

NATIONAL TRANSPORTATION SAFETY BOARD

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AIRCRAFT ACCIDENT REPORT

DOWNEAST AIRLINES

Scheduled Air Taxi

Piper PA-31, N595DE

Augusta State Airport

Augusta, Maine

August 19, 1971



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Adopted: DECEMBER 29, 1971

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this document may be better
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16. Abstract At approximately 2340 e.d.t. on August 19, 1971, Downeast Airlines Flight 88, a scheduled air taxi flight, utilizing a Piper PA-31, N595DE, crashed about 4 miles short of Augusta State Airport while attempting an approach to Runway 17. The approach was being made in instrument conditions. Augusta State Airport is served by a VOR with DME capabilities requiring a nonprecision VOR approach. The weather conditions were above minimums but required an instrument approach. The pilot and two passengers were fatally injured, two passengers received serious injuries and three passengers received minor injuries. The National Transportation Safety Board determines that the probable cause of this accident was the improper action of the pilot in discontinuing the execution of a nonprecision instrument approach and attempting to maintain visual flight while operating in instrument flight conditions at an altitude below the level of obstructing terrain.			
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DOWNEAST AIRLINES
SCHEDULED AIR TAXI
PIPER PA-31, N595DE
AUGUSTA STATE AIRPORT
AUGUSTA, MAINE
AUGUST 19, 1971

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SPECIAL NOTICE

This report contains the essential items of information relevant to the probable causes and safety messages to be derived from this accident. However, for those having a need for more detailed information, the original factual report on the accident is on file in the Washington office of the National Transportation Safety Board. Upon request the report will be reproduced commercially at an average cost of 15¢ per page for printed matter and 75¢ per page for photographs, plus postage. (Minimum charge \$1.00.)

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**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20591
AIRCRAFT ACCIDENT REPORT**

Adopted: December 29, 1971

**DOWNEAST AIRLINES
SCHEDULED AIR TAXI
PIPER PA-31, N595DE
AUGUSTA STATE AIRPORT
AUGUSTA, MAINE
AUGUST 19, 1971**

SYNOPSIS

At approximately 2140, eastern daylight time, August 19, 1971, Downeast Airlines, Inc., a scheduled air taxi Flight 88, Piper PA-31, N595DE, crashed while it was executing an approach to Runway 17 at Augusta State Airport, Augusta, Maine.

The pilot and two passengers received fatal injuries, two passengers received serious injuries and three passengers received minor injuries.

The National Transportation Safety Board determines that the probable cause of this accident was the improper action of the pilot in discontinuing the execution of a nonprecision instrument approach and attempting to maintain visual flight while operating in instrument flight conditions at an altitude below the level of obstructing terrain.

INVESTIGATION

Downeast Flight 88, a scheduled air taxi flight, departed Logan International Airport, Boston, Massachusetts, at 2028, ^{1/} with one pilot and seven passengers. The flight received an IFR ^{2/} clearance to the Augusta State Airport, Augusta, Maine, via V-3 airway to maintain 7,000 feet. Flight 88 reported to Augusta FSS ^{3/} that it was over the Augusta VOR/TAC ^{4/} at 2107. The flight was cleared for a VOR ^{5/} approach at 2114. At 2127, Flight 88 reported a missed approach and was cleared for another VOR approach at that time. At 2140, the flight reported "four miles out." This was the last known transmission made by the flight. Augusta FSS initiated a call to Flight 88 at 2142 and the flight failed to respond to this call. All other attempts to establish communications with Flight 88 were unsuccessful.

The aircraft wreckage was located in a heavily wooded area on Allen Hill at approximately the 520-foot level. Allen Hill is a prominent terrain feature which is 640 feet high, located approximately 4 nautical miles from the threshold of Runway 17 and eight-tenths of a mile west of the approach radial. All aircraft components were found along a wreckage path extending 325 feet from the point of initial impact on a bearing of 170°. The aircraft had cut a level swath through the tops of the trees between the initial and final impact points. The aircraft was destroyed.

The pilot and two passengers received fatal injuries, two passengers received serious injuries and three passengers received minor injuries.

The aircraft was configured with seats for nine persons including a pilot and a copilot. One of the passengers who was fatally injured was occupying the copilot's seat. ^{6/} He was not aeronautically qualified. The copilot's position is equipped with a full set of aircraft controls.

^{1/} All times used herein are eastern daylight, based on the 24-hour clock.

^{2/} Instrument Flight Rules.

^{3/} Flight Service Station.

^{4/} Very High Frequency OMNI Range Station and Distance Measuring Equipment.

^{5/} Very High Frequency OMNI Range Station.

^{6/} When a second pilot is not required, the certificate holder may permit a passenger to occupy the copilot's seat when the aircraft is certificated with eight or less passenger seats. See Section 135.53 of the Federal Aviation Regulations.

Examination and inspection of the aircraft's wreckage disclosed that:

1. The aircraft's main and nose landing gears were extended and locked.
2. There were no separations of structural components prior to impact.
3. Control cables and push-pull tubes to all control surfaces were secure. Control surfaces were also securely attached and were free to move.
4. There was no water or other obstruction in any portion of the airplane's pitot static system.
5. Disassembly and examination of the aircraft's engines disclosed no evidence of failures or malfunctions.

The aircraft's two VHF ^{7/} navigation receivers and components were damaged to an extent that precluded functional testing. However, they were functionally checked at Logan International Airport, Boston, Massachusetts, at 0805, with no bearing errors noted. The airborne DME ^{8/}, a King Radio, Model 60B, was functionally tested. The unit performed within the prescribed tolerance of 1/2 mile.

The aircraft's VHF navigation receivers, communication receivers/transmitters and DME were found in the "on" position. Frequency selection for these units as found were: Set No. 1 Navigation - 111.4 MHz; Course Selector - 166°; Communications - 122.6 MHz. Set No. 2 Navigation - 111.4 MHz; Course Selector - 166°; Communications 134.1 MHz; DME - 111.4 MHz; Distance - 0 nautical miles.

The autopilot was found damaged to the extent that a functional test was precluded. Mode selector was set to LDC/Norm ^{9/}. Altitude hold was set to 3,000 feet. The unit's power switch was found in the "off" position. There was no record of recent autopilot malfunction.

^{7/} Very High Frequency.

^{8/} Distance Measuring Equipment.

^{9/} Localizer - Normal

Section 135.77 of the Federal Aviation Regulations provides an exception to the requirement for a second pilot if the aircraft is equipped with an operative autopilot system and the use of that system is authorized by appropriate operations specifications. Downeast's operations specifications authorized the use of the autopilot system in lieu of a second pilot.

The aircraft's two altimeters were found substantially damaged. The pointers on both instruments were separated and not recovered. The inner components were bent and twisted. No functional tests were made on these instruments. Both altimeter settings were found at 30.00 inches, corresponding to the reported altimeter setting for Augusta, Maine, during the period the approaches were made. The pilot's altimeter had been functionally tested on May 11, 1971, and the copilot's on April 23, 1971. The units were operating within the prescribed tolerances at the time of the tests.

The surface weather charts showed a low pressure center moving northeastward along the Atlantic Coast from a point near southern New Jersey at 1700 to the eastern tip of Long Island at 2300. A general onshore flow of air was shown north of the low center.

Official surface weather observations from Augusta State Airport at the times indicated were:

- 1958 - partial obscuration, estimated 800 feet broken visibility 1-1/2 miles, fog, temperature 68° F., dew point 64° F., wind 130°, 10 knots, altimeter setting 30.00 inches, fog obscuring 7/10 of sky.
- 2058 - partial obscuration, visibility 1-1/2 miles, fog, temperature 66° F., dew point 64° F., wind 160°, 8 knots, altimeter setting 30.00 inches, fog obscuring 7/10 of sky.
- 2158 - indefinite 600-foot ceiling, sky obscured, visibility 1 mile, fog, temperature 65°, dew point 63°, wind 150°, 4 knots, altimeter setting 30.00 inches.

2258 - Record Special, indefinite 200 feet ceiling, sky obscured, visibility 3/4 mile, fog, temperature 64°, dew point 62°, wind 180°, 8 knots, altimeter setting 29.99 inches.

Terminal forecast issued for Augusta which was valid at the time of Flight 88's departure from Boston, Massachusetts, was issued at 1840, valid for a 12-hour period beginning at 1900. That forecast was, in part, as follows:

1900-2200 - 1,000 scattered, visibility 3 miles, haze, wind 180°, 12 knots, scattered clouds variable to broken.

2200-0000 - Ceiling 1,000 overcast, wind 180°, 10 knots.

At 2040, the Augusta terminal forecast was amended and was, in part, as follows:

2040-0300 - partial obscuration, ceiling 600 broken, visibility 2 miles, fog, wind 180°, 10 knots.

The National Weather Service at Boston, Massachusetts, did not have a record that Flight 88 received a weather briefing at that station.

Augusta State Airport is situated 1 mile northwest of Augusta, Maine. Air Traffic Control Service at Augusta State Airport is provided by advisories from Augusta FSS which is located on the Augusta Airport. IFR air traffic arriving at and departing from Augusta Airport is under the control of Boston Air Route Traffic Control Center, with Augusta FSS acting as a communication relay station.

Instrument approach procedures at the Augusta State Airport require the use of the Augusta VOR/TAC which is located on the airport. Approach procedures are depicted in Appendix D.

A Jeppesen Approach Chart for Augusta State Airport VOR Runway 17, dated October 17, 1969, was found in the aircraft wreckage, attached to a pilot's clipboard. The approach procedures on this chart were in accordance with those listed on the approach

chart published for Augusta State Airport VOR Runway 17 by the Coast and Geodetic Survey, Department of Commerce, dated October 23, 1969. There had been no revisions to this chart since that date.

The navigation facilities at Augusta State Airport were flight tested on August 21, 1971, by the Federal Aviation Administration (FAA) and were found to be operating within the specified tolerances of 1° left or right of the radials. Augusta FSS logs disclosed normal operation of the two VHF transmitters. The DME transmitter logs disclosed no outages for August 19, 1971.

A surviving passenger stated:

The plane, which had been due to leave Boston for Rockland, Maine, at 8:15 p. m., left with some delay. We were informed that due to fog conditions it would not land at Rockland, Maine, but at Augusta and that we would be driven from Augusta to Rockland. There was one pilot who sat in the left seat. A gentleman, in civilian clothes, took the seat next to the pilot and I noticed that he also wore earphones. The flight was uneventful. We flew along the coast and then turned inland. Upon our approach to Augusta it became very foggy. I looked outside the window and saw that we were flying very low over hills which were covered with fog. From time to time lights of buildings were visible. Then the lights of a city, presumably Augusta, came in sight. The plane appeared to turn and the lights of the city disappeared again. Then the plane prepared to land which I could tell by the fact that the wheels were lowered. After a while, however, the plane accelerated again and pulled in its wheels, gaining height. I gathered from this that the plane had attempted a landing and had been unsuccessful. I heard the gentleman next to the pilot say to him, 'I can't see a damned thing.' The plane then made another turn and again appeared to make an approach for the landing. The wheels were lowered. I heard the pilot talking into the microphone but could not hear anything that was said to him by the control tower. Seconds later there was the crash. At no time did the pilot inform us that he was trying to land, that seatbelts had to be fastened or give any warning remark. The pilot appeared calm and I did not hear any unusual

engine noise or notice anything else which would have lead me to believe that there was a defect in the engine. I had, however, noticed when looking out of the window that we were quite close to the ground and by reason of that had become very nervous.

The captain, the only crewmember, held a Commercial Pilot Certificate No. 2011802 with ratings of airplane single- and multi-engine land, rotorcraft (Helicopter) and instrument ratings. His second-class medical certificate was dated October 5, 1970. The captain completed his FAA competency check to pilot a Piper PA-31 aircraft under IFR flight conditions on July 12, 1971.

ANALYSIS

There was no failure or malfunction of the aircraft prior to impact with the trees. The aircraft was certificated and maintained in accordance with applicable regulations. The pilot was certificated and qualified for the operation involved.

Dowreast Airlines Flight 88 was cleared for a VOR approach to Augusta State Airport at 2114. This approach resulted in a missed-approach, which the pilot reported to the Augusta FSS at 2127. The flight was cleared immediately for another approach and at 2140, reported "four miles out." The passenger's observation placed this call seconds prior to the crash. The ability to report the distance out strongly suggests a properly functioning DME. With an operable DME the pilot should have had no difficulty in locating the 3-mile DME fix as required for a VOR approach.

The Jeppesen Approach Chart found in the aircraft wreckage, attached to the pilot's clipboard, indicated a VOR approach to Runway 17 is made on a magnetic heading of 166°. Minimum altitude to which the aircraft can descend inbound to the 3-mile fix is 1,020 feet m. s. l. ^{10/} (668 feet above the runway elevation). After departing the 3-mile DME fix the aircraft should be descended to 680 feet m. s. l. (328 feet above the runway elevation). The minima, with operable DME, are: ceiling 400 feet, visibility 1 mile. Surface weather observations for Augusta State Airport

^{10/} Mean Sea Level.

taken before and after the accident indicated the conditions to be better than the established minimums.

The Weather Service forecast valid for Augusta State Airport at the time Downeast Flight 88 departed Logan International Airport indicated weather conditions were expected to be a little better than they actually were. The 2040 amended Augusta Terminal forecast for the period 2040-0300 was closer to the actual conditions existing at the time of the accident as evidenced by the 2158 surface weather observation taken at Augusta State Airport. There was no evidence to indicate that the pilot either solicited or received a preflight weather briefing. The extent and source of in-flight weather information the pilot may have secured is unknown.

The weather conditions at the Augusta State Airport and along the approach path to Runway 17 were such as to permit occasional observation of the ground. This was attested to by the surviving passenger who stated, "...we were flying low over hills that were covered with fog. From time to time lights of buildings were visible." During discussions with the investigators, this survivor also noted that the pilot and the passenger in the copilot's seat had directed their attention outside the aircraft at times during the approaches.

The aircraft wreckage was located approximately 4 nautical miles from the threshold of Runway 17 at an elevation of 520 feet and eight-tenths of a mile west of the approach radial. The aircraft had cut a level swath through the trees before it struck the rising ground indicating that the flightpath had been level at approximately 520 feet m. s. l. for at least a short period before making contact with ground obstacles.

Based on the location of the crash site, it is apparent that the aircraft had descended more than 500 feet below the 3-mile DME minimum altitude while still more than a mile from the fix. In addition, the aircraft was approximately 1 mile to the right of the desired VOR radial of 166°. If the pilot had been making a VOR approach in accordance with the published procedures, he should have been closer to the 166° radial and not lower than 1,020 feet m. s. l. until after passing the 3-mile DME fix inbound.

The destruction of the autopilot precluded testing the unit to determine if it was operable prior to impact. No information was available to determine if the autopilot was used at all during

this flight. The fact that the power switch for the autopilot was found in the "off" position is not conclusive with respect to its position prior to impact since the impact forces could have resulted in the movement of the switch.

No evidence of error was found in the altimeter system. The possibility that the pilot misread the altimeter as 1,500 feet while the aircraft was actually at 500 feet is worthy of consideration. Two points, however, negate this as a causal area in this accident: (1) If the pilot had been making a VOR approach in accordance with the published procedures, he would have been looking for an altimeter reading of 1,020 feet as he approached the 3-mile DME fix. If he mistook a 500 foot reading for 1,500 feet he would consider he was too high and would have placed the aircraft in a descent. The swath through the trees at the impact point indicates the aircraft was in level flight. Therefore, the conclusion must be drawn that the pilot was not concerned with his altitude. (2) Since it was possible for the pilot to see the ground occasionally during the approach, he should have been aware of his proximity to the ground, which would void the possibility that he misread the altimeter.

Since there was a lapse of 13 minutes between the time the pilot reported his missed-approach to Augusta FSS and his report of "four miles out," the Board believes that the pilot initially followed the procedures for a missed-approach. However, because of the wide deviation from an acceptable VOR approach path, both horizontally and vertically, and the apparent ability of the pilot to see the ground occasionally, the Board concludes that the pilot discontinued the VOR approach and attempted to continue the landing through visual contact with the ground. The Board further concludes that the altimeter was indicating properly and the pilot, although aware of the 500-foot reading, believed it would give him sufficient altitude to clear ground obstacles between his position and the runway.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the improper action of the pilot in discontinuing the execution of a nonprecision instrument approach and attempting to maintain visual flight while operating in instrument flight conditions at an altitude below the level of obstructing terrain.

RECOMMENDATION

Although the National Transportation Safety Board did not make a formal recommendation, it believes that if the pilot had continued to fly in accordance with the approved VOR approach procedures it is most likely that the flight would have culminated in a successful landing.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ OSCAR M. LAUREL
Member

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

December 29, 1971

APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

The National Transportation Safety Board received notification of the accident at 2230 e. d. t., on August 19, 1971. The Investigator in Charge was dispatched immediately to the scene from the New York Office at John F. Kennedy International Airport, with technical assistance from Washington, D. C. Working groups were established for air traffic control, electronics, powerplants, aircraft and maintenance. Parties to the investigation were Downeast Airlines, Inc., Federal Aviation Administration and the Department of Aeronautics, State of Maine. The on-scene phase of the investigation was completed in 2 days. Tests of the DME were conducted at the King Radio Manufacturing Co., Olathe, Kansas. The engines were examined at Rockland, Maine, by Board personnel.

2. Hearing

There was no public hearing.

APPENDIX B

CREW INFORMATION

The pilot-in-command, Captain Dwight French, Jr., aged 40, held a Commercial Pilot Certificate No. 2011802 as well as a current second-class FAA medical certificate without limitations. Captain French was rated for multiengine land and single-engine land fixed-wing aircraft and rotorcraft. He also held an instrument rating.

Captain French, during the past 5 years had a total flying time of 3,100 hours, 625 of which were in a Piper PA-31 model aircraft.

APPENDIX C

AIRCRAFT INFORMATION

The aircraft, a Piper PA-31, serial No. 31-422, was certified in the normal category on March 28, 1969. It was maintained under a progressive maintenance program. It was last inspected on August 14, 1971, at which time the total time on the aircraft was 2,468 hours.

The aircraft was equipped with two Lycoming engines and Hartzell propellers.

<u>No.</u>	<u>Make and Model</u>	<u>Serial Number</u>
1	Lycoming T10-540 A2B	L-778-61
2	Lycoming T11-540 A2B	L-1470-61
1	Hartzell C8468-6R	DJ134
2	Hartzell C8468-6R	DJ144

The No. 1 engine had a total time of 996 hours and the No. 2 engine had a total time of 960 hours. Each propeller had a total time of 960 hours.

