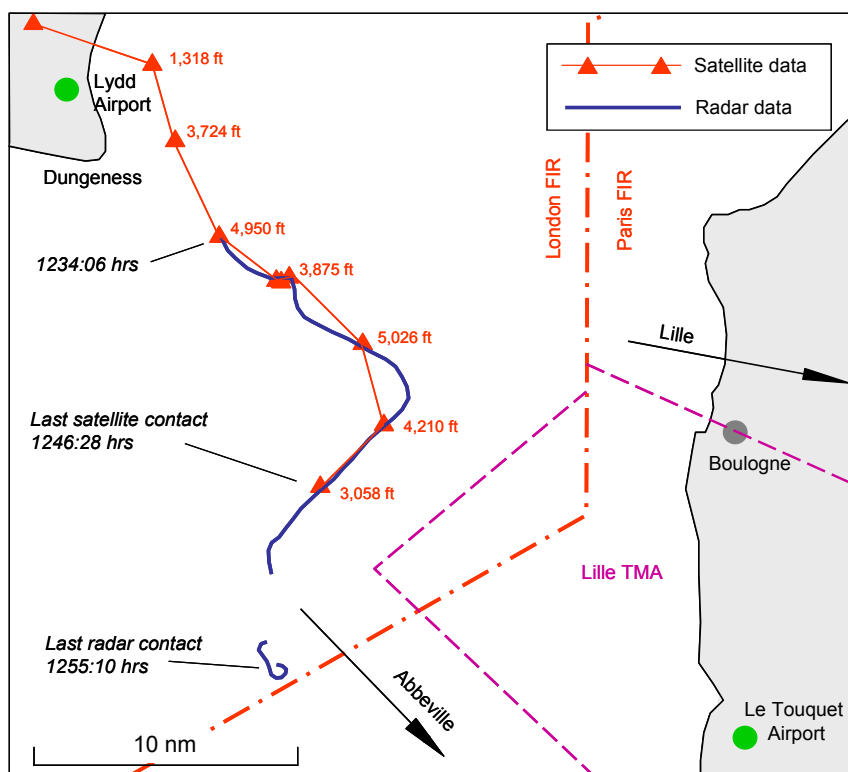


Figure 2

Radar track of G-DALI over the English Channel, with GPS derived position and altitude information

Footnote

² Flight Information Region.

Figure 3 shows G-DALI's track immediately after the aircraft appeared on French radar at 1234:14 hrs, commencing about two minutes after the pilot declared his intention to divert to Abbeville. The aircraft was initially tracking along a direct line between Lydd Airport and Le Touquet Airport (the aircraft had diverted around Lydd itself, establishing on this track once it was over the Channel). At 1235:34 hrs, the aircraft turned left and was established, for a short while, on a track, possibly coincidentally, for Lille Airport.

As Figure 3 shows, there was then a block of radar returns, which saw the aircraft slow down, possibly make a left hand orbit, and eventually take up a southerly track. Coincidental with this event, four unscheduled satellite positions were recorded, consistent with the 'emergency button' having been pushed, with time

intervals of 7, 5 and 21 seconds respectively. The only other unscheduled satellite position during the flight was recorded as the pilot negotiated the airspace around Heathrow, apparently with some difficulty, requiring Farnborough ATC's assistance.

After these returns, the aircraft resumed the track from Lydd to Le Touquet, before deviating left of it once again. At 1240:28 hrs, for a period of about one minute, the aircraft stabilised on a new direct track to Le Touquet. The aircraft then turned south-westwards, onto a track approximately parallel with the Lille TMA boundary but some three to four miles north of it. At 1249:36 hrs, the aircraft started a gentle left turn and was tracking about 30° right of the required course for Abbeville when radar contact was lost temporarily.

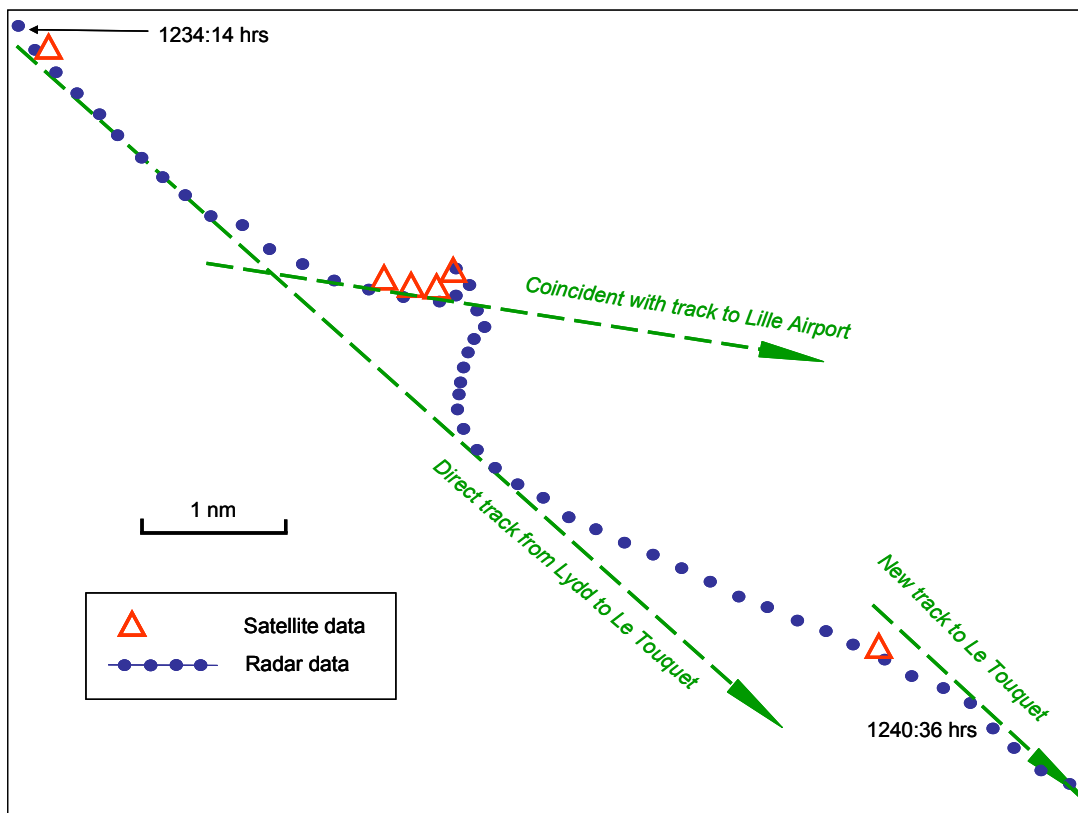


Figure 3

Track of G-DALI shortly after first appearing on French radar

Figure 4 shows the last series of radar returns from G-DALI. Radar contact was regained at 1253:18 hrs, at which point the aircraft appears to have been tracking in a left turn at relatively slow speed, before taking up a track of about 160°(T). The aircraft then made a further turn to the left, during which radar contact was finally lost. The last radar return was timed at 1255:09 hrs.

The GPS derived altitude showed that the aircraft had generally flown between 2,000 and 3,000 ft, until approaching the London area, and about 1,000 to 1,500 ft thereafter. Consistent with his comments to ATC, the data showed an increasing altitude as he climbed to improve

communications with London, reaching a maximum of 5,026 ft. At the last recorded satellite position, the GPS altitude was 3058 ft. An oblique view of the recorded satellite track is at Figure 5.

Shipping and tidal information

With the assistance of HM Coastguard at Dover, recorded shipping movements in the accident area were studied. The closest vessel to the last radar position was a commercial vessel of 90 m overall length, which was bearing 040° at 2.3 nm at the time of the last radar return and steaming away from the area in a north-easterly direction.

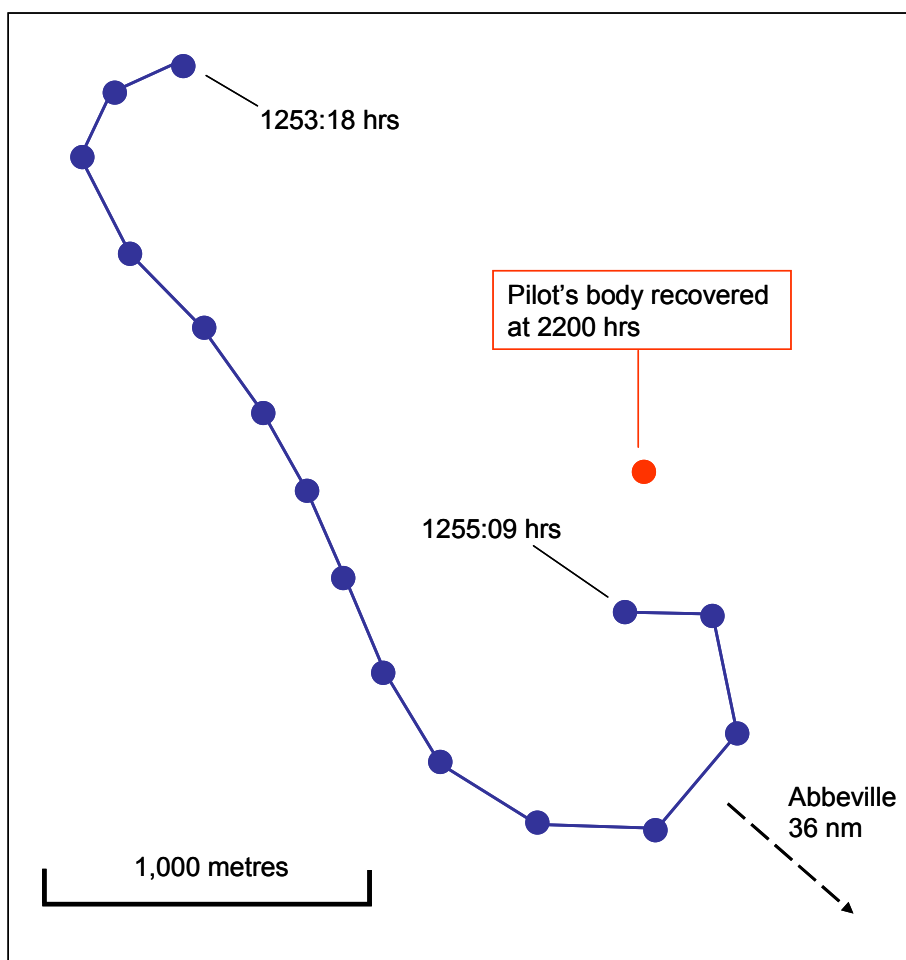


Figure 4

Final radar returns, with the reported location where the pilot was found

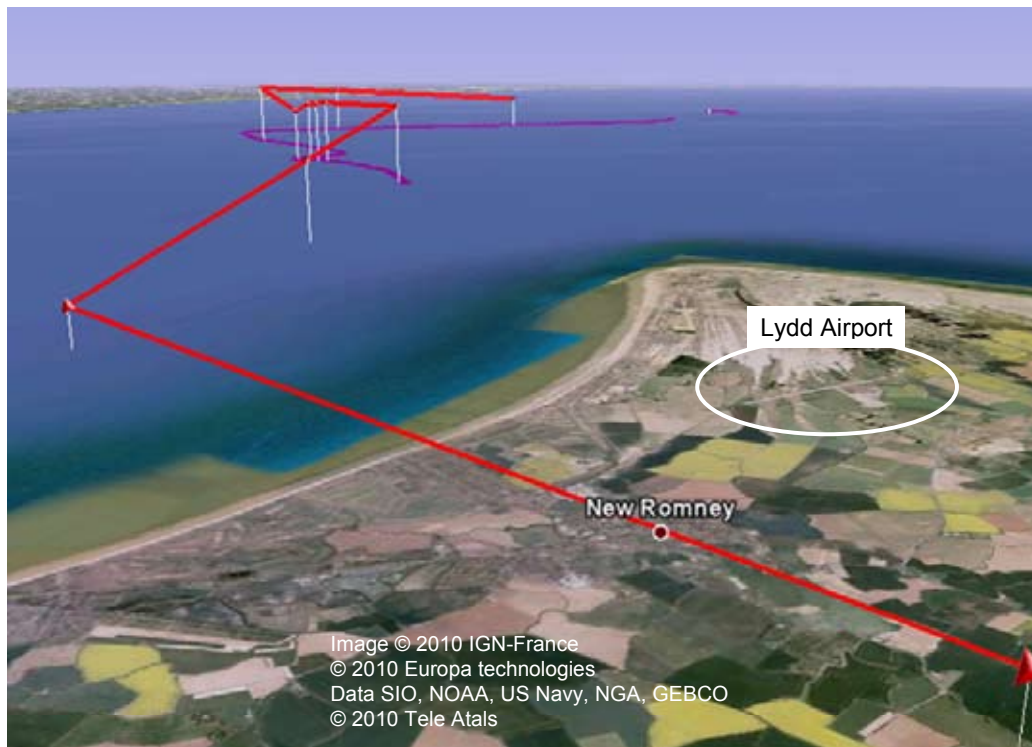


Figure 5

Oblique projection of aircraft satellite track, showing change in GPS derived altitude (radar ground track shown in purple)

A dedicated SAR computer programme was used to study the expected drift, due to tide and wind, of a person in the water in the accident area. Assuming that the drift started at 1255 hrs (the time of the last radar return) and continued until 2200 hrs, when the pilot was found, this produced a start point about 0.5 nm to the north-east of the position where the pilot was found. This calculated start point was less than 1 nm from the last radar position.

Meteorological information

When the pilot met briefing unit staff at Gloucestershire Airport two days before departure, to file a flight plan, he told them that he would only need updated airfield weather information on the morning of the flight. The pilot was known to use his home computer and mobile phone to access on-line aviation meteorological services.

Useful weather information from the nearby continental airfields was limited. There were no available METARs or TAFs³ for Le Touquet or Calais Dunkerque⁴, and the pilot did not request or receive reports for Abbeville, 24 nm south of Le Touquet. The nearest airport to Le Touquet for which a valid TAF was available was Lille, about 57 nm to the east.

According to a Met Office report, high pressure was prevalent across the near continent, with a light moist south-westerly airflow across the area and generally broken or overcast amounts of cloud. It was thought there would have been scattered or broken stratus cloud in the area, with a cloud base between 200 and 500 ft

Footnotes

³ METARs and TAFs are routine station reports which describe the actual and forecast meteorological conditions.

⁴ On-line actual and forecast meteorological reports are not routinely available for these airfields.

above the surface. Above this, there was probably broken or overcast strato-cumulus cloud, between 2,000 and 3,000 ft above the surface, extending upwards to about 4,000 ft. Embedded in this cloud layer were likely to have been isolated cumulus clouds up to about 6,000 ft, with associated moderate turbulence. The general visibility would probably have been between 5,000 m and 10 km in haze, with occasional mist and isolated fog patches reducing visibility to less than 1,000 m. The freezing level was at about 8,000 ft, so there was a risk of light icing in cloud, above about 3,000 ft, although there were no reports of icing being encountered in the area. The wind at 2,000 ft was estimated to have been from 260° at 10 to 15 kt.

The Lille TAF, which the pilot saw before departure, gave a light surface wind and a visibility of 150 m in fog. Temporary improvements to 3,000 m visibility,

with cloud at 300 ft, were forecast for the airport and a 30% probability of further temporary improvements to 7 km visibility, with cloud at 700 ft, were also predicted. The 1200 hrs Abbeville METAR gave a visibility of 4,500 m in mist, few clouds at 500 ft and broken cloud at 2,000 ft. By 1300 hrs the visibility had improved to 10 km and the cloud had become overcast at 2,000 ft.

It was noted that the forecast information from the MetForm 215⁵ and the TAFs conformed reasonably well with the actual information summarised above, in terms of weather and visibility. However, whereas Form 215 forecast areas of isolated cumulus and strato-cumulus, the observations and satellite imagery suggested this cloud was more widespread. Part of the satellite image from the report, overlaid with G-DALI's track and final radar position, is reproduced at Figure 6.

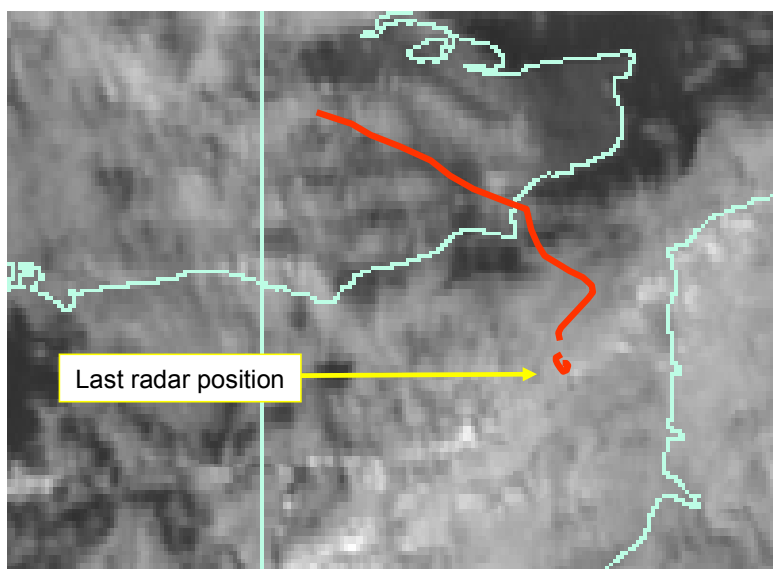


Figure 6

High resolution visible satellite image, 1315 hrs
(Crown Copyright [2010] Met Office)

Footnote

⁵ MetForm 215 provides a forecast of in-flight weather conditions below 10,000 ft and is available to pilots on-line.

Medical and pathological information

An autopsy examination was carried out by an aviation pathologist. This revealed that the pilot had died from severe multiple injuries, all of which were consistent with having been caused when the aircraft struck the sea. The nature and pattern of the injuries indicated a very significant deceleration, of the order of 200 to 300 'g', with the major component along the long axis of the spine, which favoured the pilot being in his seat at the moment of impact. This strongly suggested that the aircraft struck the water in an approximately upright orientation at a high rate of descent but with little forward speed. The crash forces were outside the range of human tolerance and no alternative or additional safety equipment would have altered the fatal outcome.

The pilot held a valid JAA Class 2 medical certificate. At his last medical, in December 2009, an ECG showed a common minor rhythm abnormality and, although it merited further investigation, it was not sufficient to prevent the pilot from holding a Class 2 certificate. Although there was the possibility that the pilot may have suffered an incapacitating cardiac event, there was no pathological evidence to support it.

Survival aspects

The pilot had obtained a single man life-raft of a type used in military fast jet aircraft. This was stowed behind his head, on top of the additional fuel tank, secured under elastic netting (see Figure 1). He was wearing a life-jacket with manually activated inflation, which was equipped with a flare and a personal location beacon (PLB). He was also wearing a thermal flying suit with thermal undergarments. He had taken a full immersion suit with him but this was packed in his luggage for use later in the journey. When the pilot was found, none of

his survival equipment had been operated, which was consistent with evidence from the autopsy examination that he had died in the initial impact.

From a sea surface temperature analysis chart for 1200 hrs on 17 January 2010, the sea temperature in the English Channel was 8°C. Sea survival times can vary widely between individuals but, in general terms, at 8°C a person without immersion protection is likely to start suffering from the effects of hypothermia, including impaired coordinated muscle activity, within 30 to 60 minutes. Immersion suits are designed to protect the wearer from cold shock and hypothermia and can extend survival times in cold sea temperatures by several hours. Although the pilot's flying clothing would have offered a measure of thermal protection, his survival time in the event of a control ditching, for example, would still be much less than if he had been wearing his immersion suit.

Analysis

The lack of any recovered aircraft wreckage or equipment significantly restricted the scope of the accident investigation and precluded a definitive statement of cause.

The aircraft was almost new and had flown for over two hours before the accident, apparently without problem. Although not certain, in the absence of any emergency transmission from the pilot, this would suggest that a structural or mechanical failure was not the most probable cause of the accident. The aircraft also carried sufficient fuel for it to return and land at Gloucester had the pilot so wished.

The weather was a major factor for the flight and, once in flight, the pilot's decision to undertake the Channel crossing, despite the uncertain meteorological situation

ahead, could have been influenced by a number of factors. There was ample fuel on board, so he would have had the option to reverse his route at any time or consider a wide choice of diversion airfields. Although the pilot was not thought to have been influenced by the flight's high profile and media coverage, it remains possible that he felt some degree of external pressure to complete the first leg of his journey, as planned.

It is known that the pilot was familiar with both le Touquet and Abbeville Airports from previous Channel crossings. As it is unlikely that he had a meteorological forecast for Abbeville and he did not seek the latest weather report from London or Lille ATC, this was probably the basis for his declared intention to divert there.

The radar data shows that the pilot did not immediately set course for Abbeville, and in fact turned away from it for a while. The reasons for this are not known; they may be weather related, but are more likely to be linked to a navigational issue, such as a need to manipulate or reprogram the GPS, or an error in waypoint selection. This is supported to some extent by the activation of the 'emergency' satellite position button. The mechanism by which this occurred is also unknown, but it was previously seen when the pilot negotiated the confined airspace around the Heathrow control zone and required assistance from Farnborough ATC.

When the aircraft turned south-westwards, it was apparently to avoid the Lille TMA, but the satellite image at Figure 6 suggests that a line of weather could also have been the reason. If continued, this south-westerly track would have taken the aircraft away from potential landing sites. Therefore, the pilot would have been faced with an increasing need to turn left as soon as he was able or, otherwise, to turn right

and return to land in the UK, both options involving an increasingly long over-water element.

The aircraft reappeared on radar shortly after the pilot told ATC that he was heading towards Abbeville. It was heading not towards Abbeville but in a more westerly direction. The lack of any additional information to ATC at this stage suggests that this manoeuvring was not due to a technical issue. Although the aircraft then took up an approximate course for Abbeville for a short while, the final radar returns show that the pilot had deviated again from his intended track. Based upon tidal calculations and the proximity of the last radar return to the position the pilot was found, the aircraft probably crashed soon after it disappeared from radar.

The pilot made no distress calls and, although communications with ATC were not always good, no other aircraft reported hearing such a call. It is unlikely that the pilot had become incapacitated, and the severity of the impact tended to rule out a controlled ditching. It is more probable that the accident resulted from a loss of control at altitude, whether due to a mechanical failure, disorientation brought about by the poor weather, or some other cause. In this case, the nominally upright impact attitude suggested by the pilot's injuries raises the possibility that the pilot may have been attempting to recover from a high rate of descent when the aircraft struck the sea.

There was evidence that the pilot was seated in the aircraft at the time of impact but none to indicate the mechanism by which he became separated from the aircraft afterwards.

Conclusion

The pilot encountered deteriorating conditions whilst flying over the Channel and was seen on radar to be

manoeuvring in a manner consistent with attempts to avoid the worst weather. The available evidence regarding the nature of the impact indicates that the aircraft struck the sea with considerable force, consistent with a loss of control at altitude. The pilot gave no indication of any fault with the aircraft and, although a technical failure could not be ruled out, it was considered likely that the pilot lost control of the aircraft after encountering poor weather conditions.

Safety comment

The pilot was not wearing an immersion suit for the Channel crossing, although he was known to be carrying one with him. Given the time of year and weather conditions, if he had been, his potential survival time following a ditching would have been significantly increased.