

**INCIDENT**

<b>Aircraft Type and Registration:</b>	Reims Aviation Cessna F150L, G-BBTZ	
<b>No &amp; Type of Engines:</b>	1 Continental Motors Corp O-200-A piston engine	
<b>Year of Manufacture:</b>	1974	
<b>Date &amp; Time (UTC):</b>	9 March 2006 at 1825 hrs	
<b>Location:</b>	Goswick Sands, Holy Island, Northumberland	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	45 years	
<b>Commander's Flying Experience:</b>	473 hours (of which 201 were on type) Last 90 days - 30 hours Last 28 days - 20 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and information provided by the Met Office and the United Kingdom Hydrographic Office	

**Synopsis**

The aircraft deviated from its intended route when the pilot encountered deteriorating weather conditions. Having become lost during the deviation, the pilot re-established his whereabouts with the assistance of the Distress and Diversion cell and was met by a Search and Rescue helicopter that had been dispatched to guide the aircraft to an airfield. However, the pilot was concerned that his aircraft contained insufficient fuel for the flight to the proposed airfield and on sighting a large area of clear sand beside Holy Island, he elected to land there instead.

**History of the flight**

The pilot intended to fly with a passenger from

Cumbernauld to Carlisle in order to collect another aircraft. The flight was to be conducted in accordance with the Visual Flight Rules. The pilot stated that he "checked the weather from the usual sources" at Cumbernauld, checked that the aircraft had sufficient fuel onboard and departed Cumbernauld at 1515 hrs. Shortly after departure he contacted Scottish Information, which provided a Flight Information Service, and flew along his planned route at an altitude of approximately 3,000 ft. After passing abeam Talla VOR, approximately half way to Carlisle, the weather deteriorated rapidly and to avoid flying beneath a lowering cloud base, the pilot turned to the east where conditions appeared to him to be better. He intended

to assess his options for diversion as soon as he had set course to the east but, as he became increasingly concerned about the weather, he also became uncertain of his position. When he realised he was lost, he informed Scottish Information that he would contact the Distress and Diversion cell (commonly referred to as "D&D") on 121.50 MHz. His first recorded contact with that service was at 1647 hrs. He was, however, unable to maintain continuous contact and subsequent transmissions relied upon relays from commercial aircraft flying at higher altitudes.

An incident record provided by D&D indicated that at 1700 hrs the pilot thought he was in the vicinity of Longtown, 7 nm northwest of Carlisle. Using the pilot's description of ground features below the aircraft, which included a race track to the north of a small town, D&D identified his position as close to Kelso, approximately 35 nm east of his intended route and 40 nm northeast of Longtown. An SAR helicopter based at Boulmer, on the east coast 30 nm south east of Kelso, was alerted to provide assistance but the pilot of G-BBTZ stated that he would divert via Coldstream to Charterhall Airfield, 8 nm northeast of Kelso, and the helicopter was stood down.

Later, having failed to find Charterhall, the pilot called D&D again. D&D suggested that he should return to Coldstream and proceed east along the River Tweed to Berwick. The SAR helicopter was tasked to meet him there. He found Berwick without difficulty and orbited in sight of the town until the helicopter arrived. Remaining on 121.50 MHz, the pilot then made contact with the crew of the helicopter, who advised him that he should fly south along the coast to Eshott, an airfield 9 nm south of Boulmer. The pilot advised the helicopter crew that because he had only a small amount of fuel remaining, he would prefer to land at Brunton, near the coast 18 nm south of Berwick. Approximately 10 minutes after setting course along the coast the

pilot noticed a large area of sand. Increasingly anxious about the amount of fuel remaining and the fading light, he decided to land immediately and informed the helicopter crew of his intentions. The aircraft landed without further incident at 1825 hrs on Goswick Sands, having been airborne for 3 hours and 10 minutes.

The helicopter, which had been flying a short distance offshore and in sight of G-BBTZ, landed beside the aeroplane, marked its position with a portable strobe light, collected the uninjured pilot and passenger and returned with them to Boulmer. A coastguard vessel that had been monitoring the incident came ashore and members of its crew pushed the aircraft onto Holy Island, clear of the incoming tide.

Two days later the aircraft was collected by the Chief Flying Instructor (CFI) of the flying school which operated it. He stated that the aircraft was assessed by a licensed engineer prior to flight and filled, from an approved container, with sufficient fuel for a short positioning flight. It then took off from the metalled causeway between Holy Island and the mainland and flew directly to Eshott, 20 nm to the south, where it could be refuelled from a fixed installation and washed.

#### **Aircraft information**

The optional 'long range' fuel tanks fitted to G-BBTZ had a total useable capacity of 132.5 litres. Fuel quantity could be measured on the ground by placing a dipstick in each tank and inspecting the contents visually, a process known as "dipping". The pilot dipped both tanks prior to the flight and found that they contained a total of 70 litres, which was sufficient for the intended flight. During the flight, two fuel quantity gauges in the cockpit indicated fuel remaining in each tank, but instead of relying on these gauges, the pilot preferred to make an assessment of fuel remaining based on the

known contents of the tanks prior to departure and an estimate of average fuel consumption. Information provided in the Cessna 150 *Owner's Manual* indicates that a representative aircraft cruising at 3,000 ft will consume approximately 20 litres per hour, giving an endurance of 3½ hours. When he collected the aircraft after the incident flight, the CFI found that the tanks contained a total of 18 litres, sufficient for approximately 55 minutes of flight<sup>1</sup>. This would have enabled the aircraft to continue to Brunton or Eshott.

### Meteorological information

#### *Visual Flight Rules*

Rule 26 of the Rules of the Air Regulations 1996 states:

*(1) An aircraft flying outside controlled airspace at or above flight level 100 shall remain at least 1500 metres horizontally and 1000 feet vertically away from cloud and in a flight visibility of at least 8 km.*

*(2) (a) Subject to sub-paragraph (b), an aircraft flying outside controlled airspace below flight level 100 shall remain at least 1500 metres horizontally and 1000 feet vertically away from cloud and in a flight visibility of at least 5 km.*

*(b) Sub-paragraph (a) shall be deemed to be complied with if:*

*(i) the aircraft is flying at or below 3000 feet above mean sea level and remains clear of cloud and in sight of the surface and in a flight visibility of at least 5 km;*

*(ii) the aircraft, other than a helicopter, is flying at or below 3000 feet above mean sea level at a speed which according to its air speed indicator is 140 knots or less and remains clear of cloud and in sight of the surface and in flight visibility of at least 1500 metres; or*

*(iii) in the case of a helicopter the helicopter is flying at or below 3000 feet above mean sea level flying at a speed, which having regard to the visibility is reasonable, and remains clear of cloud and in sight of the surface.*

Typically, a Cessna 150 cruises at an indicated airspeed of 100 kt or less.

The elevations of Cumbernauld and Carlisle airports are 350 ft and 190 ft amsl respectively. The highest ground along the intended route, rising to 2,697 ft amsl, is close to the point at which the pilot noticed the deteriorating weather conditions. The highest terrain within 5 nm of the route rises to 2,726 ft, 1.5 nm east of Talla VOR. Consequently, it would not have been practical to remain at 3,000 ft above sea level throughout the journey and paragraph 2 (a) of Rule 26 would have been applicable.

#### *Information available to the pilot before departure*

Form F215 – *Forecast Weather Below 10,000 ft*, issued by the Met Office at 0950 hrs on the day of the incident, and valid from 1400 hrs to 2300 hrs, predicted visibility of 15 km in light rain reducing occasionally to 7 km in rain and drizzle and in isolated cases to 3,000 metres in heavy rain. Visibility was forecast to reduce further to 2,000 metres along a band of weather associated with an occluded front which was aligned

#### Footnote

<sup>1</sup> The extra fuel remaining might be accounted for either by lower than predicted fuel consumption or a conservative measurement of fuel on board prior to departure from Cumbernauld.

approximately from Stranraer to Norwich at 1800 hrs and moving in a north-easterly direction at 15 kt. Broken or overcast cloud was forecast with a base of 1,500 to 3,000 ft, with areas of low stratus base 300 to 600 ft and fog on hills, resulting in visibility of 800 metres or less.

The most recent aerodrome forecast available to the pilot prior to departure indicated that temporarily between 1500 hrs and 1800 hrs the visibility at Carlisle would reduce to 5,000 metres in rain and that the base of cloud would reduce to 1,000 ft aal. The forecast also indicated that at both Glasgow and Edinburgh, temporarily between 1300 hrs and 2200 hrs, visibility would reduce to 8,000 metres in light rain with cloud broken at 1,400 ft.

#### **Aftercast**

An aftercast produced by the Met Office showed low pressure lying to the west of Scotland feeding a south-easterly flow over the Borders region. An occluded front within the air mass was moving towards the Borders bringing rain and lowering cloud to the area. During the afternoon a band of rain moved into the area and covered the intended route. Surface visibility reduced from between 20 to 40 km generally to between 7 and 15 km in rain, but deteriorated to between 3,000 and 5,000 metres in moderate rain over high ground.

Radar imagery showed a band of rain running in a south-easterly direction from the north coast of Ireland to the South East of England, including strong returns indicating heavier rain in the area around Talla VOR at the time the flight deviated from its intended route.

#### **Environmental information**

Local sunset was at 1758 hrs. The pilot assessed the actual conditions at the time of touchdown as “dusk”. The United Kingdom Hydrographic Office estimated low tide at Holy Island to have occurred at 1716 hrs on the date of the incident, subject to wind and pressure effects which were not evaluated. The water level would not have risen appreciably by 1825 hrs, when the aircraft landed.

#### **Aids to navigation**

The aircraft was fitted with a combined VHF navigation and communication radio capable of receiving VOR station signals. No other radio navigation aids were fitted. The planned direct route between Cumbernauld and Carlisle passed close to Talla VOR, but the pilot commented that, although he operated the VOR receiver “as an exercise”, he did not use it as an aid to navigation on the incident flight.

#### **Communications**

The D&D cell at West Drayton, operated by the Royal Air Force, provides position information<sup>2</sup> (“fixes”) derived from direction finding (DF) equipment which is able to determine the direction from which a signal is transmitted. The location of a transmission can be determined when it is received at two or more stations at different locations and the accuracy of a fix improves if the signal is received at three or more stations at widely separated locations. A computerised system enables fixes to be displayed on a variety of detailed topographical and aeronautical charts in order that D&D

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#### **Footnote**

<sup>2</sup> This service is available routinely to pilots, even if they are not lost. The D&D cell encourages pilots to make use of it without embarrassment, and emphasises the value to both parties of “training fixes”. Further details are available in ‘Safety Sense’ leaflets and on the CAA website.

can give pilots meaningful position information relative to their own charts and ground features visible from the air. It is usually possible to fix the position of an aircraft transmitting on 121.50 MHz at 2,000 ft or more above the surface, but not necessarily over hilly or mountainous terrain. In this incident, D&D was not able to establish the position of G-BBTZ accurately using DF alone but was able to do so in conjunction with the description that the pilot gave of ground features below the aircraft.

### Recorded information

It was not possible to identify the track of the aircraft using radar recordings. It probably flew below the coverage of radar stations surrounding and within the area.

### Additional information

#### *Published guidance*

CAA Safety Sense Leaflet 1e – “*Good airmanship*” published by the CAA includes the following advice about weather planning:

*‘Get an aviation weather forecast, heed what it says and make a carefully reasoned GO/NO-GO decision.’*

*‘Establish clearly in your mind the current en-route conditions, the forecast and the “escape route” to good weather. Plan an alternative route if you intend to fly over high ground where cloud is likely to lower and thicken.’*

Under the heading ‘*LOST*’ the same leaflet offers the following advice:

*a. If you become unsure of your position, then tell someone. Transmit first on your working frequency. If you have lost contact on that frequency or they cannot help you, then change to 121.5 MHz and use Training Fix, PAN or MAYDAY, whichever is appropriate (See CAP 413 ‘Radiotelephony Manual’). If you have a transponder, you may wish to select the emergency code, which is 7700. It will instantly alert a radar controller.*

*b. Few pilots like to admit a problem on the radio. However, if any 2 of the items below apply to you, you should call for assistance quickly, ‘HELP ME’:*

**H** *High ground/ obstructions – are you near any?*

**E** *Entering controlled airspace – are you close?*

**L** *Limited experience, low time or student pilot (let them know)*

**P** *Position uncertain, get a ‘Training Fix’ in good time; don’t leave it too late*

**M** *MET conditions; is the weather deteriorating?*

**E** *Endurance – fuel remaining; is it getting short?*

*c. As a last resort, make an early decision to land in a field while you have the fuel and daylight to do so. Choose a field with care by making a careful reconnaissance. Do not take off again without obtaining a weather update or further advice.*

CAA Safety Sense Leaflet 5 – ‘*VFR navigation*’ contains similar advice.

#### *Beach landing*

The pilot commented that he had landed several times at Barra, an aerodrome whose sand runways are located on a tidal beach. He said that this experience gave him confidence to carry out a landing on Goswick Sands.

#### **Conclusion**

Forecasts available to the pilot prior to the flight indicated that the flight could not be conducted under Visual Flight Rules at all points along the intended route.

The pilot manoeuvred the aircraft away from the worst weather associated with the approaching front but became

lost before deciding on an alternative destination. He was assisted by the Distress and Diversion cell despite being at a height and in an area which limited the performance of its direction finding system. A rescue helicopter was able to find the aircraft and guide it towards suitable airfields but, concerned about the amount of fuel remaining, the pilot of G-BBTZ decided to land on a clear area of beach. Unknown to the pilot there was sufficient fuel remaining onboard the aircraft for it to have continued to either of the airfields suggested by the helicopter crew but, in view of the diminishing light and deteriorating weather, a decision to continue may not have resulted in a safe outcome.