AIRCRAFT ACCIDENT REPORT 4/88

Air Accidents Investigation Branch

Department of Transport

Report on the accident to Cessna F 172M OO-JEL in the sea, 3 nautical miles east-north-east of Ryde, Isle of Wight on 30 April 1987

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3/88	Bell Model 222, G-META at Lippitts Hill, Loughton, Essex, 6 May 1987.	
4/88	Cessna F 172 M, OO-JEL in the sea 3 miles east north east of Ryde, Isle of Wight.-	

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Department of Transport
Air Accidents Investigation Branch
Royal Aircraft Establishment
Farnborough
Hants GU14 6TD

Date :- 15 July 1988

The Right Honourable Paul Channon
Secretary of State for Transport

Sir,

I have the honour to submit the report by Mr E.J.Trimble, an Inspector of Accidents, on the circumstances of the accident to a Cessna F172M, OO-JEL, which occurred 3 nautical miles east-north-east of Ryde, Isle of Wight, on 30 April 1987.

I have the honour to be
Sir
Your obedient servant

D A COOPER
Chief Inspector of Accidents

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Air Accidents Investigation Branch

Aircraft Accident Report No: 4/88
(EW/C1012)

Registered Owner and Operator:		Jeugd en Luchtvaart, Vliegdienst Antwerpen, VZW
Aircraft:	Type:	Cessna F172M
	Nationality:	Belgian
	Registration:	00-JEL
Place of Accident:		In the sea 3 nautical miles east-north-east of Ryde, Isle of Wight, United Kingdom Latitude 50° 42' north longitude 001° 05' west
Date and Time:		30 April 1987 at 1006 hrs All times in the report are in UTC

Synopsis

The accident ocurred on the morning of 30 April 1987 and was reported to the Air Accidents Investigation Branch at 1100 hrs. The investigation was commenced the same day.

The aircraft was on a flight from Antwerp to Exeter. It was refuelled to full tanks before departure, and radio telephony (RTF) communications were satisfactory throughout the flight, although the pilot appeared to have difficulty with non-routine messages.

The cloud cover on the route was reported to be layered strato cumulus up to 8,000 feet, with locally embedded cumulus. The aircraft was flown at heights of between 1,000 feet and 4,500 feet in order to avoid entering cloud. Upon approaching the Solent area, Southampton Air Traffic Control (ATC) asked the pilot if he could descend from 3,500 feet to 3,000 feet and accept a re-routing to take the aircraft north of the Bournemouth (Hurn) area. The pilot agreed and was asked to turn onto a heading of 360° magnetic, a 110° turn to the right, which he again accepted.

Shortly afterwards the aircraft was seen to dive out of low cloud, apparently fast and under power, and to strike a yacht. The aircraft and yacht disintegrated and sank. The three occupants of the aircraft were killed, as were the two persons onboard the yacht. Very little wreckage was recovered.

The accident was probably the result of the pilot continuing VFR flight into adverse weather conditions for which he was neither trained nor qualified. The weather, and manoeuvres carried out by the pilot, would have been conducive to spatial disorientation, with consequent loss of control of the aircraft.

1 Factual Information

1.1 History of the flight

The aircraft was on a private flight from Antwerp to Exeter with the pilot and 2 female passengers on board. The aircraft had been refuelled to full tanks prior to departure, and it was intended to refuel at Exeter in order to continue the flight to the Scilly Isles.

A Visual Flight Rules (VFR) [1*] flight plan was filed with the desired routeing within the London Flight Information Region (FIR) being overhead Dover, Lydd, Seaford and direct to Exeter (Appendix 2). The aircraft took off from Antwerp at 0705 hrs and the pilot made initial RTF contact with Kent Radar at 0813 hrs, reporting that he was flying at an altitude of 2500 feet. Transcripts of the communications with Kent Radar show that the aircraft descended to 1500 feet at 0815.30 hrs, and subsequently Kent Radar queried its southerly heading. At 0834.30 hrs the pilot was warned of a radio mast near Dover with a height of 1229 feet above mean sea level. The suggestion was made that he should follow the coastline, on the seaward- side. At 0835 hrs the Exeter weather was passed to 00-JEL (0-EL). This was acknowledged. Shortly afterwards Kent Radar again queried the aircraft's south easterly heading, and was told that the pilot was going to try to follow the coastline. At 0843.30 hrs the pilot reported that the aircraft was in cloud and requested a climb in order to regain Visual Meteorological Conditions (VMC). This was approved. During the climb to 2500 feet, the aircraft's heading was again requested by Kent Radar. The pilot replied that it was 150° and that he was turning onto a heading of 240°. He then reported, at 0846 hrs, that he was in VMC at 2500 feet.

The pilot made RTF contact with other Air Traffic Control (ATC) services and aerodromes en route, reporting the aircraft's position, altitude, and requesting aerodrome weather information. The altitudes reported varied from 1000 feet to 4500 feet and it is apparent from the ATC RTF tapes and transcripts that the pilot was endeavouring to maintain VMC in compliance with his VFR flight plan.

At 0956 hrs RTF contact was made with Southampton Zone Control and the pilot reported the aircraft's position as south of Goodwood (Chichester) and at an altitude of 3500 feet. The zone controller asked if the pilot intended to route via the Sierra Alpha Mike (SAM), a VHF Omnidirectional Range (VOR) radio navigational aid situated on Southampton (Eastleigh) airport, and 17 nautical miles north of the pilot's intended track. The pilot replied "yes sir could you give me the Southampton weather please and the Exeter weather".

1* Visual Flight Rules as tabulated in the United Kingdom, Belgium and Luxembourg Aeronatical Information Publications (AIP), see Appendix 1

A Canberra aircraft south of the Isle of Wight then called Southampton Zone to report that it was heading northwards, towards Boscombe Down at Flight Level (FL) 40, i.e. 4000 feet on the standard pressure setting. It wanted to maintain that level as there was other traffic operating out of Bournemouth (Hurn), and this was approved by the controller. As neither the Canberra nor the Cessna 0-EL were visible on Southampton's primary radar screen, and in order to preclude any possible conflict, the Controller asked if 0-EL could transit the zone at 3000 feet. The pilot acknowledged and accepted the request. When he reported at 3000 feet, at 1000 hrs, the controller asked him to report overhead SAM, and there followed some discussion on the intended routeing with the pilot re-stating his intention to fly direct to Exeter and not via the SAM VOR.

The pilot of 0-EL was asked to report passing the 160° radial of the SAM VOR, and at 1005 hrs was informed that a number of research aircraft were returning to Bournemouth short of fuel. He was asked by the Southampton controller if he could accept radar vectors to the SAM VOR, to the north of his position, before continuing westwards, so passing to the north of the busy Bournemouth area (Appendix 3). This the pilot accepted. Upon replying that his heading was 250°, he was asked by the controller, for radar identification purposes, to turn onto a heading of 360° at 1006 hrs. This heading would also have vectored the aircraft north of the traffic approaching Hurn and positioned it for subsequent vectoring towards the SAM VOR. The pilot acknowledged and repeated the heading. There was no further communication from O-EL. A transcript of the communications with Southampton zone control is at Appendix 4.

A recording of the primary radar returns from the ground radar station at Ventnor indicates that the aircraft was maintaining a somewhat erratic westerly track until asked to turn onto 360°. The plot (Appendix 5) shows that the aircraft turned right, through 360°, and on to an east-north-easterly heading before disappearing completely from the radar screen.

A high-winged light aircraft was seen to emerge from low cloud and drizzle, heading in a north easterly direction, erect, and diving towards the sea at an angle of 20° - 30° to the horizontal. One witness stated that the aircraft was spiralling down slowly and then appeared to try to 'level-out'. Several yachts and a fishing boat were in the area, and a number of witnesses had their attention drawn to the aircraft by the very loud high-pitched engine noise. Two yachts, the "Spartina" and "Electra II" were sailing in a south easterly direction, in the vicinity of the 'Warner' buoy, with "Electra II" to the right of, and slightly ahead of the "Spartina".

The aircraft is reported to have dived from the base of the cloud at high speed, before striking the yacht "Spartina" on its starboard side momentarily after hitting the sea. The aircraft and yacht disintegrated and sank. The three occupants of the aircraft, and two men crewing the yacht, died as a result of the impact. Only four bodies were recovered that day, the body of the owner of the yacht being recovered some eight weeks later (see para 1.13 page 12). A substantial fuel slick was noticed by witnesses intent on rescue. Only three seats, a control column, documents, clothing, and wood from the yacht were recovered. Efforts were made over a period of two and a half days to locate the aircraft wreckage by the use of side-scan sonar, but these were unsuccessful.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	1	2	2
Serious	-	-	-
Minor	-	-	-

1.3 Damage to the aircraft

The aircraft was completely destroyed by impact with the sea and the yacht. The wreckage was not recovered.

1.4 Other damage

The 22 foot yacht "Spartina" was destroyed and sunk by impact forces.

1.5 Pilot information

1.5.1 *Commander:* Male aged 36 years

Licence: Private Pilot's Licence (PPL) (Belgian) VFR only, and for single (piston) engined landplanes of less than 5700 kgs all up weight.Renewed 10 February 1987, valid to 5 March 1989.

Medical Certificate: Last renewed on 10.2.87

Flying experience: VFR Day: 466 hours 45 minutes of which 65 hours were on the Cessna 172. Night: 1 hour 56 minutes dual and 28 minutes solo, accumulated in 1985.

1.5.2 Pilot's experience

The pilot's flying experience dated from the 7th June 1981 with his first solo on the 10th June 1982, after 28 hours 05 minutes of dual instruction. He passed his General Flying Test on the 27th July 1984 after 130 hours 44 minutes dual and 21 hours 13 minutes solo. A PPL was issued on the 6th August 1984.

The pilot's instructor suggested that a change of aircraft type and poor weather were reasons for his slow solo progress. His logbook indicated that he was only able to achieve a few hours flying per month during the three year period prior to his flight test.

However, the pilot had previously flown to the Scilly Isles via Exeter in May 1985. In addition, during the following year, he had flown more than 260 hours. He had also flown 50 hours within the 90 days preceding the accident, and 21 hours over the last 28 days, including four flights on 26 April.

The pilot had also gained approval to conduct air experience flights on behalf of a Belgian youth organisation.

1.6 Aircraft information

1.6.1 Leading particulars

Type:	Cessna F172M
Constructor	Reims Cessna, France
Constructor's Number:	1251
Date of Manufacture:	December 1974
Certificate of Airworthiness:	No 2084. Private category. Issued by the Ministry of Communications, Kingdom of Belgium, 30 November 1977.Valid to 18 November 1987
Certificate of Registration:	No. 2084, Belgium. Issued 9 December 1977.
Total airframe hours:	2660 approximately
Last maintenance check (50 hr):	21 March 1987 at 2628 airframe hours
Engine:	Lycoming 0-320-E2D Serial No. RL-44108-27A
Engine total running hours:	1300 approximately
Propeller:	McCauley IC160/DTM7553.

1.6.2 *Certificate of airworthiness*

Belgian registered aircraft are certificated as either permitted to fly in Instrument Meteorological Conditions (IMC) or restricted to Visual Meteorological Conditions (VMC). The annex to the Certificate of Airworthiness held by 00-JEL restricted its use to flight in VMC by day and in an airfield circuit by night. Instrument flight by day or night and flight in icing conditions were expressly forbidden in this annex.

The report at the last inspection for the renewal of the Certificate of Airworthiness listed a number of defects. These were rectified before the certificate was renewed although this was not entered in the aircraft's log book. A similar situation obtained for the last 50 hour maintenance check.

1.6.3 *Weight and balance*

	Weight	Centre of gravity x 1000 Kg cm
Maximum weight authorised for take-off	1043.3 Kg	
Aircraft (empty tank) weight, including engine oil	650.3 Kg	
Maximum fuel available and loaded	103.7 Kg	
Weight of pilot and passengers	199 Kg	
Assumed weight of baggage Stn. 241	50 Kg	
Assumed take-off weight and C of G	1003 Kg	108.5
Assumed accident weight and C of G	954 Kg	104.6
C of G forward limit at 1043 Kg		102.2
C of G Aft limit at 1043 Kg		125.2
C of G forward limit at 885 Kg		79.7

1.7 Meteorological information

1.7.1 *Actual weather observed at Antwerp at 0700 hrs was:-*

Wind:	180° at 07 kts
Weather:	Ceiling and visibility unlimited (CAV OK)
Temperature:	plus 16°C
Dewpoint:	plus 11°C

1.7.2 *The forecast available to the pilot for Exeter, his destination, was as follows:-*

Period 0700 - 1600 hrs
Wind: 222° at 12 kts
Visibility: 7 kilometres
Cloud: 7 okta stratus 1000 feet

A temporary condition was forecast between 0700-1100 hrs:

Visibility: 4000 metres
Cloud: 5 okta stratus 500 feet

gradually becoming, between 1000-1300 hrs:

Visibility: more than 10 kilometres
Weather: rain showers
Cloud: 6 okta cumulus 1500 feet

A wind/temperature chart for FL 100 and a Significant Weather chart for FL's 100 to 450 and valid for 1200 hrs were also available.

1.7.3 *Actual weather reports en route*

The pilot asked for weather reports en route and at 0835 hrs was passed the latest Exeter weather by Kent Radar:

Wind:	210° at 6 kts
Visibility:	8 kilometres
Weather:	rain
Cloud:	1 okta 500 feet
	6 okta 800 feet
	7 okta 1800 feet

The same Exeter actual was passed by Lydd Approach at 0849 hrs. At 0850 hrs Lydd offered the latest Southampton weather for information, and at 0852 hrs gave:

Visibility:	5 kilometres in rain
Cloud:	3 okta 300 feet
	8 okta 400 feet

Subsequent to making contact with Southampton Zone Control at 0956 hrs the pilot requested the Southampton and Exeter weather, but did not receive them due to the controller then requesting O-EL to descend to improve separation with the Canberra cross-traffic.

It is evident from the RTF recordings that the aircraft was frequently climbing and descending in order to maintain VMC, but not always successfully.

1.7.4 *Aftercast*

An aftercast was prepared by the Meteorological Office for the South Coast area of England between the Isle of Wight and Dover for the 30th April 1987 for the period 0800 to 1000 hrs:

Synoptic Situation

A moist west-south-westerly airstream covered the area throughout the period. Air mass surface dewpoints of 10° or 11°, combined with a long sea fetch and sea surface temperature of 9° near the South Coast, led to extensive stratus development. This airstream was also marginally unstable, with ascent over the Isle of Wight and coastal hills likely to trigger some embedded cumulus.

Winds	Surface	210°-240°	10-15 kts	
	1000 ft	230°	15 kts	Temperature Plus 09°C
	2000 ft	240°	22 kts	Temperature Plus 08°C
	4000 ft	250°	25 kts	Temperature Plus 05°C

Cloud

The upper air ascents showed a good deal of moisture up to at least 10,000 ft, but with some variation between ascents on the amount and distribution of moisture. From the ascents and surface observations there would seem to have been no definite clear lane between the stratus induced by the cool sea and the layered stratocumulus above. Also the presence of local embedded cumulus would have helped to break up any tendency to form extensive uniform layers. The cloud was assessed as follows:-

5 to 8 oktas stratus, base 300-600 ft above mean sea-level (amsl), covering coastal hills. Local breaks to 3 oktas. Stratus tops 1000-1500 ft, 8 oktas stratocumulus above, base 1500-3000 ft, in layers to 8000 ft (layers likely to be discontinuous). Locally embedded cumulus, base 1500-2000 ft, tops 5000-8000 ft. Further altocumulus, layers 8000-16000 ft.

Surface Visibility:	2500-5000 m in rain and drizzle, occasionally 8 km out of precipitation. 400 m or less in hill and coastal fog.
Weather	Scattered outbreaks of mainly light rain and drizzle. Extensive hill fog and some associated with the coast.
0°C Isotherm	7000 ft.
Turbulence	Mostly slight, but light to moderate in embedded cumulus.

1.7.5 Local observation

The pilot of a Canberra aircraft overflying the Isle of Wight has stated that his aircraft "was in-and-out of cloud at FL 40"

1.8 Aids to navigation

The aircraft was equipped with a standard flight instrument panel, and had VOR and ADF (Automatic Direction Finding) receivers fitted.

A transponder [2*] was also fitted, but apparently not selected to "On" at the time of the accident. London Air Traffic Control Centre (LATCC), who recorded the final primary radar path of the aircraft, had the facility to display a transponder code (secondary radar return) but this was not being transmitted. Southampton radar was not equipped to receive secondary radar returns.

The aircraft appears to have been following a route passing over the radio navigation aids positioned at the places recorded on the flight plan. When warned of a radio mast obstruction near Dover, the pilot seems to have had difficulty in reverting to visual navigation and the use of landmarks at that time, and subsequently.

All navigation aids en-route were functioning normally and there were no recorded defects associated with the aircraft's equipment.

1.9 Communications

1.9.1 At 0813 hrs the pilot made contact with Kent Radar on 129.45 MHz and within a minute requested a descent from 2500 feet to 1500 feet. This was approved. Kent Radar monitored the aircraft's progress and warned the pilot of a radio mast near Dover with a height of 1229 feet amsl. They also suggested suitable headings and approved a climb for the aircraft to regain VMC, which was achieved at 2500 feet.

1.9.2 The pilot contacted Lydd Approach Control on 120.7 MHz at 0849 hrs and requested a climb to 3000 feet in order to maintain VFR. At 0850.30 hrs Lydd offered the latest Southampton weather and the pilot reported that he was ready to copy and was levelling at 3000 feet. Southampton weather was copied at 0852, and after querying the Seaford VOR frequency, the pilot announced that he was then flying at 3500 feet. At 0913 hrs the pilot reported that the aircraft was at 4500 feet and half a minute later requested a descent to 1500 feet, since he had

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2* Transponder An electronic device carried on an aircraft which enhances and identifies a radar return on a radar controller's screen

contact with the surface. He was cleared initially to 2500 feet and then asked to stop his descent at 3500 feet due to opposing traffic. He was then transferred to Shoreham Control on 123.15 MHz.

1.9.3 Shoreham cleared the aircraft to descend to 3000 feet and queried the aircraft's routeing. The 270° radial of the Seaford VOR was declared as the preferred route and was acknowledged. A further descent was offered by Shoreham at 0930 hrs and the pilot replied that he would like to descend to 1500 feet. At 0934 hrs he reported at 1000 feet and that "we have contact".

There was some confusion between the Shoreham controller and the pilot as to the aircraft's requested and actual altitude. The pilot then transmitted that he was climbing to 1500 feet. When asked if he was passing abeam Shoreham he replied "I think so sir I'm not quite sure, I have not any contact anymore". At 0943 hrs the aircraft was cleared to climb to 2500 feet, and to call Goodwood on 122.45 MHz.

1.9.4 After having made initial contact with Goodwood Tower at 0943 hrs the controller advised that Thorney Island might be active within a 5 nautical mile radius, up to 3000 feet. The pilot acknowledged and said he was climbing to 3500 feet. After reporting 'North' of the Golf Whiskey Charlie navigational beacon at 0953 hrs the pilot was asked by Goodwood to contact Southampton on 121.3 MHz.

1.9.5 Contact was established with Southampton Zone Control and the aircraft's position was reported as just 'South' of Golf Whiskey Charlie, altitude 3500 feet. Traffic information was requested, and after the Zone controller replied that there was no known traffic, he asked if the aircraft was routeing via the SAM VOR. The pilot replied in the affirmative and requested the Southampton and Exeter weather. The aircraft was then cleared into the Special Rules Airspace at 3500 feet on the QNH (barometric altimeter setting) of 1015 millibars.

A summary of the subsequent communications with Southampton is contained in paragraph 1.1 pages 3, 4, History of Flight (and transcript at Appendix 4). It is apparent that the pilot had some difficulty in interpreting any communication which was not strictly routine.

1.10 Aerodrome information

Not relevant.

1.11 Flight recorders.

Not required and none fitted.

1.12 Wreckage and impact information

The only significant wreckage recovered was the aircraft's seats. Examination of the failures of the seat attachments to the cabin floor suggested that the aircraft had suffered a frontal impact at fairly high speed, whilst yawed slightly to the left.

1.13 Medical and pathological information

A post mortem examination was carried out on each of the four bodies recovered on the day of the accident. All three occupants of the aircraft died as a result of multiple injuries consistent with the accident. The pilot was assessed as a well nourished Caucasian male, in good health, and with no abnormal physical characteristics. The sole crew member from the yacht also received fatal multiple injuries.

Samples from each person were sent for specialist toxicological analysis, and drug screening. Nothing remarkable was reported.

The body of the owner of the yacht was recovered eight weeks after the accident and a post mortem examination confirmed that the cause of his death was also multiple injuries.

1.14 Fire

There was no physical or pathological evidence of smoke or fire.

1.15 Survivability

The accident was not survivable. Numerous vessels attended the scene and a Royal Naval Search and Rescue helicopter was over the site within 15 minutes.

1.16 Tests and research

None.

1.17 Other information

1.17.1 Spatial disorientation

The following description of this aspect was produced with the assistance of the R.A.F. Institute of Aviation Medicine flight skills section.

Spatial disorientation is a well known phenomenon during which a person loses their sense of balance, attitude, and direction in space relative to the surface of the earth.

The perception of orientation is governed by cues derived from the visual, somatasensory (body posture), and vestibular (inner ear) systems. In the absence of strong visual information, false perceptions may be generated by misleading vestibular cues. For example, during a balanced banked turn, the vestibular system will, in time, settle and respond as though the aircraft was in a straight and level attitude. If the aircraft is then returned to the horizontal, the sensory system is again disturbed and will signal this as a bank away from the horizontal.

In addition, if an aircraft is subjected to a linear acceleration such as occurs during a go-around, the rotational resultant of the weight and acceleration vectors on the pilot can induce the perception that the nose of the aircraft is pitching up, or is pitching up even further than the desired attitude.

Any pilot flying in cloud conditions without good visual cues may become subject to these factors which are conducive to spatial disorientation. Those with no training in instrument flying are especially vulnerable.

Restoration of adequate external visual reference almost invariably regenerates an accurate perception of orientation.

It is only through comprehensive and supervised training that the ability to recognise an aircraft's attitude, speed and direction is gained by the sole reference to its flight instruments, coupled with an understanding of their interelationship. Instrument flying training also instills the necessity, under such conditions, for the application of moderate, smooth and accurate control inputs in order to reduce the rate-of-change of aircraft attitude, thereby minimising those effects which can induce spatial disorientation.

1.18 New investigation techniques

None.

2 Analysis

2.1 The aircraft

The aircraft had valid Certificates of Airworthiness and Registration, and had been maintained to the required standard. Prior to the accident it had been airborne for just over 3 hours with no comment from the pilot as to any change in the status of the aircraft's serviceability, which was satisfactory before take-off. Witnesses state that the aircraft appeared to be intact when it emerged from the cloud and was under a great deal of power. They also remarked on a strong smell of petrol in the area, and a long slick of an oily substance.

Efforts to locate the sunken wreckage were unsuccessful and consequently a detailed examination of the aircraft was not possible. One witness commented on an apparent effort to 'level out' from a spiral descent, and it is probable that the aircraft was under power and capable of being controlled at the time of the collision.

2.2 The pilot

The pilot had achieved a reasonable level of experience for a PPL holder. Despite a slow start, requiring 150 hours to obtain his licence over a three year period, he had flown over 260 hours during the preceeding year, including four flights on the 26th April. He was therefore well in practice. This applied only to the VFR limitations of his licence. There is no logbook evidence of formal instrument flying instruction. In 1985, three instructional flights at night totalling 2 hours 24 minutes were recorded, including a solo flight of 28 minutes.

The pilot had journeyed abroad previously and had undertaken a flight to Exeter and the Scilly Isles in May 1985. He had been accompanied by a more experienced pilot on that occasion but he was obviously confident of his ability to undertake this flight. However, the record of the RTF communications indicates that he was under pressure to maintain VMC as required by his VFR flight plan, to navigate visually when possible, and with the aid of VOR beacons when not in visual contact with the ground. The RTF transcripts and final recording of the primary radar returns to the Ventnor radar head show that the aircraft departed from its intended heading and track on a number of occasions. The descent and re-routing via the SAM VOR would have added to the pressure on the pilot's limited capabilities.

2.3 The flight

The forecast for the pilot's destination was not unreasonable provided that he could remain in VMC en-route. The temporary weather condition at his estimated time of arrival at Exeter (1035 hrs) of 4000 metre visibility and 5 okta stratus at 500 feet, was expected to improve gradually from 1000 hrs onwards.

The significant weather chart forwarded to AAIB, and available at Antwerp, was for FL100 to FL450. Had the pilot not had access to a low level chart, and not noticed the flight level band for the significant weather chart, he would have been aware only of high broken cloud on his intended route.

The weather recorded at Antwerp at 0700 hrs was very good and on the information available, the pilot was quite justified in initiating the flight. However, after reaching the London FIR, it was obviously difficult for the pilot to maintain VMC, and his desired track. A more sensible option might have been to have returned to Antwerp, which was enjoying clear weather, rather than endeavouring to continue the flight to Exeter.

2.4 Air Traffic Control

The aircraft had been flying in uncontrolled airspace, but RTF contact was maintained with all the ATC agencies along the route. All were helpful, and a warning of an obstruction and suggested route to avoid it were offered to the pilot, as was the latest Southampton weather at a later stage. On contact with Southampton the aircraft was cleared to enter the Special Rules Zone at an altitude of 3500 feet. When the northbound Canberra called Southampton and reported at FL40 the controller asked if O-EL could transit the Zone at 3000 feet. This was in order to provide a separation of 1000 feet, and to avoid any possible conflict. This the pilot accepted. When the controller learned of the activity at Bournemouth he again asked if O-EL could accept a re-routing via the SAM VOR and this was also accepted by the pilot.

This accident occurred shortly after the pilot attempted to comply with the last ATC request to turn onto a heading of 360°.

The controller did not know whether the pilot had any type of instrument rating, nor was he required to know. It is considered therefore, that although the ultimate responsibility for the conduct of a flight must rest with the pilot in charge, there exists a questionable omission in the information available to a controller when handling an aircraft in such weather conditions. This is particularly so when light aviation pilots, who may be prone to comply with ATC requests without challenging the associated implications for the continued safety of their flight, are involved.

Had the accident not occurred at that stage, the presence of the aircraft within the control zone under such weather conditions may have endangered other aircraft, due to the pilot's lack of experience or qualification in instrument flying.

In effect, in such situations, the controller cannot rely upon the pilot being able to comply with instructions which may be vital to maintain separation from other aircraft within the zone.

It is considered, therefore, that the CAA should assess the implications of such ATC requests made to a pilot with no instrument flying qualifications, both with regard to the possible effect on the continued safe flight of that, and any other aircraft.

2.5 Summary

The only available evidence is that of RTF transcripts, a primary radar plot, and eyewitnesses who saw the aircraft at a very late stage in its descent.

The aircraft appears to have been intact and under power at the time of the sea impact and collision, and the pilot did not report any difficulty or unusual occurrence to ATC during the preceding three hours of flight.

The en-route weather was such that there were no clearly defined cloud layers, and most probably no reliable visual horizon. After several changes of height and excursions away from suitable headings, the aircraft, on the evidence of the Canberra pilot, was most probably in cloud.

The pilot of O-EL was asked to undertake a reasonably protracted turn to the right of 110°. After three hours of demanding flight, the three basic causes of spatial disorientation may well have been encountered: lack of visual cues; displaced physical cues; and erroneous vestibular sensations. It is therefore considered that spatial disorientation could have caused the pilot to lose control of the aircraft, and he may have only regained visual contact at a stage too late to prevent the aircraft from hitting the sea, and the yacht.

3 Conclusions

(a) Findings

(i) The pilot was properly licenced for the initiation of the flight.

(ii) The aircraft had a valid Certificate of Airworthiness and the remainder of the documentation was in order.

(iii) The aircraft had been maintained to an approved schedule and there were no significant recorded defects.

(iv) The weight and balance of the aircraft were considered to be within the prescribed weight and centre of gravity limitations at take-off, and within limits at the time of the accident.

(v) The pilot continued the flight into weather conditions whereby visual reference would have been seriously impaired.

(vi) The pilot was asked to descend to 3000 feet, almost certainly into cloud.

(vii) Shortly afterwards the pilot was asked to turn right on to a heading of 360°, a turn of 110°.

(viii) It was the pilot's responsibility to accept or decline these requests before entering Special Rules Airspace.

(ix) The pilot was not rated or trained to fly in IMC

(x) The aircraft was seen to dive from the base of low cloud, with audible indications of high engine rpm.

(xi) The aircraft was destroyed by collision with the sea and a yacht.

(xii) The wreckage was not recovered.

(b) Cause

The accident was probably the result of the pilot continuing VFR flight into adverse weather conditions for which he was neither trained nor qualified. The weather, and manoeuvres carried out by the pilot, would have been conducive to spatial disorientation, with consequent loss of control of the aircraft.

4.0 Recommendations

It is recommended that:.

4.1 The Civil Aviation Authority reviews its existing publications which remind pilots that they are responsible for the safe conduct of their flight, and that other than when under positive radar control, the ATC service is 'purely advisory'.

In addition, pilots should be advised that upon initial contact with each ATC unit, they should state, positively, whether they wish to maintain VFR conditions. The CAA should also liase with other regulatory authorities on this aspect to ensure that pilots visiting the U.K. are similarly advised.

4.2 The CAA consider the implications of ATC requests, which may be made to a pilot with no instrument flying qualification, both with regard to the possible effect on the continued safe flight of that, and any other, aircraft.

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