Aviation Investigation Final Report

Location:	Fernandina Bch, Florida	**Accident Number:**	MIA04FA064
Date & Time:	April 4, 2004, 16:06 Local	**Registration:**	N14A
Aircraft:	Piper PA-30	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane was fueled on the day of the accident; the fuel from the fuel truck was contaminant free. No rain was reported at a nearby airport from the time the airplane landed the day before, to the time of departure. After takeoff with the landing gear retracted, the flight climbed to approximately 200 feet, banked left, then quickly to the right. One witness briefly heard a sputtering sound. The airplane was observed to bank to the left, and impacted the ground while in a 25-30 degree left wing low and nose-low attitude. No smoke was noted trailing the airplane in-flight. Both main and auxiliary fuel tanks were ruptured. Examination of the flight controls, and each engine core revealed no evidence of preimpact failure or malfunction. The left propeller was not feathered. Corrosion and a small amount of debris were noted inside the left engine-driven fuel pump. Internal contamination, and corrosion was noted for both servo fuel injectors (fuel servo). Drops of water were noted in the regulator area of the left fuel servo. During troubleshooting for rough running engines in June 2002, a slight amount of water was detected in the fuel tanks; no repairs or work was performed to the airplane's fuel tanks or fuel caps between the troubleshooting date, and March 26, 2004. The pilot noted discrepancies with the fuel injectors on 2 separate flights in October 2003; no corrective action for either entry was taken. During the last annual inspection, a broken screw was removed from a nut plate in the left main fuel cell access hole plate assembly, the left main fuel tank fuel cell cover plate upper gasket was replaced, and both fuel quantity senders were removed, cleaned, and reinstalled with "new hardware." During the accident flight in a six-second period, the EGT readings for each cylinder of the left engine decreased on average approximately 659 degrees Fahrenheit, while the right engine EGT readings remained nearly the same. Testing of a six cylinder engine to determine the EGT drop with reduction to idle and sudden combustion cessation revealed the temperature drops were 86 and 177 degrees, respectively. Postaccident weight and balance calculations revealed the airplane gross weight at the time the engines were started was approximately 3,788 pounds, and the center of gravity (CG) was 89.66 inches; the weight and CG calculations did not include the weight of fuel found in the left tip tank. A limitation for the airplane was that any weight in excess of 3,650 pounds

must be carried symmetrically as fuel in the tip tanks.

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 feather the left propeller and his failure to maintain control of the airplane following a loss of engine power from the left engine resulting in the in-flight collision with terrain. A factor in the accident was the loss of power from the left engine for undetermined reasons.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. 1 ENGINE
2. (F) REASON FOR OCCURRENCE UNDETERMINED
3. (C) PROPELLER FEATHERING - NOT PERFORMED - PILOT IN COMMAND

Occurrence #2: MISCELLANEOUS/OTHER
Phase of Operation: MANEUVERING

Findings
4. LOW ALTITUDE FLIGHT/MANEUVER - INITIATED - PILOT IN COMMAND

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING

Findings
5. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. TERRAIN CONDITION - GRASS

Factual Information

HISTORY OF FLIGHT

On April 4, 2004, about 1606 eastern daylight time, a Piper PA-30, N14A, registered to Light Wing, LLC, crashed onto airport property shortly after takeoff from Fernandina Beach Municipal Airport, Fernandina Beach, Florida. Visual meteorological conditions prevailed at the time and an instrument flight rules (IFR) flight plan was filed for the 14 CFR Part 91 personal flight from Fernandina Beach Municipal Airport, to Burlington-Alamance Regional Airport, Burlington, North Carolina. The airplane was substantially damaged and the commercial-rated pilot and one passenger were fatally injured. The flight originated about 5 minutes earlier from Fernandina Beach Municipal Airport.

One witness who is an airplane mechanic and was outside a hangar located north of runway 08/26, near the midfield of the runway, reported hearing the accident airplane's engines start, and based on the time from the engine start to the time he saw and heard the airplane during takeoff, he thought the pilot had time to perform an engine run-up before takeoff. The airplane departed from runway 26, and after becoming airborne, the gear retracted. The flight climbed to approximately 200 feet and at that time, the airplane banked to the left then quickly back to the right. After that, the airplane then appeared to be flying stabilized. The airplane then flew past the hangar where he was located and he lost sight of the airplane.

Another witness who was located east of the previous witness and who is a private-rated pilot reported he did not see the point where the airplane became airborne. He reported the airplane was airborne with the landing gear retracted before reaching the intersection of runway 04/22 and 08/26. He believed the airplane climbed to approximately 250-300 feet during climb out which initially appeared normal. Just before the airplane flew past the hangar, he heard a brief sputtering sound, and then observed the airplane bank to the left. He lost sight of the airplane for a short time and when he saw it again, the airplane was south of runway 08/26 and was in a 25-30 degree left wing low and nose-low attitude, which continued until the airplane impacted the ground. He described the sputtering sound as being similar to a sound he has heard in the past when power is reduced. He also reported that he did not see any smoke trailing the airplane.

NTSB review of recorded radar data from Whitehouse ARSR-4, Naval Air Station (NAS) Jacksonville ASR-8, and NAS Mayport ASR-8 radar facilities revealed all targets in the vicinity of the airport were transmitting "VFR 1200 code." A radar target at 1605:58, was located southeast of the departure end of runway 26, or northwest of the accident site location. The radar target was noted to be at 200 feet, with a speed of 105 knots, and the location was consistent with the witness reported position of the accident airplane.

Readout of the on-board, portable global positioning system (GPS) receiver at the manufacturer's facility revealed the unit retained data from the beginning of the taxi, to near the accident site location. The retained data (coordinates), is correlated with time received directly from satellites' signals. A review of the data and a plot of it revealed the airplane started taxiing at approximately 1600:27. The airplane taxied to runway 26, and a gap in data was noted between 1602:45, and 1604:46. At 1605:04, the airplane was plotted to be on the runway heading 266 degrees. The airplane continued on the runway heading from 1605:04, to 1605:21, at which time the ground speed was recorded to be 77 knots. The plotted data indicates the airplane began a left turn, accelerated to 92 knots groundspeed, and was on a heading of 144 degrees magnetic at 1605:50. The last recorded coordinates occurred at 1605:53, in which the groundspeed was 84 knots, and the heading was 122 degrees magnetic. The initial impact site was located approximately 97 feet and 71 degrees magnetic from the last recorded coordinates.

PERSONNEL INFORMATION

According to FAA records, the pilot was the holder of a commercial pilot certificate with ratings airplane multiengine land, and instrument airplane; he had a DC-3 type rating. He was also the holder of a private pilot certificate with a airplane single engine land rating. The pilot held a second-class medical certificate that was issued on January 15, 2003, with the restriction "must wear corrective lenses."

A review of the pilot's pilot logbook that contained entries from November 18, 1995, to November 23, 2003, and a computer flight log which contained entries from September 1, 2003, to December 28, 2003, some of which are duplicate entries from the pilot logbook, revealed his total logged flight time was approximately 643 hours. His first logged flight in the accident airplane occurred on December 21, 2001; since that date he logged a total time of 150.9 hours in the accident airplane. His last flight review in accordance with federal regulations occurred on September 9, 2003; the flight duration was 3.6 hours, and was flown in a Piper PA-39. At the time of the accident, the airplane had been operated approximately 43 hours since the date of the last logged flight in the computer flight log.

AIRCRAFT INFORMATION

The airplane was manufactured on July 13, 1966, by Piper Aircraft Corporation, as model PA-30, and designated serial number 30-1208. The airplane was certificated in the normal category, and Brittain Industries model TT-5 tip tanks were installed when the airplane was manufactured under Delegation Option Authorization. With the installed tip tanks, the design gross weight was 3,725 pounds. Robertson Aircraft Corporation modified the airplane on March 3, 1973, in accordance with Supplemental Type Certificate (STC) SA2312WE, and SA1113SW. Supplemental Type Certificate SA2312WE, incorporated leading edge cuffs, stall fences, stall strips, drooped ailerons, flap actuated stabilator trim system, and dorsal fin. The STC (SA2312WE), allowed the gross weight to be increased to 3,800 pounds, and lowered the velocity minimum control (Vmc) speed to 80 miles-per-hour. The limitations and conditions

section of the STC indicated, "When Brittain Model TT-5 wing tip tanks are installed, all weight in excess of 3,650 lbs. must consist of symmetrically loaded fuel in the tip tanks." Supplemental Type Certificate SA1113SW incorporated a nose extension. Two 200-horsepower, Lycoming IO-360-C1C engines, and two Hartzell HC-C2YR-2CFU constant-speed, manual-feathering propellers were installed on August 15, 1974, in accordance with STC SA 1151SW. The airplane was also equipped with a JPI Instruments EDM 760 engine monitor that was installed on March 24, 2003, in accordance with STC SA00729SE. The engine monitor was programmed to record in part the exhaust gas temperature (EGT) and cylinder head temperature (CHT) readings from both engines every 6 seconds.

Light Wing LLC (owner at time of accident), purchased the airplane on December 21, 2001; the pilot and passenger were each listed as a co-owner of the airplane on the "Aircraft Registration Application." Both engines were removed from the airplane and overhauled on March 21, 2002; the overhauled engines were installed in the airplane on April 17, 2002. At the time of each engine overhaul, both servo fuel injectors and manifold valves were overhauled, and new engine-driven fuel pumps were installed on each engine. At the time of the accident, the airplane had accumulated approximately 161 hours since the overhauled engines were installed.

A review of the maintenance records revealed on June 26, 2002, or approximately 6 months after the pilot and passenger purchased the airplane, and approximately 2 months after the overhauled engines were installed, an entry in the airframe logbook indicates, "Troubleshot both engines running rough. Cleaned all fuel injectors and spark plugs. Reinstalled cowlings. Removed small amount of water from fuel tanks during sumping." The airplane was approved for return to service. There was no entry in the airframe logbook between June 26, 2002, and March 26, 2004, indicating repairs or work performed to the airplane's fuel tanks, or fuel caps.

A review of the pilot's computer flight log revealed two entries describing discrepancies relating to the fuel injector systems of both engines. The first entry was dated October 18, 2003, and the remark was "clogged L3 injector." The next entry was dated October 19, 2003, and the remark was "L4 & R4 injector clogs." Review of the airframe and both engine maintenance records revealed no entry on or immediately following those dates indicating the above referenced fuel injectors were removed and inspected.

Further review of the airframe logbook revealed the airplane was last inspected on March 26, 2004, in accordance with an annual inspection. The inspection of the airplane was performed using Piper Aircraft Corporation Inspection Report, and additional inspection items prepared by the facility. During the inspection, the fuel caps were removed, and the fuel cap seals were inspected and lubricated. Airworthiness Directive (AD) 83-10-01, which requires inspection every 50 hours to prevent retention of water and deterioration of fuel system, was complied with. The AD requires in part removal of the fuel strainers, and to inspect the screen. An individual of the facility that performed the inspection later reported that during the inspection, "When we removed the filter bowls we found water and a little rust. We discussed the importance of draining the fuel bowls and for how long. During the demonstration, we found a

small amount of water in the fuel. We drained until clean fuel was present." Also during the inspection, standing water was noted on top of the left main and auxiliary fuel quantity senders. They were removed, corrosion on both was removed, the cleaned area on both was "treated", and the units were installed with "new hardware." Additionally, a broken screw was removed from a nutplate in the left main fuel cell access hole plate assembly. The left main fuel tank fuel cell cover plate upper gasket was replaced during the inspection, and the fuel inlet screens of both fuel injector servos were removed, inspected, and reinstalled. All fuel injector nozzles of both engines were ultrasonically cleaned. The ailerons were rigged in accordance with Robertson Aircraft Corporation literature.

According to the vice president (V.P.) of the facility that last inspected the airplane, the pilot contacted him prior to bringing the airplane to his facility and advised him that while flying the accident airplane, he previously experienced a loss of engine power during cruise flight in temperatures below freezing. Engine power was restored after the fuel selector was repositioned. An inspection of the airplane by a mechanic after landing revealed ice in one of the fuel strainers. The V.P. of the facility reported advising the pilot to hold the drain open for 1 minute when checking each fuel tank for water. The airplane and pilot were at his facility from March 21 through March 27, 2004, and during that time, the owner assisted with the annual inspection. The pilot came to their facility with items listed by priority that needed to be accomplished during the annual inspection. NTSB review of the list revealed Item 8 that indicates, "Check complete fuel system due to chronic injector clogging (both engines). This problem only manifests itself if the plane sits for a month or more. If flown regularly it doesn't happen." During the annual inspection, the owner was shown how to clean the fuel injector nozzles.

Since the date the annual inspection was signed off (March 26, 2004), the installed engine monitor recorded a total of four separate events including an event on the accident date. The first event following the inspection completion date occurred on March 27th; the duration was .37 hour. The second event the same day was 6.32 hours in duration, and the third event the day before the accident lasted 2.25 hours. The fourth and final event occurred on the day of the accident; the duration was .13 hour. The airplane had accumulated approximately 9 hours since the inspection at the time of the accident as determined by the installed hour meter.

METEOROLOGICAL INFORMATION

An automated weather observing system (AWOS), weather observation taken on the day accident at 1605, or approximately 4 minutes before the accident, indicates clear skies existed, the visibility was 10 statute miles, the temperature was 26 degrees Celsius, the dew point was missing, the wind was from 300 degrees at 16 knots, with gusts to 22 knots, and the altimeter setting was 29.78 inHg.

No rain was recorded on any of the METAR reports for April 3rd or April 4th, at the Jacksonville International Airport (KJAX), Jacksonville, Florida. The KJAX airport is located approximately 14 nautical miles west-southwest of the Fernandina Beach Municipal Airport.

COMMUNICATIONS

The pilot did not advise on the UNICOM frequency that the flight was returning, nor did he advise of a malfunction.

WRECKAGE AND IMPACT INFORMATION

The airplane crashed onto airport property during daylight conditions. The ground impact was located at 30 degrees 36.470 minutes North latitude and 081 degrees 27.806 minutes West longitude, or approximately 85 feet south of the southern edge of runway 04/22. A pitot tube mast was located approximately 6 feet east of the first ground scar. The left tip tank was separated and was found 43 feet left of a line drawn from the first ground impact point to the main wreckage location (wreckage centerline path), and 104 feet from the first ground impact point. The wreckage was upright on a magnetic heading of 330 degrees, approximately 122 feet from the first ground impact point. Review of photographs taken by personnel from Fernandina Beach Police Department revealed luggage/items from the cabin were removed, placed on the ground, then returned to the airplane before NTSB arrival. The luggage/items were retained for weighing.

Examination of the airplane revealed all components necessary to sustain flight were attached to the airplane or in close proximity to the main wreckage. No evidence of in-flight or on-ground fire was noted on any observed components. The left engine with attached propeller came to rest on the right side of the airplane. The right engine with attached propeller was separated but came to rest in close proximity to the right nacelle area. The cabin roof and stabilator trim cables were cut during extraction of the occupants. The empennage, stabilator control cables, and rudder control cables were cut at the start of the dorsal fin to facilitate recovery of the airplane.

Examination of the cockpit revealed the left and right alternate engine air controls were in the off position, both magneto switches of both engines were on, and both auxiliary fuel pump switches were on. The left and right throttle controls were positioned to within approximately 1 3/4 inches and 1 inch from idle or closed, respectively. The left and right propeller controls were positioned approximately 3/4 inch from full forward and full forward, respectively, and the left and right mixture controls were positioned within 1 inch and 3/4 inch from full rich, respectively. A placard to the right of the airspeed indicator on the pilot's side of the airplane indicated, "Drain fuel tanks before the first flight each day." Another placard located above the flap indicator indicated, "Do not extend flaps beyond 15 degrees (takeoff position)."

Examination of the airplane following recovery revealed the landing gear selector handle was in the "down" position, but the right main landing gear was in the wheel well, and the left main and nose landing gears were near the retracted position. The flaps were retracted, and the stabilator trim was found in the full nose down direction. The rudder trim was found in the neutral position. Flight control cable continuity was confirmed for roll, pitch, and yaw with the

exception of where the cables were cut postaccident. The stabilator was in position; no damage was noted to the left side of the stabilator while the right side was bent up and aft approximately midspan. No impact damage was noted to the vertical stabilizer or attached rudder. A bag marked "25 LBS.", and "9 Chill Shot" was found beneath each aft seat. The bags were retained for weighing. Examination of the aluminum pan beneath the left rear seat revealed the pan was displaced down with impact marks noted on the lower surface associated with contact with flight control pulleys; no evidence of chafing was noted on the lower surface of the pan.

The left wing main spar was fractured approximately 5 feet 6 inches outboard of the wing root area; the left main fuel tank bladder was torn/ruptured. The left cowl flap was in the "closed" position. Of all three fuel tanks of the left wing, the tip tank was the only tank found to contain any fuel; it contained approximately 1 gallon of fuel. The fuel outlet screens for the left main and auxiliary fuel tanks were free of obstructions. No obstructions were noted from each of the three of the left fuel tanks from each tank to the left engine nacelle area, and no obstructions were noted for any of the fuel vent lines for each of the left wing fuel tanks. The left fuel strainer was found to contain fuel that was blue in color and consistent with 100 low lead (100LL); no contaminants were noted and the screen was clean. The left fuel selector valve handle was found in the auxiliary fuel tank detent position, while the selector valve was found near the auxiliary fuel tank position; impact damage was noted to the left fuel selector valve attach bracket. No obstructions were noted to the left fuel selector valve; fuel drained from it was free of contaminants and water and was consistent with 100LL. The left auxiliary fuel pump was electrically operated and found to operate.

Examination of the right wing revealed impact damage approximately 6 feet inboard from the wing tip. Compression wrinkles were noted in the upper skin of the right wing outboard of the engine nacelle. The right flap and aileron remained attached. The right cowl flap was in the "open" position. All three fuel tanks of the right wing did not contain any fuel when examined. No obstructions were noted from each of the three right fuel tanks from each tank to the right engine nacelle area, and no obstructions were noted for any of the fuel vent lines for each of the right wing fuel tanks. The right fuel strainer was found to contain fuel that was blue in color and consistent with 100LL; no contaminants were noted and the screen was clean. The right fuel selector valve handle was found between the detents of the inboard and auxiliary fuel tanks; the selector valve push/pull rod was bent, and the selector valve attach structure was impact damaged. The fuel selector valve was positioned to the main tank position. No obstructions were noted to the right fuel selector valve; fuel drained from it was free of contaminants and water, and was consistent with 100LL. The right auxiliary fuel pump was electrically operated and found to operate.

Examination of the left engine revealed the propeller flange was bent and partially fractured. Rotation of the engine crankshaft was performed using an adaptor, which revealed crankshaft, camshaft, and valve train continuity. The magneto to engine timing was determined to be correct. Both magnetos were rotated by hand and spark was noted at all towers of the distributor block. Examination of the spark plugs revealed all exhibited a gray color with slight

wear noted; the electrode gaps were noted to be acceptable. The oil filter element was noted to be clean with no ferrous material. Residual fuel was noted in all flexible fuel lines, and components in the engine compartment; all flexible fuel hoses were found secured. Disassembly of the engine-driven fuel pump revealed internal corrosion and a small amount of debris; no evidence of preimpact failure or malfunction was noted to the engine driven fuel pump. The servo fuel injector, fuel injector nozzles, and flow divider were retained for further examination.

Examination of the right engine revealed the propeller flange was bent and partially fractured. Rotation of the engine crankshaft was performed using an adaptor, which revealed crankshaft, camshaft, and valve train continuity. The magneto to engine timing was determined to be correct. Both magnetos were rotated by hand and spark was noted at all towers of the distributor block. Examination of the spark plugs revealed all exhibited a gray color with slight wear noted; the electrode gaps were noted to be acceptable. Paint discoloration was noted on the Nos. 1 and 3 cylinder air induction tubes. The oil filter and oil suctions screen were noted to be clean. The oil sump was impact damaged and only residual oil was noted inside the engine assembly; however, no lubrication system anomalies were noted. Residual fuel was noted in all flexible fuel lines, and components in the engine compartment; all flexible fuel hoses were found secured. Examination of the impact damaged engine driven fuel pump revealed no contamination or corrosion; no evidence of preimpact failure or malfunction was noted to the engine driven fuel pump. The servo fuel injector, fuel injector nozzles, and flow divider were retained for further examination.

Examination of both propellers and propeller governors was performed with NTSB oversight at a FAA certified repair station. Examination of the left propeller as removed from the engine revealed the No. 1 propeller blade was at the low pitch stop and the No. 2 propeller blade was in reverse pitch. The No. 1 propeller blade was slightly bent aft with paint abrasion noted on the outer two inches on the cambered side of the blade. The counterweight and pitch change knob of the No. 1 propeller blade were "intact." The No. 2 propeller blade was bent aft approximately 45 degrees with the leading edge twisted towards low pitch. Paint abrasion was noted on the cambered side of the blade of the outer 1/2 span. The counterweight was "intact" while the pitch change knob was fractured; no evidence of preimpact failure or malfunction was noted. The cylinder exhibited impact damage by the counterweight from the No. 2 propeller blade. The propeller blades of the left propeller were not feathered at the time of impact, though exact blade angle could not be determined.

Examination of the right propeller as removed from the engine revealed the No. 1 propeller blade was at a high blade angle but not feathered, and the No. 2 propeller blade was at a low blade angle. The No. 1 propeller blade exhibited a slight aft bend; the counterweight was "intact", and the pitch change knob was fractured; no evidence of preimpact failure or malfunction was noted. The No. 2 propeller blade was bent aft midspan approximately 45 degrees, with the tip leading edge slightly twisted towards low pitch. Paint abrasion was noted on the cambered side of the blade at the blade tip. Two gouges were noted in the leading edge of the blade, both were within 4 inches from the blade tip. The counterweight and pitch

change knob were "intact." Impact damage to the cylinder was noted. The propeller blades of the right propeller were not feathered at the time of impact, though exact blade angle could not be determined.

Bench testing of the left propeller governor revealed the unit checked good in all parameters. Bench testing of the right propeller governor revealed it tested 2,315 rpm at the takeoff check (specification is 2,320 to 2,340 rpm). The right governor flowed 13 quarts per minute (specification is 9-12 quarts per minute). The feather check occurred at 1,490 rpm (specification is 1,575 to 1,600 rpm). The relief valve check was within limits. Visual examination of the right governor revealed slight impact damage to the pulley wheel (control arm). Disassembly of the right governor revealed wear marks on the control shaft teeth.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations of the pilot and passenger were performed by District Four Medical Examiner's Office (M.E.'s Office). The cause of death for both was listed as blunt trauma.

The M.E.'s Office, and by FAA Toxicology and Accident Research Laboratory (CAMI), located in Oklahoma City, Oklahoma, performed toxicological analysis of specimens of the pilot. The M.E.'s Office performed toxicological analysis of specimens of the passenger. The results of analysis of specimens of the pilot by CAMI were negative for carbon monoxide, cyanide, volatiles, and tested drugs. The result of analysis of specimens of the pilot by the M.E.'s Office was negative for alcohol. Caffeine was detected in the urine, and less than 1 percent saturation of Hemoglobin was detected in blood. The result of analysis of specimens of the passenger by the M.E.'s Office was negative for ethanol; caffeine was detected in urine.

TESTS AND RESEARCH

Bench testing and examination of the left and right servo fuel injectors, flow dividers, fuel injector lines and nozzles, was performed with NTSB oversight at a FAA certified repair station; bench testing of all components was performed using Naphtha solvent. Corrosion was noted on the inlet screen and spring of the left servo fuel injector (fuel servo); the throttle-opening gap was correct. Bench testing of the left fuel servo revealed it flowed in terms of pounds-per-hour (PPH) within service limits at engineering test points 1 and 4, while it flowed .4 PPH greater than service limits at engineering test point 3. The regulator was noted to hang up, and erratic fuel flow was noted during the hysteresis check. Disassembly of the left fuel servo following bench testing revealed contamination on the fuel diaphragm, and corrosion on the center body (fuel side of the regulator). Debris was noted in the fuel control housing area, and drops of water were also found in the fuel side of the regulator. Bench testing of the left fuel injector nozzles revealed all exhibited a poor spray pattern; the No. 4 nozzle was visually slightly better than the rest. All nozzles from the left engine checked good with respect to the air check. The fuel flow of the Nos. 1, 2, and 4 nozzles was 31 PPH, while the No. 3 nozzle flowed 32 PPH. Bench testing of the left flow divider and fuel injector lines revealed the flow divider began flowing at 2 psi, and flowed 155 PPH (minimum specified fuel flow is 90 PPH).

An even flow pattern was noted from all fuel injector lines. Disassembly of the left flow divider after bench testing revealed the piston moved freely; ferrous material was noted beneath the diaphragm.

Examination of the right fuel servo revealed corrosion on the fuel inlet screen; the throttle-opening gap was correct. Debris was noted flowing from the unit during the start of bench testing. The unit flowed within service limits in terms of PPH for test points 1,3, and 4. The regulator was noted to hang up (over rich condition) during throttle reduction. Disassembly of the right fuel servo revealed contamination at the regulator, and debris and contamination on the fuel side of the diaphragm. Corrosion was noted in the fuel control area, and on the fuel control idle valve. Bench testing of the right fuel injector nozzles revealed all exhibited a poor spray pattern; all nozzles checked good with respect to the air check. The fuel flow of the Nos. 1,2, and 4 nozzles flowed 31 PPH, while the No. 3 nozzle flowed 32 PPH. Bench testing of the flow divider and lines revealed the flow divider was slow to open during the first check, but was noted to flow evenly from all lines. The assembly flowed 140 PPH (minimum specified fuel flow is 90 PPH). Disassembly of the flow divider after bench testing revealed slight drag of the piston.

Readout of the JP Instruments EDM 760 engine monitor at the manufacturer's facility revealed ten recorded events of varying duration including the accident flight. The events varied from .13 hour (accident flight), to a maximum of 6.32 hours. A review of the data downloaded for an event that occurred the day before the accident (2.25 hours), revealed no noted anomalies. A total of 78 readings taken every 6 seconds were recorded during the accident flight. A review of the accident flight data revealed that at "20:22:00", the EGT reading of each cylinder of the left engine were, 1,429, 1,398, 1,311, and 1,396 degrees Fahrenheit (F.,), respectively. At the same time ("20:22:00"), the EGT reading for each cylinder of the right engine were 1,399, 1,413, 1,364, and 1,384 degrees F. The next readings taken 6 seconds later, or at "20:22:06", indicates the EGT reading for all cylinders of the left engine were 710, 710, 726, and 753 degrees F., respectively. At the same time ("20:22:06"), the recorded EGT reading for all cylinders of the right engine were 1,392, 1,418, 1,364, and 1,384 degrees F., respectively.

Further review of the data downloaded from the engine monitor revealed that between "20:22:00" to "20:22:06", the EGT reading for each cylinder of the left engine decreased 719, 688, 585, and 643 degrees F., respectively. During the same time frame ("20:22:00" to "20:22:06"), a review of the right engine EGT readings revealed the No. 1 cylinder decreased 7 degrees F., the No. 2 cylinder increased 5 degrees F., and the Nos. 3 and 4 cylinders remained the same. The next recorded reading 6 seconds later, or at "20:22:12", indicates the EGT reading for all cylinders of the left engine were 474, 473, 506, and 508 degrees F., respectively. At the same time ("20:22:12"), the EGT reading for each cylinder of the right engine were 1,392, 1,423, 1,364, and 1,384 degrees F., respectively. The next to last readings at "20:22:18", indicates the EGT reading for each cylinder of the left engine were 369, 373, 407, and 398 degrees F., respectively. At the same time ("20:22:18"), the EGT reading for each cylinder of the right engine were 1,403, 1,423, 1,374, and 1,396 degrees F., respectively. The last readings occurred at "20:22:24." At that time the EGT reading for all cylinders of the left engine were

664, 691, 683, and 747 degrees F., respectively. At the same time ("20:22:24."), the EGT reading for each cylinder of the right engine were 1,397, 1,410, 1,374, and 1,396 degrees F., respectively.

Testing of a 6 cylinder engine was performed at the engine manufacturer's facility to determine the EGT temperature drop for each of the cylinders with the engine power rapidly reduced from full power to idle, and to have combustion cease while operating at full power. The later test was accomplished by turning off both magneto switches. The result of the test where both magnetos were turned off while operating at full power revealed that in a 6-second period, the EGT decreased on average approximately 177 degrees Fahrenheit. The result of the test where the engine was suddenly decreased from full throttle to idle revealed that in a 6-second period, the EGT decreased on average approximately 86 degrees Fahrenheit. A representative of the engine manufacturer reported that they could not introduce water contaminated fuel during the testing.

According to an "Aircraft & Guest Registration" form provided by the facility that fueled the airplane, the airplane was noted to arrive the day before the accident at 1214. The fuel instruction indicated to "top inboard & outboards leave tips empty" with a box drawn around the instruction to leave the tips empty. The airplane was fueled earlier in the day on the date of the accident. According to the person who fueled the airplane, he fueled the main and auxiliary fuel tanks of both wings to within 1/2 to 1 inch below the top. He did not put fuel in the tip tanks as the fuel request said to leave the tip tanks empty. Following the accident, the facility that fueled the airplane suspended fueling operations as a precaution. The day after the accident, the FAA inspector-in-charge observed a sample of fuel being taken from the fuel nozzle under pressure from the truck that fueled the accident airplane. The fuel facility submitted the FAA observed fuel specimen for testing. Fueling was resumed on April 11th, or 7 days after the accident, with no reported discrepancies from any customers fueled from the same truck.

Postaccident weight and balance calculations were performed by NTSB; the calculations did not include the weight and moment amount of fuel drained from the left tip tank (1 gallon). Cargo that was removed from the cabin was weighed using certified scales. The estimated fuel amount in each main and auxiliary fuel tank was based on testing by a mechanic of a similar make and model airplane with the fuel level in each tank being approximately 1 inch below the top. The weight calculations were performed using the empty weight of the airplane (2,751 pounds), the weights of the pilot and passenger per the autopsy reports (199 and 131 pounds) respectively, the weight of luggage/items that were removed from the cabin area (185 pounds), the estimated weight of cargo from the nose baggage compartment (approximately 5 pounds), and the total weight of two 25-pound bags found beneath each aft seat (50 pounds). The calculations also include the estimated amount of usable fuel in the main and auxiliary fuel tanks, 293 and 174 pounds, respectively. The calculations indicate that at the time the engines were started, the airplane gross weight was approximately 3,788 pounds, and the estimated center of gravity location was 89.66 inches. As previously reported, a limitation of the airplane is that any weight above 3,650 pounds must be carried symmetrically as weight of

fuel in the tip tanks. The maximum allowable weight for the load condition is 3,650 pounds, and the forward and aft center of gravity limits for that condition are 87 inches, and 91.75 inches, respectively.

According to the FAA Approved Flight Manual, the "Feathering Procedure" section indicates the first step is to open the throttle of the operating engine to maintain altitude and airspeed above 97 miles-per-hour. The second, third, and fourth steps of the "Feathering Procedure" section pertain to the inoperative engine and specify to close the throttle, pull the mixture control to idle cut-off, and to pull the propeller control to the feather position, respectively. As previously addressed in the Wreckage and Impact section of this report, the left propeller was not found in the feathered position though exact blade angle at impact could not be determined.

ADDITIONAL INFORMATION

The airplane with the exception of retained components was released to Jason J. Steele, claims manager for Phoenix Aviation Managers, Inc., on June 2, 2004. All retained components were released to Kevin Twiss, also of Phoenix Aviation Managers, Inc., on June 15, 2005.

Pilot Information

Certificate:	Commercial; Private	**Age:**	48,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):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 1, 2003
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	September 1, 2003
Flight Time:	643 hours (Total, all aircraft), 151 hours (Total, this make and model), 549 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N14A
Model/Series:	PA-30	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	30-1208
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 1, 2004 Annual	**Certified Max Gross Wt.:**	3800 lbs
Time Since Last Inspection:	8.8 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	3689.8 Hrs at time of accident	**Engine Manufacturer:**	Textron Lycoming
ELT:	Installed	**Engine Model/Series:**	IO-360-C1C
Registered Owner:	Light Wing, LLC	**Rated Power:**	200 Horsepower
Operator:	David P. Mack	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	55J,16 ft msl	**Distance from Accident Site:**	
Observation Time:	16:05 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	16 knots / 22 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.78 inches Hg	**Temperature/Dew Point:**	26°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fernandina Bch, FL (55J)	**Type of Flight Plan Filed:**	IFR
Destination:	Burlington, NC (KBUY)	**Type of Clearance:**	VFR
Departure Time:	16:01 Local	**Type of Airspace:**	

Airport Information

Airport:	Fernandina Beach Municipal 55J	**Runway Surface Type:**	Asphalt
Airport Elevation:	16 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	26	**IFR Approach:**	Unknown
Runway Length/Width:	4999 ft / 150 ft	**VFR Approach/Landing:**	Unknown

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	30.607778,-81.463058

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Alan Nemcik; FAA, Flight Standards District Office; Orlando, FL Billy J Meadows; FAA, Flight Standards District Office; Orlando, FL Robert Martellotti; The New Piper Aircraft, Inc.; Vero Beach, FL Edward G Rogalski; Textron Lycoming; Williamsport, PA Thomas J McCreary; Hartzell Propeller, Inc.; Piqua, OH Joseph Polizzotto; J.P. Instruments; Costa Mesa, CA
Original Publish Date:	December 20, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=58992