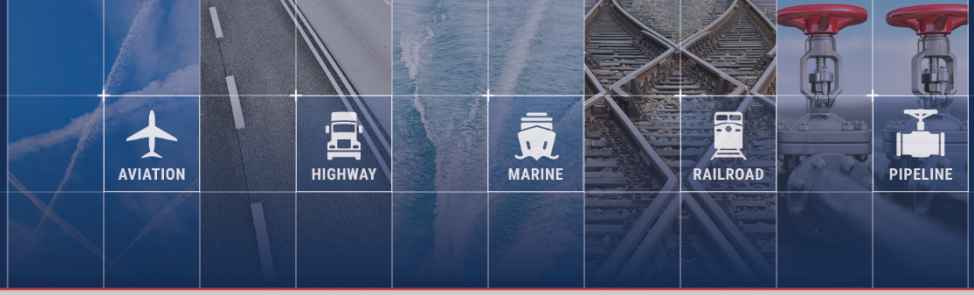

Aviation Investigation Factual Report

Location:	Vineyard Haven, Massachusetts	**Accident Number:**	NYC08FA324
Date & Time:	September 26, 2008, 20:03 Local	**Registration:**	N770CA
Aircraft:	Cessna 402	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Positioning		

Factual Information

HISTORY OF FLIGHT

On September 26, 2008, about 2003 eastern daylight time, a Cessna 402C, N770CA, was destroyed when it impacted terrain shortly after takeoff from the Martha's Vineyard Airport (MVY), Vineyard Haven, Massachusetts. The certificated airline transport pilot was killed. Instrument meteorological conditions prevailed and an instrument flight rules flight plan had been filed for the flight destined for the General Edward Lawrence Logan International Airport (BOS), Boston, Massachusetts. The positioning flight was operated by Hyannis Air Service, doing business as Cape Air, under the call sign "care ten fifty five." The flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

According to information obtained from the Federal Aviation Administration (FAA), and Midwest ATC Service, the operator of the MVY air traffic control tower, the pilot reported "ready for taxi" and was instructed to taxi to runway 24, at 1958. The pilot requested to depart from, and was subsequently instructed to taxi to, runway 33. The airplane was cleared for takeoff from runway 33, a 3,297-foot-long, 75-foot-wide, asphalt runway, at 1959:50. After takeoff, the pilot was instructed to climb to an altitude of 4,000 feet, and make a right turn to a heading of 360 degrees. The instructions were acknowledged by the pilot at 2001:53. At 2002:03, the pilot transmitted "and ten fifty five." There were no further communications from the airplane.

Radar data depicted the airplane climbing at an altitude of 400 feet, and accelerating to a ground speed of 120 knots shortly after takeoff. The airplane made a slight left turn, before entering a right turn which continued until radar contact was lost at an altitude of 700 feet, and a ground speed of 160 knots.

A witness near the accident site reported hearing the sound of a low flying airplane. He described the engine noise as "very loud, like the airplane was at full-throttle." He then heard a loud crashing sound.

The airplane struck the tops of approximately 50-foot-tall trees before impacting in a wooded area in-between two houses, about 3 miles northwest of MVY.

PERSONNEL INFORMATION

The pilot, age 61, held an airline transport pilot certificate, with a rating for airplane multiengine land. He also held a commercial pilot certificate, with ratings for airplane single-engine land and instrument airplane. In addition, the pilot held a type rating for Boeing 747, Douglas DC-8, and Lockheed L-382 airplanes.

Prior to his employment at Cape Air, the pilot flew Boeing 747s on international cargo flights. According to company records, the pilot was hired on May 2, 2005, and based at MVY. At the time of the accident, the pilot had accumulated approximately 16,746 hours of total flight experience, which included 2,330 hours in the same make and model as the accident airplane. His most recent regulatory checkride was conducted on August 2, 2008.

The pilot's logbooks which were provided by his family were not current. Company flight records revealed that the pilot had not logged any instrument meteorological flight experience during the 12 months, and 0.2 hours during the 24 months that preceded the accident; respectively. He had logged 168 instrument approaches during the 12 months preceding the accident. The pilot had flown about 200 hours, and 35 instrument approaches during the 90 days that preceded the accident.

A Cape Air representative stated that it was likely that the pilot had accumulated more instrument flight experience than was indicated in his flight records. He believed that due to the pilot's age and experience, the pilot might have only logged the minimum experience necessary to meet currency requirements. Company records pertaining to another pilot, who was based at MVY, revealed that pilot had logged about 130 hours of instrument flight experience during the 12 months preceding the accident.

The pilot's most recent FAA first-class medical certificate was issued on September 16, 2008.

The pilot had been off-duty during the 3 days preceding the accident. He was scheduled to report for duty at 1200, and he had completed a round trip flight from MVY to BOS prior to the accident flight.

AIRCRAFT INFORMATION

The ten-seat, low-wing, retractable-gear airplane, serial number 402C0432, was manufactured in 1981. It was powered by two Teledyne Continental Motors TSIO-520-VB series, 325-horsepower engines, each equipped with a McCauley propeller.

The airplane was maintained utilizing an approved inspection program and had been operated for about 26,810 hours at the time of the accident. Review of the airplane’s maintenance records revealed that it had been operated for about 40 hours since its most recent phase inspection, which was performed on September 17, 2008.

The airplane's most recent pitot-static system test was conducted on March 7, 2007.

The left engine was manufactured on May 29, 2006. It was installed on June 16, 2006, and had been operated for about 2,520 hours since new.

The right engine was manufactured on September 25, 2006. It was installed on January 6, 2007, and had been operated for about 1,930 hours since new.

A pilot, who flew the accident airplane for 3 hours on the date of the accident, and 17.4 hours during the week preceding the accident, reported that he experienced no performance or operational abnormalities. Two other pilots, who flew the accident airplane on the date of the accident, also stated that they did not experience any mechanical issues during their flights.

METEOROLOGICAL INFORMATION

A weather observation taken at MVY at 1953, reported: wind from 110 degrees at 6 knots; visibility 5 statute miles with light rain and mist; overcast ceiling at 400 feet; temperature 19 degrees Celsius (C); dew point 18 degrees C; altimeter 30.17 inches of mercury.

Review of a National Weather Service "rawinsonde" sounding from the Chatham, Massachusetts, site number 74494, indicated a surface wind from 125 degrees true at 9 knots, veering to the south with height. A low-level wind maximum was noted immediately above a low-level temperature inversion with winds from 135 degrees at 39 knots at 1,300 feet mean sea level. The sounding further indicated a greater than 90 percent chance of severe turbulence below 2,000 feet, to the surface.

A Cessna 402 operated by Cape Air, destined for Providence, Rhode Island, departed from runway 24 at MVY, approximately 1 minute after the accident flight. The pilot of that flight did not report any unusual weather during his initial climb and described the turbulence below 1,000 feet as "light."

AERODROME INFORMATION

The Martha's Vineyard Airport was operated by the Martha's Vineyard Airport Commission. The airport was positioned at 41 degrees, 23.58 minutes, north latitude; 70 degrees, 36.86 minutes, west longitude, at an elevation of 67 feet above sea level.

FLIGHT RECORDERS

The airplane was not, nor was it required to be equipped with a cockpit voice recorder or flight data recorder.

WRECKAGE AND IMPACT INFORMATION

All major portions of the airplane were accounted for at the accident site.

The majority of the wreckage was strewn along a 305-foot-long debris path, which was oriented on a heading about 285 degrees magnetic. Three cuts, consistent with propeller strikes were observed on the northwest corner of a rooftop, 60 feet from the initial tree strike. In addition, a 12-inch diameter tree located 83 feet from the initial tree strike contained an approximate 3-foot-long vertical cut, which varied from 3 to 5 inches in depth. The cut

contained black paint transfer. An impact crater that measured about 9 feet wide, and 20 feet long, was observed just beyond the tree. A second impact crater, which measured 6 feet wide and 20 feet long, was located 137 feet from the initial tree strike.

The fuselage came to rest oriented vertically, and was partially wrapped around a tree that was located 160 feet from the initial tree strike. The sides and roof of the cabin, the cockpit, the nose section, and the instrument panel were destroyed. The inboard portion of the left wing, with its landing gear extended about 30 degrees, was located with the fuselage. The outboard portion of the left wing was located 223 feet from the initial tree strike. The majority of the right wing was located at the base of a tree, 197 feet from the initial tree strike. The right landing gear was observed in the retracted position. The nose landing gear assembly was separated and located 205 feet from the initial tree strike.

Flight control cable continuity was confirmed from the main wing spar to the elevator and rudder control bellcranks. Aileron flight control cable continuity could not be confirmed due to impact damage.

The left engine was located approximately 175 feet beyond the initial tree strike, in an inverted position. The left propeller assembly was observed approximately 137 feet beyond the initial tree strike and was partially buried within the second impact crater.

The right engine was located about 530 feet beyond the initial tree strike, in an upright position. The right propeller was observed approximately 100 feet beyond the initial tree strike, on the right side of the first impact crater.

Both propeller assemblies exhibited "s" bending, chordwise scratches and leading edge damage. One propeller blade was separated from the left propeller hub. All other blades were loose within their respective hub assemblies.

Both engines and propellers were recovered to a hanger at MVY airport for further examination. The examinations did not reveal evidence of any catastrophic failures. The crankshafts on both engines were rotated through their normal travel through an accessory gear drive gear. Both engines and propellers were retained for further examination.

The right vacuum pump body was separated and not located; however, the frangible drive coupling remained attached to the engine and was not damaged. The left vacuum pump was separated from its mount and located in the debris path. The frangible drive coupling was undamaged and disassembly of the pump revealed that the vanes and rotor were not damaged.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot, on September 28, 2008, by the Commonwealth of Massachusetts, Office of the Chief Medical Examiner, Boston, Massachusetts. The autopsy

report indicated the cause of death as blunt trauma, and listed multiple traumatic injuries.

Toxicological testing was performed on the pilot by the FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma. The reported noted the presence of "Quinine" detected in the pilot's blood.

Quinine could be found in tonic water, used to treat severe malaria, and used to reduce the frequency of nocturnal leg cramps. The pilot's wife reported that he was not taking any medications. The pilot began taking a multivitamin about one month prior to the accident; however, it did not contain Quinine.

TESTS AND RESEARCH

On January 13-14, 2009, both engines and their respective turbochargers were disassembled and examined at Teledyne Continental Motors, Mobile, Alabama, under the supervision of an NTSB investigator. The examinations did not reveal any abnormalities, which would have precluded normal engine operation.

Disassembly of both propellers at McCauley Propeller Systems, Wichita, Kansas, under the supervision of an FAA inspector, did not reveal any preimpact failures. All propeller blades displayed evidence of rotation and operation under conditions of power at the time of impact. According to a representative from McCauley, the exact blade angle for both propellers could not be determined; however, the propeller piston rod damage location along each respective rod's length was in the same lateral position, which indicated that both propellers were operating at approximately the same blade angle at impact.

The gyros from the pilot's attitude indicator, horizontal situation indicator (HSI), and the copilot's attitude indicator and directional gyro where forwarded to the NTSB Material's Laboratory, Washington, DC, for further examination. The examination did not reveal any evidence of rotational scoring on any of the gyro housings, and on the rotors associated with the pilot's gyros. Some minor circumferential scratches were noted on the rotors associated with the copilot's gyros. It was noted that the gyros were not severely damaged; and it was not possible to determine if they were operating at the time of the accident.

ADDITIONAL INFORMATION

Company/Operator Information

Cape Air was an independent regional airline, which began service in 1989. The company was based in Hyannis, Massachusetts, and at the time of the accident operated 51 Cessna 402 series and 2 ATR-42 series airplanes. The company held both Part 135 and Part 121 FAA operating certificates. The Cessna 402s were operated under Part 135 and in service domestically and in the Caribbean. The ATR-42s were operated under Part 121 and were in service in Micronesia.

Performance Study

A performance simulation for the accident flight was created by an NTSB National Resource Specialist in aircraft performance, using radar data obtained from the FAA. The simulation revealed that the airplane's performance during the initial climb, specifically, the performance recorded by the radar data between the start of the data at 2000:58, and 2001:28 corresponded to about one 325-horsepower engine driving a propeller with about 75 percent efficiency. However, the 1,200 feet/minute rate of climb between 2002:08 and 2002:25 was consistent with full-power on both engines. In addition, the observed airspeeds remained above the minimum controllable airspeed during the entire simulation.

Sun Data

According to data obtained from the U.S. Naval Observatory, sunset occurred at 1832, and the end of civil twilight was at 1900.

Pilot Information

Certificate:	Airline transport	**Age:**	61,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	September 16, 2008
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 2, 2008
Flight Time:	16746 hours (Total, all aircraft), 2330 hours (Total, this make and model), 13930 hours (Pilot In Command, all aircraft), 198 hours (Last 90 days, all aircraft), 109 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N770CA
Model/Series:	402 C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	402C0432
Landing Gear Type:	Retractable - Tricycle	**Seats:**	10
Date/Type of Last Inspection:	September 17, 2008 AAIP	**Certified Max Gross Wt.:**	7210 lbs
Time Since Last Inspection:	39 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	26809 Hrs at time of accident	**Engine Manufacturer:**	TCM
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520VB
Registered Owner:	Hyannis Air Service	**Rated Power:**	325 Horsepower
Operator:	Hyannis Air Service	**Operating Certificate(s) Held:**	Commuter air carrier (135)
Operator Does Business As:	Cape Air/Nantucket Airlines	**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	MVY,67 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	19:53 Local	**Direction from Accident Site:**	20°
Lowest Cloud Condition:		**Visibility**	5 miles
Lowest Ceiling:	Overcast / 400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	110°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	19°C / 18°C
Precipitation and Obscuration:			
Departure Point:	Vineyard Haven, MA (MVY)	**Type of Flight Plan Filed:**	IFR
Destination:	Boston, MA (BOS)	**Type of Clearance:**	IFR
Departure Time:	20:00 Local	**Type of Airspace:**	

Airport Information

Airport:	Martha's Vineyard MVY	**Runway Surface Type:**	Asphalt
Airport Elevation:	67 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	33	**IFR Approach:**	None
Runway Length/Width:	3297 ft / 75 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	41.422779,-70.659446

Administrative Information

Investigator In Charge (IIC):	Schiada, Luke
Additional Participating Persons:	TR Proven; FAA AAI-100; Washington, DC Tom Moody; Cessna Aircraft Company; Wichita, KS John Kent; Teledyne Continental Motors; Mobile, AL Richard I Bunker; Massachusetts Aeronautics Commission; Boston, MA James S Goddard; Cape Air; Hyannis, MA
Report Date:	February 24, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=69009