



# Aviation Investigation Final Report

|                                |  |                         |            |
|--------------------------------|--|-------------------------|------------|
| <b>Location:</b>               | Fernandina Bch, Florida                    | <b>Accident Number:</b> | MIA03FA046 |
| <b>Date &amp; Time:</b>        | January 26, 2003, 15:20 Local              | <b>Registration:</b>    | N52513     |
| <b>Aircraft:</b>               | Cessna M337B (O-2A)                        | <b>Aircraft Damage:</b> | Destroyed  |
| <b>Defining Event:</b>         |  | <b>Injuries:</b>        | 4 Fatal    |
| <b>Flight Conducted Under:</b> | Part 91: General aviation - Other work use |                         |            |

## Analysis

The airplane was 7 miles off shore when it collided in a steep angle with water during an aerial survey of whales. The survey was to be done in accordance with a grid pattern, at an altitude of 1000 feet. Once whales were spotted, the flight would descend to 500 to 750 feet, with flaps extended to 10 to 20 degrees, and right turns using a 45-degree bank would be conducted. According to recorded radar data, the flight departed from the grid pattern and did right circling turns in a one mile radius at 1000 feet. The flight descended and leveled at 800 feet before descending to 500 feet with a ground speed of 61 knots last recorded.

Toxicological testing on the pilot revealed: 0.008 ug/ml dextromethorphan detected in blood, dextromethorphan present in urine, ephedrine detected in blood and urine, phenylpropanolamine detected in urine, pseudoephedrine detected in blood and urine. The presence of these drugs indicated the pilot likely used at least one medication for upper respiratory symptoms and one herbal supplement (possibly ephedra) within the 24 hours preceding the accident; however, the pilot was probably not impaired by these substances.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain airspeed while maneuvering at low altitude, which resulted in an inadvertent stall and subsequent collision with the ocean.

## Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: MANEUVERING

Findings

1. LOW ALTITUDE FLIGHT/MANEUVER - PERFORMED - PILOT IN COMMAND
  2. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
  3. (C) STALL - INADVERTENT - PILOT IN COMMAND
- 

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

4. TERRAIN CONDITION - WATER

## Factual Information

### HISTORY OF FLIGHT

On January 26, 2003, about 1520 eastern standard time, a Cessna M337B-O2A, N52513, operated by Environmental Aviation Services, Inc., as a Title 14 CFR Part 91 other work use flight, impacted with the waters of the Atlantic Ocean about 7 miles east of Fernandina Beach, Florida. The airplane was destroyed. The commercial rated-pilot and three passengers received fatal injuries. Visual meteorological conditions prevailed, and a company flight plan was filed. The flight originated from the Fernandina Beach Municipal Airport about 1430.

The flight was a whale survey flight conducted on behalf of Wildlife Trust, a non-profit environmental organization. The mission was reported to be originally funded by NOAA, subsequently subcontracted to the Georgia Department of Natural Resources (GDNR), who then subcontracted to Wildlife Trust. Wildlife Trust assigned contract scientist observers to the flight and contracted with Environmental Aviation Services for the airplane. The accident flight was the second survey flight of the day for the pilot and the three Wildlife Trust employees on board. The first flight originated from Fernandina Beach about 0930 and returned there about 1330. The airplane's main and auxiliary fuel tanks were filled before its departure on the second flight. After takeoff, the airplane proceeded eastbound out over the Atlantic Ocean, climbed to an altitude of 1,000 feet agl, and began to fly a series of east-west track lines spaced 1.5 nautical miles apart.

According to the survey protocol, when a right whale was spotted, the airplane was to break from the survey track, fly directly over the whale, and then circle the whale. Once documentation was completed, the airplane was to return to the track line and continue the survey.

The pilot radioed the survey company at 1447 and 1515 stating that they had spotted some whales. According to the owner of the airplane, the flight would customarily fly at 1,000 feet until a whale was spotted, and then would descend to 750 to 500 feet for closer observations. While tracking a whale, the pilot would bank the airplane to 45 degrees and make right turns only. While circling the whale, the procedure followed was to use approach flaps of 10 to 20 degrees and fly at a speed of 100 knots. After tracking the whale, the pilot would climb the airplane to 1,000 feet and continue the pre-planned survey.

Tracking data from the FAA's Jacksonville TRACON indicated that at 1508:41, the airplane was heading westbound at an altitude of 1,000 feet and a groundspeed of 97 knots. At 1511:04, the airplane began a right turn to the north. Over the next 4 minutes, the airplane executed a series of right 360 degree turns with a turn radius of less than 1 nautical mile. During this time period, the airplane descended initially to 800 feet where it remained for about 2 minutes and

40 seconds before descending further. The last recorded radar return was at 1515:04 and indicated the airplane was heading westbound at an altitude of 500 feet and a groundspeed of 61 knots.

Radar data provided by U.S. Navy FACSAC Jacksonville indicated a similar track for the airplane. The last radar return recorded was at 1520:07 and indicated the airplane was at latitude 030:36:46 N and 081:16:34 W. The reason for the discrepancy in times between the U.S. Navy radar data and the FAA radar data was not determined.

There were no witnesses to the accident. When the airplane did not return to Fernandina Beach Municipal Airport, the operator reported it overdue at 1830, and a search was initiated. The airplane wreckage was located on January 29, 2003, about 7 miles east of Fernandina Beach, in 65 feet of water, at 030:36:49 N latitude and 081:16:50 W longitude. The airplane was recovered from the Atlantic Ocean on February 1, 2003.

#### PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with airplane single and multi-engine land and instrument ratings. Additionally, he held a flight instructor certificate with airplane single and multi-engine land and instrument ratings. He held a second class medical certificate dated May 29, 2002, with no limitations. He was employed by the operator to pilot whale and manatee survey flights. Review of the pilot's logbook indicated that he had a total flight time of approximately 991 hours of which 215 hours were in multi-engine airplanes and about 160 hours were in the accident make and model airplane.

#### AIRCRAFT INFORMATION

The airplane was manufactured in 1967 as a military O-2A. It was transferred from long-term storage on September 10, 1993, at 6,653 hours total airframe time to be converted to civilian use. The FAA normal category airworthiness certificate was issued on May 28, 1996. The airplane was purchased by the operator on February 22, 2002. According to the airplane's maintenance records, the most recent annual inspection was completed on January 2, 2003, at 8,807 hours total airframe time. At the time of the accident, the airplane had flown 45 hours since this annual inspection.

The records indicated that the front engine, a Continental IO-360-D, S/N 56171-R was on the airplane when it was transferred from long term storage, at which time it had accumulated 703 hours since major overhaul. The front engine received a top overhaul on September 7, 1996, at which time it had accumulated 733 hours since major overhaul. The most recent 100 hour inspection on the front engine was completed on January 2, 2003; the logbook entry for this inspection did not include the time since major overhaul. The time since major overhaul of the front engine at the most recent inspection was estimated to be 2,857 hours.

The records indicated that the rear engine, a Continental IO-360-D, S/N 57653-R was installed

on the airplane on June 1, 2002, at which time it had accumulated 27 hours since major overhaul. The most recent 100 hour inspection on the rear engine was completed on January 2, 2003, at which time it had accumulated 690 hours since major overhaul.

Refueling records indicated that the airplane was most recently fueled at the Fernandina Beach Municipal Airport at 1349 on the day of the accident, when it was serviced with 46 gallons of 100 LL aviation fuel.

## METEOROLOGICAL INFORMATION

At 1455, the reported weather conditions at Mayport Naval Station, Mayport, Florida, located approximately 15 nautical miles southwest of the accident site, were wind variable at 6 knots, visibility 7 statute miles, broken clouds at 25,000 feet agl, temperature 13 degrees C, dewpoint -4 degrees C, altimeter 30.20 inches.

## WRECKAGE AND IMPACT INFORMATION

The wreckage was examined on February 2, 2003, by the NTSB investigator-in-charge and representatives from Cessna Aircraft Company, Teledyne Continental Motors, and the FAA. The wings and cabin roof were torn from the fuselage, remaining attached only by control cables. The cabin floor structure was buckled and the cabin sides were torn open. Both wings displayed crushed leading edges and were accordion folded in a span wise direction. Both tail booms were separated, remaining attached to the fuselage only by control cables. All control surfaces were accounted for and remained intact. All control cables were traced and were either intact or exhibited evidence of tensile overload or being cut by recovery personnel. The flap jackscrew was extended 3.2 inches, which according to the Cessna representative, corresponded to a flap setting of 10 degrees. The landing gear was observed in the retracted position. The bladder fuel tanks were compromised and contained seawater. The fuel selector valves sustained impact damage and reliable pre-impact positions could not be determined. A piece of the lower section of the right wing lift strut was retained for examination at the NTSB Materials Laboratory in Washington, DC.

The front engine was intact with the fuel pump, hydraulic pump and right magneto separated. The propeller remained attached to the crankshaft, and both of the blades were bent back 70 to 80 degrees. The throttle, mixture, and propeller controls remained attached. The valve covers and top spark plugs were removed, the crankshaft was rotated, and continuity was confirmed to all of the cylinders and to the rear of the engine. Good hand compression was confirmed on all of the cylinders. The top spark plugs showed normal wear when compared to the Champion Check A Plug card. The fuel pump was broken in half, and the rotating section was missing. The fuel pump drive coupling was intact and undamaged. The fuel manifold was disassembled and water was found in the interior; the diaphragm and spring were intact and undamaged, and the fuel screen was clean. The right magneto had heavy impact damage and was hanging by the ignition harness. The left magneto was in place. Both magnetos had heavy corrosion. They could be rotated, but would not spark. Both were disassembled and

found to be full of water; no internal damage was observed.

The rear engine was intact with all of the accessories attached. The propeller remained attached to the crankshaft, and both blades displayed minimal damage. The throttle, mixture, and propeller controls remained attached. The valve covers and top spark plugs were removed, the crankshaft was rotated, and continuity was confirmed to all of the cylinders and to the rear of the engine. Good hand compression was confirmed on all of the cylinders. The top spark plugs showed normal wear when compared to the Champion Check A Plug card. The fuel pump was intact with no damage; the shaft was free to rotate. The pump was disassembled, no internal damage was observed, and fuel was found in the interior. The fuel manifold was disassembled and fuel was found in the interior; the diaphragm and spring were intact and undamaged, and the fuel screen was clean. Both magnetos were in place and rotated freely, but would not spark. They were disassembled and found to be full of water; no internal damage was observed.

#### MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies of the pilot and the three passengers were performed by the Office of the Medical Examiner, Jacksonville, Florida. Toxicology tests on the pilot were performed by the FAA's Toxicology and Accident Research Laboratory. The tests were negative for carbon monoxide, cyanide and ethanol. The following drugs were detected: 0.008 ug/ml dextromethorphan detected in blood, dextromethorphan present in urine, ephedrine detected in blood and urine, phenylpropanolamine detected in urine, pseudoephedrine detected in blood and urine.

Dextromethorphan is an over-the-counter cough suppressant, available in a large number of preparations, including many multi-symptom cold relievers. Ephedrine is sold as an asthma medication (trade name Primatene) available over-the-counter in tablet form.

Pseudoephedrine is a common decongestant (trade name Sudafed) found in many over-the-counter cold and allergy preparations. Ephedrine and pseudoephedrine are often found together in the herbal supplement "Ma Huang" or "ephedra." Phenylpropanolamine is an over-the-counter decongestant; it is also a metabolite of ephedrine and pseudoephedrine.

#### TESTS AND RESEARCH

The lower section of the right wing lift strut was examined at the NTSB Materials Laboratory in Washington, DC. The failure of the strut was determined to be a result of overstress. No evidence of fatigue was found.

#### ADDITIONAL INFORMATION

The airplane, with the exception of the retained section of the right wing lift strut, was released to a representative of the owner on February 2, 2003. The section of the right wing lift strut was returned to Air and Sea Recovery, Pompano Beach, Florida, following its examination at the NTSB Materials Laboratory in Washington, DC.

## Pilot Information

|                                  |   |  |                |
|----------------------------------|---|--|----------------|
| <b>Certificate:</b>              | Commercial; Flight instructor   | <b>Age:</b>                              | 41,Male        |
| <b>Airplane Rating(s):</b>       | Single-engine land; Multi-engine land   | <b>Seat Occupied:</b>                    | Left           |
| <b>Other Aircraft Rating(s):</b> | None  | <b>Restraint Used:</b>                   |                |
| <b>Instrument Rating(s):</b>     | Airplane  | <b>Second Pilot Present:</b>             | No             |
| <b>Instructor Rating(s):</b>     | Airplane multi-engine; Airplane single-engine; Instrument airplane  | <b>Toxicology Performed:</b>             | Yes            |
| <b>Medical Certification:</b>    | Class 2 Valid Medical--no waivers/lim.  | <b>Last FAA Medical Exam:</b>            | May 29, 2002   |
| <b>Occupational Pilot:</b>       | Yes   | <b>Last Flight Review or Equivalent:</b> | August 6, 2002 |
| <b>Flight Time:</b>              | 991 hours (Total, all aircraft), 160 hours (Total, this make and model), 950 hours (Pilot In Command, all aircraft), 51 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft) |  |                |

## Aircraft and Owner/Operator Information

|                                      |                                      |                                       |                      |
|--------------------------------------|--------------------------------------|---------------------------------------|----------------------|
| <b>Aircraft Make:</b>                | Cessna                               | <b>Registration:</b>                  | N52513               |
| <b>Model/Series:</b>                 | M337B (O-2A)                         | <b>Aircraft Category:</b>             | Airplane             |
| <b>Year of Manufacture:</b>          |                                      | <b>Amateur Built:</b>                 |                      |
| <b>Airworthiness Certificate:</b>    | Normal                               | <b>Serial Number:</b>                 | M3370036 (67-21330)  |
| <b>Landing Gear Type:</b>            | Retractable - Tricycle               | <b>Seats:</b>                         | 4                    |
| <b>Date/Type of Last Inspection:</b> | January 2, 2003 Annual               | <b>Certified Max Gross Wt.:</b>       | 4300 lbs             |
| <b>Time Since Last Inspection:</b>   | 45 Hrs                               | <b>Engines:</b>                       | 2 Reciprocating      |
| <b>Airframe Total Time:</b>          | 8807 Hrs as of last inspection       | <b>Engine Manufacturer:</b>           | Teledyne Continental |
| <b>ELT:</b>                          | Installed, not activated             | <b>Engine Model/Series:</b>           | IO-360-D             |
| <b>Registered Owner:</b>             | Environmental Aviation Services Inc. | <b>Rated Power:</b>                   | 210 Horsepower       |
| <b>Operator:</b>                     |                                      | <b>Operating Certificate(s) Held:</b> | None                 |

## Meteorological Information and Flight Plan

|   |                                  |   |                   |
|---|----------------------------------|---|-------------------|
| <b>Conditions at Accident Site:</b>     | Visual (VMC)                     | <b>Condition of Light:</b>                  | Day               |
| <b>Observation Facility, Elevation:</b> | KNRB,17 ft msl                   | <b>Distance from Accident Site:</b>         | 15 Nautical Miles |
| <b>Observation Time:</b>                | 14:55 Local                      | <b>Direction from Accident Site:</b>        | 225°              |
| <b>Lowest Cloud Condition:</b>          | Unknown                          | <b>Visibility</b>                           | 7 miles           |
| <b>Lowest Ceiling:</b>                  | Broken / 25000 ft AGL            | <b>Visibility (RVR):</b>                    |                   |
| <b>Wind Speed/Gusts:</b>                | 6 knots / None                   | <b>Turbulence Type Forecast/Actual:</b>     | /                 |
| <b>Wind Direction:</b>                  |                                  | <b>Turbulence Severity Forecast/Actual:</b> | /                 |
| <b>Altimeter Setting:</b>               | 30.2 inches Hg                   | <b>Temperature/Dew Point:</b>               | 13°C / -4°C       |
| <b>Precipitation and Obscuration:</b>   | No Obscuration; No Precipitation |   |                   |
| <b>Departure Point:</b>                 | FERNANDINA BCH, FL (55J )        | <b>Type of Flight Plan Filed:</b>           | Company VFR       |
| <b>Destination:</b>                     |                                  | <b>Type of Clearance:</b>                   | None              |
| <b>Departure Time:</b>                  | 14:30 Local                      | <b>Type of Airspace:</b>                    | Class G           |

## Wreckage and Impact Information

|                            |         |                             |                      |
|----------------------------|---------|-----------------------------|----------------------|
| <b>Crew Injuries:</b>      | 1 Fatal | <b>Aircraft Damage:</b>     | Destroyed            |
| <b>Passenger Injuries:</b> | 3 Fatal | <b>Aircraft Fire:</b>       | None                 |
| <b>Ground Injuries:</b>    | N/A     | <b>Aircraft Explosion:</b>  | None                 |
| <b>Total Injuries:</b>     | 4 Fatal | <b>Latitude, Longitude:</b> | 30.613611,-81.280555 |



## Administrative Information

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|--|--|
| <b>Investigator In Charge (IIC):</b>     | Yurman, Alan   |
| <b>Additional Participating Persons:</b> | Gary A Vidak; FAA, Orlando FSDO; Orlando, FL<br>Emile J Lohman; Cessna Aircraft Company; Wichita, KS<br>John T Kent; Teledyne Continental Motors; Mobile, AL |
| <b>Original Publish Date:</b>            | July 7, 2005   |
| <b>Last Revision Date:</b>               |  |
| <b>Investigation Class:</b>              | <a href="#">Class</a>  |
| <b>Note:</b>                             |  |
| <b>Investigation Docket:</b>             | <a href="https://data.nts.gov/Docket?ProjectID=56393">https://data.nts.gov/Docket?ProjectID=56393</a>  |

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).