Aviation Investigation Final Report

Location:	PROVINCETOWN, Massachusetts	**Accident Number:**	NYC99FA012
Date & Time:	October 9, 1998, 19:44 Local	**Registration:**	N7100L
Aircraft:	Grumman American AA-5	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot initiated an ILS approach in IMC conditions, at night, from over water. After tracking on the localizer and glideslope for part of the approach, the airplane entered a descent and leveled off at 100 feet for about 12 seconds prior to disappearing from radar. No evidence of a mechanical failure or malfunction was found with the airplane. Both wings had sustained moderate impact damage. The outboard portion of the left wing was not recovered. The pilot had told approach control that if he missed, he would request the approach to a nearby airport. The navigation radio frequencies did not match the instrument approach flown, the missed approach, or the planned subsequent approach.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot to follow the published instrument approach procedure, which resulted in inadvertent collision with water. Factors in the accident were the dark night and low ceiling.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: APPROACH

Findings
1. (F) LIGHT CONDITION - DARK NIGHT
2. (F) WEATHER CONDITION - LOW CEILING

3. (C) IFR PROCEDURE - NOT FOLLOWED - PILOT IN COMMAND
4. TERRAIN CONDITION - WATER

Factual Information

HISTORY OF FLIGHT

On October 9, 1998, about 1944 eastern daylight time, a Grumman American AA-5, N7100L, impacted water while on approach to the Provincetown Municipal Airport (PVC), Provincetown, Massachusetts. The certificated private pilot was fatally injured, and the airplane was destroyed. Instrument meteorological conditions prevailed for the personal flight that originated from Albany County Airport (ALB), Albany, New York, about 1750. The flight was conducted on an instrument flight rules (IFR) flight plan under 14 CFR Part 91.

Records from the Federal Aviation Administration (FAA), revealed the pilot received a weather briefing at 1430. The briefer stated in part:

"low pressure off the coast of jersey northeasterly stationary front through coastal cape cod trailing south southwestward stationary front near the atlantic coastline by seven p m low pressure uhh over cape cod northeasterly stationary front and southerly stationary front to a low pressure near cape hatteras and then from there a cold front southbound which will remain uh nearly stationary through midnight...radar is showing wide spread rain showers for your destination that extend from portland down through uh pease and boston and the cape light to moderate to occasionally to isolated strong rain showers...."

At the completion of the briefing, the pilot filed an instrument flight plan to Provincetown, and listed Concord, New Hampshire as his alternate airport. The pilot reported his expected en route time as 1 hour 50 minutes, with 4 hours of fuel onboard.

According to FAA records, N7100L departed the Albany airport, at 1748.

There were no reported problems with the flight until after the ILS Runway 7 approach was initiated.

The pilot established initial radio contact with Cape TRACON at 1920:10. At 1922:28, the pilot transmitted, "zero zero lima the awos at p town [Provincetown, MA] is showing below minimums sir do you have any other suggestion for an alternate on the cape."

Cape TRACON replied, "ah yes sir the hyannis airport is available advise with the atis for that please." The pilot reported that he had the ATIS for Hyannis, Massachusetts. He then requested to make the approach into Provincetown, and advised them that if he was unable to land at Provincetown, he would then divert to Hyannis.

At 1929:07, Cape TRACON transmitted, "grumman zero zero lima roger present heading

join the ils seven final approach course proceed inbound." This was acknowledged by the pilot.

At 1930:10, Cape TRACON transmitted, "grumman zero zero lima is ah eleven miles from phony [intersection] cleared ils runway seven approach." This was acknowledged by the pilot.

At 1937:43, Cape TRACON transmitted, "grumman zero zero lima is four from phony [intersection] frequency change is approved report cancellation as soon as possible on the ground 120.65 have departure traffic waiting." The pilot acknowledged this, at 1937:54.

No further radio transmissions were received from N7100L.

The pilot of a scheduled commuter airline at Provincetown reported that his departure from PVC was held, pending the arrival of N7100L. When N7100L did not arrive, the commuter pilot taxied his airplane on the taxiway to the run-up area adjacent to the approach end of the Runway 7, shut down both engines and exited the airplane. He said the ceiling was about 100 feet, visibility was about 3/4 statute mile, and the wind was estimated to be from 240 to 260 degrees at 6 knots. Rain had been intermittent; however, it was not raining at the approach end of the runway just after N7100L had initiated its approach to Provincetown. He was unable to see or hear the airplane.

The accident occurred during the hours of darkness, near 42 degrees, 3 minutes, 3 seconds north latitude, and 70 degrees, 15 minutes, 57 seconds west longitude.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with airplane single engine land and instrument airplane ratings. He also held a glider rating, limited to aero-tow. He was issued a Third Class Airman Medical Certificate by the Federal Aviation Administration (FAA) on May 5, 1998.

According to the pilot's flight logbook, he had logged a total time of 1,371 hours, with 1,255 hours as pilot-in-command, and 107 hours in the accident airplane. In addition, he had logged 262 hours of night time, and 253 hours of actual instrument flight time, along with 67 hours of simulated instrument flight time. He had last passed an instrument proficiency flight check on May 19, 1998, in a Cessna 172. Logbook records indicated he had logged 9.4 hours of night time, and 6.0 hours of instrument time in the preceding 90 days.

AIRCRAFT INFORMATION

The airplane was a 1974 Grumman-American AA-5. The airplane maintenance records were not recovered, and the date of the last inspection, and total time of the airplane were not determined.

The airplane had last been refueled at Signature Flight Support, Albany, New York, on October 9, 1998, with 14 gallons of 100 low lead aviation grade gasoline, which filled the two wing tanks.

According to FAA records, N7100L was observed on the ramp at Provincetown Municipal Airport on September 8, 1998. Based upon a visual inspection of the airplane, an FAA Inspector placed an Aircraft Condition Notice (FAA Form 8620-1) on the airplane. According to a copy of the original notice that was left on the airplane, the following items were noted:

"1. Left aileron has a hole [in] trailing edge." "2. Landing light not secured. Floating in bottom of engine cowl." "3. Hole in right elevator tip."

According to the condition notice, the airplane required a Special Flight Permit for further operations. The condition notice was followed up with a letter that was sent Certified-Return Receipt Requested. According to the FAA Inspector who signed the condition notice, the letter was returned as unclaimed. The FAA Inspector also reported that he talked to the previous owner of N7100L, who told him the current owner of N7100L had admitted to receiving the condition notice.

During the post accident examination of the airplane, a hole was found on the tip of the leading edge of the right elevator that measured 2 1/2 inches wide and 1 1/2 inches high. In addition, an epoxy like substance was found in a hole that measured about 1/4 inch across, located 11 inches inboard from the tip on the trailing edge of the left aileron. The lower cowling had been crushed rearward and the center portion was missing. No determination could be made on how the landing light was secured.

The wreckage was viewed by the FAA inspector who wrote the condition notice. He reported that the hole on the right elevator tip was in the same condition as when he wrote the condition notice, and the hole in the trailing edge of the left aileron was plugged with an unknown substance. He could not comment on the engine cowling, as that portion was not recovered.

METEOROLOGICAL INFORMATION

The 1954 automatic weather observation from Provincetown reported calm winds, visibility of 3/4 statute mile, an overcast cloud ceiling at 200 feet, and a temperature and dewpoint of 13 degrees Celsius.

AIDS TO NAVIGATION

Provincetown Municipal Airport was served by two instrument approaches. There was an ILS approach to Runway 7, and a GPS or NDB approach to Runway 25. A post-accident flight check on October 11, 1998, of the ILS was satisfactorily completed. Due to the

overwater configuration of the ILS Runway 7 approach, the final approach fix was identified by the localizer final approach course and the 287 degree radial on the MARCONI VOR. It was called PHONY intersection.

During the flight check the ceilliometer was observed to be reporting inaccurately. It was NOTAMED out of service until it could be replaced.

AIRDROME INFORMATION (Destination)

Runway 25 was also equipped with medium intensity runway lights (MIRL), medium intensity approach lights with sequenced flashers (MALSF), and a visual approach slope indicator lighting system on the left hand side of the runway (VASI-L).

A check of the MALSF approach lighting system was conducted by the Massachusetts Aeronautics Commission on October 11, 1998, and no problems were noted.

RADAR AND OTHER REMOTELY RECORDED DATA

Recorded radar data from Cape TRACON revealed the airplane tracked inbound to the airport following the localizer. The last two radar contacts recorded an altitude of 100 feet mean sea level (MSL). The last radar contact occurred at 1943:07, with the airplane 2.07 NM from the approach end of Runway 7, after which no further radar contact was established. There was no record of a signal being received from an emergency locator transmitter (ELT).

Examination of the radar data revealed that the airplane was within the course limits of the localizer at all times. The airplane was observed to approach the glideslope from below, and then as it neared the glideslope, a descent was initiated. Although the computed position of the airplane was always below the glideslope, the airplane was in a descent, maintaining a constant relative position. As the airplane passed through 1,100 feet, the descent rate increased, and continued at an increasing rate until the airplane reach 100 feet, at which time the descent stopped. The maximum course deviation for both localizer and glide slope occurred at 1942:55, when the airplane was 2.59 degrees to the left of the localizer, and 2.63 degrees below the glide path. The next radar contact, which was also the last radar contact revealed a correction to the right on the localizer, and a constant altitude.

WRECKAGE AND IMPACT INFORMATION

The first debris from the airplane was recovered by a fisherman at a reported position of 42 degrees, 01.8 minutes north latitude, 70 degrees, 17.1 minutes west longitude, on October 26, 1998, and consisted of the right side control yoke, the top engine cowling, and the tow bar. On November 1, 1998, a fisherman recovered the main wreckage at a reported position of 42 degrees, 01.8 minutes north latitude, and 70 degrees, 17.2 minutes west longitude. The airplane was taken to the Provincetown Municipal Airport, where it was examined on November 2 and 3, 1998.

When first observed, the airplane was in a hanger at Provincetown. It was resting on its nose, and on the main landing gear. The nose landing gear had collapsed rearward. The tail cone with left horizontal stabilizer and elevator, and the rudder, remained attached to the airplane by control cables. In addition, the left aileron, right aileron, right horizontal stabilizer, and right elevator were separated from the main wreckage, but were recovered with the airplane.

The following items were not recovered; pilot's seat, vertical stabilizer, both wing tips, outboard 4 feet 2 inches of right wing, and the outboard 11 1/2 inches of the left horizontal stabilizer and elevator.

The propeller blades were bent forward. One blade was bent 6 inches forward, starting 20 inches inboard from the tip. The other blade was bent 1 inch forward starting 10 inches from the tip.

The engine was rotated, and valve train continuity was confirmed. Compression was found in all cylinders. The main engine suction screen was free of debris. The starter solenoid was not engaged. The cockpit magneto switch was in the right magneto position. The spark plug electrodes were covered with corrosion and debris. The magnetos were wet and would not produce spark when rotated. When opened up and dried out, both units still failed to produce spark. However, both units were covered with salt corrosion.

The fuel pump had separated at the main seam, and the tachometer drive cable was not engaged on the back of the engine. Examination of the threaded holes for the screws on the fuel pump revealed they were missing. The threads for securing the tachometer drive were also missing. Both items were constructed of magnesium which disintegrate in salt water.

The main fuel line leading to the carburetor contained about 2 fluid ounces of a light blue liquid, similar to 100 Low Lead aviation grade gasoline. The single-piece venturi was in place and secure. The accelerator pump worked, and salt water was found in the carburetor bowl. The metallic floats were crushed, consistent with exposure to high pressure. The main jet was clear of debris. The throttle was positioned to high power, the mixture control was full rich, and the carburetor heat control was off. These carburetor positions were matched by the controls in the cockpit.

The engine was equipped with a dry vacuum pump. The shear shaft and vanes were intact. The vane length measured between 0.725 inches and 0.716 inches.

The engine mounts were intact, although the two braces on the lower left mount were found to be bent inboard about 1 inch. The canopy and plexiglas windshield were not recovered. A portion of the right side canopy railing was found in the closed position.

The right side control yoke was bent up about 90 degrees. The instrument panel was

intact except for the attitude indicator and altimeter which were torn from their mounts, and were found behind the front panel.

The seat rails for the left seat were distorted. The seat belts and shoulder harness for the forward seats were in place. The belts were latched and unlatched with no problems noted. The right side seat belts fit snug across the top of the right seat cushion. The left side seat belt was extended to its maximum length. Examination of the seat belt and shoulder harnesses under the adjustable metal latches found no evidence of deformation of the material.

The airplane was equipped with a single axis auto-pilot, also known as a wing lever. The ON/OFF status of the unit was not determined.

The main spar was intact. The wing skin over both wing tanks was buckled and ruptured. Both fuel tanks were empty. The outboard 4 feet 2 inches of the left wing skin was crushed and rotated about the circular carry through structure. The same structure on the right wing was not recovered.

The wing flaps were electrically operated by a torque tube that overlaid the aileron torque tube. The left side flap was separated from the torque tube and rotated about the tube. The right side flap remained attached, and was in the retracted (up) position.

The top of the aft fuselage in the vicinity of the missing vertical stabilizer was bent down.

Flight control continuity was confirmed from the rudder pedals to the rudder, the control yoke to the aileron torque tubes, and the control yoke to the elevator control. The left and right aileron torque tubes were bent aft. In addition, the fuselage bracket for the right side aileron torque tube fractured. Elevator trim was found in the neutral position. The emergency locator transmitter (ELT) was found in the tail cone. The antenna lead was attached. The battery expiration date was August, 2000. The ARMED, OFF, ON switch was found in the OFF position. When placed in the on position, the unit failed to operate. The unit was covered with salt-water corrosion and was not designed for water immersion.

SURVIVAL ASPECTS

A water search by the US Coast Guard (USCG) failed to find the airplane or any debris on the water. The search was predicated on the last known location of the airplane from radar data. According to the USCG, the temperature of the water in the vicinity of the last radar contact was 55 degrees Fahrenheit. The depth of the water was about 180 feet.

In addition to the pilot, there was a large dog onboard the airplane. The dog was recovered on October 11, 1998, on the bay side, near Sandwich, Massachusetts. The pilot was recovered on October 15, 1998, on the Atlantic Ocean side of the Cape Cod peninsula, opposite

of the town of Wellfleet, Massachusetts.

MEDICAL AND PATHOLOGICAL INFORMATION

The toxicological testing report from the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma was negative for drugs and alcohol for the pilot.

An autopsy was conducted on October 17, 1998, by the Massachusetts Medical Examiner's Regional Office located in Pocasset, Massachusetts.

TESTS AND RESEARCH

The navigation radios were examined for confirmation of the frequencies observed on the face of the instruments. The primary navigation radio with localizer and glideslope capability indicated a frequency of 114.05 megahertz (MHz). The secondary navigation radio with localizer only, indicated a frequency of 115.60 MHz. The radios were examined at the Narco facility in Fort Washington, Pennsylvania, on November 17, 1998. According to the FAA inspector who hand carried the radios to Narco, there was no slippage between the internal frequency selection, and the frequencies displayed on the units.

The frequency 115.60 was identified as the Providence, Rhode Island, VOR. The frequency 114.05 could not be identified as a navaid in the area.

ADDITIONAL INFORMATION

The pilot's wife reported that the pilot was carrying some items for their home on Cape Cod. In addition, he was carrying his dog, a Chow, which weighed about 50 pounds. The dog was carried in the back of the airplane but she was unable to report how the dog's was secured. She did report that the dog had been carried almost every week for the past 8 months, and it had never been a problem.

The investigation was unable to match the frequencies observed on the VHF navigation radios with any of the known radios used for the ILS Runway 7 approach. The frequency on the ADF (390 kHz) was similar to the published frequency of the radio beacon used on the missed approach (398 kHz).

The pilot had previously requested Hyannis as an alternate. The frequency of the ILS Runway 15 approach was 108.95 MHz, the frequency of the ILS Runway 24 approach was 110.5, and the frequency of the VOR Runway 6 approach was 114.5 MHz.

The aircraft wreckage was released to Mr. Jim Cobb of Ryan Insurance Services, Inc, Biddeford, Maine, on November 3, 1998.

Pilot Information

Certificate:	Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	May 5, 1998
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1371 hours (Total, all aircraft), 107 hours (Total, this make and model), 1255 hours (Pilot In Command, all aircraft), 36 hours (Last 90 days, all aircraft), 17 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Grumman American	**Registration:**	N7100L
Model/Series:	AA-5 AA-5	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	AA5-0600
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	2200 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-E2G
Registered Owner:	RONALD SINZHEIMER	**Rated Power:**	150 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	PVC ,8 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	19:54 Local	**Direction from Accident Site:**	70°
Lowest Cloud Condition:	Unknown	**Visibility**	0.75 miles
Lowest Ceiling:	Overcast / 200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	13°C / 13°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	ALBANY , NY (ALB)	**Type of Flight Plan Filed:**	IFR
Destination:	(PVC)	**Type of Clearance:**	IFR
Departure Time:	17:48 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	PROVINCETOWN MUNI AIRPORT PVC	**Runway Surface Type:**	Asphalt
Airport Elevation:	8 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	7	**IFR Approach:**	ILS
Runway Length/Width:	3498 ft / 100 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:**	

Administrative Information

Investigator In Charge (IIC):	Hancock, Robert
Additional Participating Persons:	BARRY OTTO; BOSTON , MA DONALD SMALL; BOSTON , MA GREGORY ERICKSON; WILLIAMSPORT , PA RICHARD BUNKER; BOSTON , MA
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