National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: NYC03FA008	Aircraft Registration Number: N96WF
Occurrence Date: 10/16/2002	Most Critical Injury: Minor
Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
Trenton	NJ	08628	1424	EDT	

Airport Proximity: On Airport	Distance From Landing Facility:	Direction From Airport:

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
Pilatus	PC-12/45	Airplane

Sightseeing Flight: No Air Medical Transport Flight: No

Narrative

Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:

HISTORY OF FLIGHT

On October 16, 2002, at 1424 eastern daylight time, a Pilatus PC-12/45, N96WF, was substantially damaged during a forced landing at Trenton Mercer Airport (TTN), Trenton, New Jersey. The two certificated airline transport pilots, and one passenger were not injured. One passenger received minor injuries. Instrument meteorological conditions prevailed for the corporate flight, which departed from Trenton, and was destined for Dulles International Airport (IAD), Dulles, Virginia. The flight was conducted on an instrument flight rules (IFR) flight plan under 14 CFR Part 91.

According to a Federal Aviation Administration (FAA), transcript of air/ground communications from the Trenton control tower, the pilot made initial contact with Trenton ground control at 1407, and was cleared for takeoff on runway 6 at 1421.

At 1423:02, the pilot stated to the local controller, "...nine six whiskey fox declaring an emergency, we're engine out, we're coming back to the airport." The local controller enquired if they had the field in sight, and the pilot replied that they had the field in sight and were going to land on runway 16. The local controller cleared the flight to land on runway 16.

The last segment of the landing roll was captured by a security camera. The airplane departed the runway in a right yaw of approximately 45 to 60 degrees. The pilot-in-command (PIC) reported the yaw was intentional, and an attempt to avoid the chain link fence beyond the runway.

The PIC stated:

"...Engine startup was normal, checklists were completed and we were cleared to taxi to runway six...Then we were cleared for takeoff...Ignition was turned on because of anticipated turbulence, all engine parameters were normal on takeoff including engine and aircraft acceleration...Gear was retracted and then the flaps were retracted. Concurrent with the flaps being retracted there was a squeal...We had been given a clearance to turn to a heading of 290 and we commenced this turn about 700 feet msl [mean sea level] and were in the clouds at that time. About the time we started the turn there was a strong odor of something hot, but not an electrical smell...[the SIC] told the tower we were returning to land and I planned on a downwind to runway six...Before the turn was completed, there was a loud bang that sounded like a compressor stall, but much more violent and a long flame shot out of the engine exhaust. I reduced the PCL (power control lever-throttle) to mid-position, targeting 15 PSI torque. The first bang interrupted thrust and then the engine seemed to regain some power, the second bang followed almost immediately with the same exhaust flame and thrust was lost. The PCL was closed to idle, there was one more lesser bang...[the SIC] announced that he was feathering the engine and did so...A glide was established and the aircraft turned in the direction of where the approach end of runway 16 was believed to be...The runway became visible through ragged clouds and we were high. I extended the gear and lowered the flaps.

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By that time there were main gear green lights...[the SIC] said that he would pump the [nose] gear, which he did, and he announced the green-gear down...I maneuvered the aircraft to lose altitude and align with the runway, landed on the runway with an estimated 20 knots tailwind in rain, ran off the end and made a right turn to cause a long run-out and attempt to avoid the airport boundary fence, berm, and railroad....We evacuated using the overwing exit (which is on the right side)...."

The second pilot stated:

"...Touchdown happened at a higher than normal airspeed with a high tailwind about at the intersection of the two runways. Braking action was observed to be minimal. At this point I turned to the passengers and shouted brace. After the announcement, I cycled the electrical crash bar. I felt the right pedal advance to the floor and observed the aircraft yaw to the right and queried...[the PIC] about this. He said he was doing this intentionally to avoid the railroad tracks. I concurred...After impact, I departed the cockpit to evacuate the aircraft. A foreign metal bar blocked the main cabin door, so I continued to the cargo door. The cargo door would only budge an inch or two after the second shove, so I turned around and announced we would be exiting through the window exit. I assisted...[a passenger] in removing the exit window and tossing it out and then helped both him and ...[the other passenger]to evacuate the aircraft. I then stepped through the exit and turned around to assure...[the PIC] was behind me...."

When interviewed, the PIC reported that although he was aware of the engine shutdown, he had not called for it at the time it was initiated. He added that based upon his airline experience, the first thing you normally do with a compressor stall is reduce the power. The second pilot reported that he initiated the engine shutdown based upon feeling a reduction of power in the engine. He reported that the PIC had not requested the shutdown at the time that it was initiated.

A person employed by Trenton Airport reported:

"While doing the mid-day field check, I had just exited off of R/W 16/34. The tower had notified me that a plane coming in with a dead engine onto R/W 16/34. At that time, I turned to look out the window to see the plane passing me. I noticed that the engine was off, and the prop was not spinning...I watched the craft leave the R/W. I saw mud flying all over, the plane hit the fence...I saw 4 people exiting the aircraft...One of the passengers was complaining of side pain, I walked him to the ambulance. I notice the left wing was off and landed on the train tracks...."

The accident occurred during the hours of daylight at north 40 degrees, 16 minutes, 18 seconds, and west 74 degrees, 48 minutes, 24 seconds.

OTHER DAMAGE

Approximately 100 feet of airport chain link security fence was destroyed.

PERSONNEL INFORMATION

Pilot-In-Command

The PIC held an airline transport pilot certificate with a rating for multi-engine land airplanes. He held a commercial pilot certificate with ratings for single engine land and single engine sea airplanes. He also held a flight instructor rating for single and multi-engine airplanes and instrument airplane. He was last issued a second-class FAA Airman medical certificate, with no limitations, on May 23, 2002. He reported his total flight experience as 26,274 hours, which included 3,942 hours in single engine airplane. He reported that he had accumulated 563 hours in make and model, including 45 hours in the preceding 90 days.

The PIC had completed Pilatus PC-12 initial ground and flight training on April 19, 2000, and

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completed his last recurrent Pilatus PC-12 ground and flight training on April 6, 2002.

Second Pilot

The second pilot held an airline transport pilot certificate with a rating for multi-engine land airplanes. He held a commercial pilot certificate with ratings for single engine land airplanes. He also held a flight instructor rating for single and multi-engine airplanes and instrument airplane. He was last issued a first-class FAA Airman medical certificate, with no limitations, on March 26, 2002. He reported his total flight experience as 12,000 hours, which included 10,500 hours in single engine airplanes. He reported that he had accumulated 1,500 hours in make and model, including 50 hours in the preceding 90 days.

The second pilot had completed Pilatus PC-12 initial ground and flight training on June 19, 1999. His last recurrent ground and flight training in the Pilatus PC-12 occurred June 6, 2001. He had completed LearJet 31A, initial ground and flight training on June 14, 2002.

Interviews disclosed the airplane was flown both in the single pilot configuration, and with two pilots.

AIRCRAFT INFORMATION

The wing flaps were electrically operated, and the landing gear was hydraulically operated.

The airplane was equipped with a Pratt & Whitney of Canada (PWC) PT6A-67B engine, and certificated for single pilot operations.

The engine installation was designed so that feathering the propeller also cut off the fuel, and induced engine shutdown. In addition, a loss of oil pressure on the engine would also cause the propeller to go into feather. A check of the emergency procedures contained in the airplane flight manual revealed that movement of the condition lever to cut-off/feather is part of the ENGINE FAILURE IN FLIGHT checklist.

The engine's oil system was equipped with a magnetic chip detector (MCD) that was installed in the reduction gearbox (RGB). The MCD used a dipole magnet, which attracted magnetic materials that may be in the engine's oil. When enough magnetic (or other conductive) material had collected to bridge the two poles, the material completed an electrical circuit that illuminated an amber caution light CHIP on the central advisory and warning system (CAWS) in the cockpit. There was no MCD installed in the accessory gear box (AGB).

The CAWS on early serial-numbered PC-12 and PC-12/45 airplanes, including the accident airplane, was designed so that such engine MCD warnings would be enabled only when the airplane was on the ground. The CAWS received a signal from the weight-on-wheels (WOW) switch on the left main landing gear. As soon as the airplane took off and the WOW switch was opened, MCD warnings were disabled.

When PC-12 and PC-12/45 airplanes were registered for use in Canada, Transport Canada required that they be modified so that the installed CAWS would display any engine MCD cautions throughout all phases of flight. Pilatus issued Service Bulletin (SB) No. 04-002, "Canadian Registration of PC-12 and PC-12/45 Aircraft," which called for the replacement of the CAWS in these airplanes with a system that would not inhibit any engine MCD cautions when the airplane was in flight.

When PC-12 and PC-12/45 airplanes were registered in the United States, the FAA did not impose a similar requirement.

The PWC PT6A-60 series engine MCD monitored the oil scavenged from the RGB; the MCD did not monitor

Narrative (Continued)

the oil scavenged from the AGB and main engine bearings 1 and 2. After the oil was scavenged from the AGB and bearings, it was pumped back into the engine's oil tank and passed through the main oil filter, which trapped any debris in the oil scavenged from these areas before the oil was reused by the engine.

On August 20, 2001, Pilatus issued SB No. 79-005, "Oil Indicating, Introduction of Chip Detector in Engine Accessory Gearbox," which made available the installation of a MCD in the AGB to monitor the gearbox oil-drain for metal particles. The airplane was not modified with this service bulletin.
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AIRDROME INFORMATION

Trenton airport had two runways. Runway 6/24 was 6,006 feet long, 150 feet wide, and had an asphalt surface. Runway 16/34 was 4,800 feet long, 150 feet wide, and had an asphalt surface.

METEOROLOGICAL INFORMATION

The 1408 weather observation at Trenton included winds from 350 degrees at 17 knots, with gusts to 21 knots, visibility 3 statute miles, mist, a few clouds at 800 feet, and broken clouds at 1,200 feet. The 1440 weather observation included winds from 340 degrees at 17 knots, with gusts to 22 knots, visibility 3 statute miles, mist, and clouds at 800 feet overcast.

WRECKAGE AND IMPACT INFORMATION

The airplane had been moved to a hanger and placed on jacks prior to the arrival of the Safety Board investigator.

The outboard portion of the left wing was lying adjacent to the airplane. A compression buckle was observed on the lower wing skin, outboard of the right main landing gear. The right main landing gear retraction cylinder was separated from the airframe. The steel shaft of the retraction cylinder on the left main landing gear had a compression buckle and was fractured. The nose landing gear was separated from the airplane with a compression buckle on the right side of the steel oleo strut. The left wing, outboard of the left main landing gear, was separated from the airplane.

The wing flaps were in their maximum extended position of 40 degrees. Flight control continuity was observed on the elevator, rudder, and right aileron. The left wing was separated from the airplane, outboard of the left main landing gear. Flight control continuity was present to the break, and present on the separated portion of the wing.

The four propeller blades were bent about mid-span, opposite the direction of rotation.

The exhaust stacks were removed, and the turbine blades were smooth to the touch with no rough spots or evidence of damage. The turbine section of the engine rotated freely, with no binding. The compressor section of the engine was frozen.

The MCD in the RGB was removed and the two magnetic poles were not bridged. The oil in the RGB contained small particles of ferrous material. The engine oil filter was removed and found to contain small particles of ferrous material.

TESTS AND RESEARCH

The engine was shipped to the Pratt & Whitney facility in Bridgeport, West Virginia, for further examination. During the engine examination, conducted under the supervision of the Safety Board, small particles of ferrous material were found in the accessory gearbox.

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The disassembly of the engine revealed that its No. 1 bearing ball cage was fractured into several pieces, which allowed the balls to be loose in the bearing compartment. The disassembly also revealed that the interior surfaces of the AGB were coated with metallic particles and that there was metallic debris in the oil filter.

Rubbing was observed on components of the compressor drive shaft consistent with a rearward displacement of the compressor drive shaft.

The starter-generator was mounted on the back of the AGB. The splined end of the starter-generator drive shaft connected to the starter-generator drive gear in the AGB. There was a direct link from the starter-generator drive gear to the No. 1 bearing, through the other gears in the AGB. Further, testing of various AGB gear components with a magnetometer revealed that the starter-generator drive gear had a reading of between 18 and 20 Gauss. Other AGB gear components also registered Gauss readings, which were lower the further away they were from the starter-generator drive gear. A gauss meter reading on the propeller drive shaft was negative for a magnetic field.

Examination of the gears from the AGB was accomplished by PWC, under the supervision of the Transportation Safety Board of Canada. According to the report published by PWC:

"Metallographic examination showed heat affected zones associated to the pits observed at the surface of the gears. The heat affected zone included the untempered martensite (re-hardened zone) and the overtemper zone. This indicates that the pits resulted from electrical erosion. Note that all the affected gears were located upstream of the No. 1 bearing PN3113589."

"The primary cause of the No. 1 bearing distress could not determined because of considerable secondary damage obliterating the original surface and thus, preventing to confirm, the presence of pits on the rolling contact surfaces. Pits are spall originating surface defects. Progression of spalls leads to vibration causing eventually fracture of the cage by fatigue."

A further examination of the parts was conducted by the Safety Board Metallurgical Laboratory in Washington, DC. They reported:

"...The internal splines of the starter generator gear were examined...using an optical stereomicroscope. At the inner edge of the spline tooth flanks, many of the spline teeth had areas that appeared reflective and light in color. The shaft [with internal splines] portion of the gear was sectioned to facilitate the examination and documentation of these areas, and a view of one of these areas...The internal spline teeth flanks generally had a dark gray appearance corresponding to contact with the mating splines. The reflective area...is typical of similar areas seen near the ends of the spline contact regions on many of the spline teeth. These reflective areas had a globular appearance with smooth surfaces consistent with resolidified metal, features consistent with local heating from electrical arcing."

ADDITIONAL INFORMATION

Starter-Generator History

The airplane was delivered in March 1996, with a Lucas Aerospace starter-generator P/N 23085-015, S/N 95255. On September 7, 1999, with an airplane total time of 948.9 hours, the starter-generator was removed and overhauled by NAASCO. The overhaul report from NAASCO stated:

"...UNIT FOUND WITH BRUSHES AND BEARINGS WORN, COMMUTATOR GROVED. PERFORMED ROUTINE OVERHAUL. REPLACED ALL REQUIRED PARTS. INCORPORATED NAASCO 'ETR-20' STARTER GENERATOR IMPROVEMENTS. REFACED & UNDERCUT COMMUTATOR. CLEANED, INSPECTED, REFINISHED & TESTED TO MFG SPECS...."

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The starter-generator was reinstalled on the airplane and remained there, until its unscheduled removal on April 14, 2000, with an airplane total time of 1343.1 hours. During engine start, there was a loss of engine acceleration, accompanied by smoke coming from the rear area of the engine, and an electrical smell. The starter-generator was replaced and the airplane returned to service. The overhaul report from NAASCO stated:

"...UNIT FOUND WITH BROKEN BRUSH, CAUSE UNKNOWN. PERFORMED ROUTINE REPAIR. REPLACED BRUSHES AND BEARINGS, REFACED AND UNDERCUT COMMUTATOR. INSPECTED & TESTED TO MFG SPECS.

After being overhauled, the removed starter-generator was then made available for use on other airplanes.

The replacement starter-generator P/N 23085-025, S/N 99152 was installed and remained on the airplane until May 10, 2001, with an airplane total time of 1,923.2 hours. The chief pilot reported that while the airplane was en route to a 100 hour inspection, the generator dropped off line. The generator was reset, and remained on line for the remainder of the flight. It was checked during the 100 hour inspection, and no problems were noted. However, when the airplane was picked up for return to its home base, the starter-generator would not come on line after engine start. The starter-generator was then replaced, and forwarded to AviSTO. According to records from AviSTO:

"...After incoming inspection, we found unit with locked rotor and heavily burnt on armature and stator...fan - found broken...cover terminal block - found cracked...armature - found internal short circuit to ground...stator - found internal short circuit to ground...."

No further written documentation was available. A check with AviSTO found that the armature and stator had been returned to Goodrich for rewinding. Additional parts, identified as being from the failed starter-generator were still available. These parts were forwarded to Goodrich for examination. Other than the data plate which carried the serial number, the other parts including the starter-generator drive shaft did not have serial numbers, and could not be confirmed as having come from the failed unit.

The examination occurred at Goodrich, and was conducted under the supervision of airworthiness inspectors from the FAA. According to the Goodrich report:

"...The nameplate was determined to be a replacement nameplate, indicating that the generator (at some point in time) was modified and/or the original nameplate was damaged. There were no 'MOD' markings on the nameplate and the information in the fields was legible...The bearings were slightly dirty, but both rotated freely. They were identified as 'Goodrich' bearings. Both had a part number and date code stamped on them...The air inlet was slightly dirty, and had a very small dent in it, but was good overall condition. The inside of it [air inlet] shows no sign of rubbing (from the fan). The part number of the air inlet was not stamped on it...The fan had one blade broken. The three remaining blades showed no sign of rubbing (against the air inlet cover) and the splined area showed no sign of damage...The four brush sets were found to be in good condition; all were evenly worn and revealed 30 - 35 % brush wear. The shunt leads of each set showed nothing unusual...The drive shaft was in good condition and showed no apparent signs of pitting...No evidence of EDD was observed...."

A temporary replacement starter-generator P/N 23085-025, S/N 90170 was installed on the airplane on May 10, 2001, and remained there until May 14, 2001, with an airplane total time of 1,933.6 hours. At that point, the loaner starter-generator was removed. No further information was found on this starter-generator.

On May 14, 2001, starter-generator P/N 23085-025, S/N 96360 was installed. This was the starter-generator that was installed at the time of the accident, which occurred at an airplane

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total time of 2,627 hours. The starter-generator was examined at the Goodrich facility in Aurora, Ohio, under the supervision of the Safety Board. The examination revealed no evidence of a failure or malfunction. In addition, there was no evidence of an electrical surge and/or arc, which was transmitted through the starter-generator splined shaft, and into the engine.

SOAP and PATCH Tests

On March 22, 2001, PWC released Temporary Revision No. 72-34, to the PT6A-67B maintenance manual. This revision called for a patch test to be completed within 25 hours of starter-generator replacement that had a suspected electrical fault or bearing distress. In addition, the revision called for three additional patch tests, at 100-hour intervals for the next 300 hours.

According to airplane maintenance records, the patch tests were not complied with. However, the operator was conducting spectrometric oil analysis program (SOAP) checks, at 100 hour intervals, concurrent with 100 hour inspections. Records from SOAP tests performed from January 2000, through September 11, 2002, 32.6 hours prior to the accident were reviewed. There were no discernible trend for metal in the oil.

The SOAP test was originally implemented to detect magnesium wear in the engine. An oil sample is taken from the middle of the oil storage tank by use of a pipit within 15 minutes of engine shutdown, or motoring the engine with the starter motor. The SOAP test checks for lightweight and/or small particles that remain suspended in the oil, down to 1.5 to 2 microns. The oil is then mixed with a solvent, and the sample is nebulized by an argon flow. Specific wave lengths are created which correspond to specific elements.

The patch test was done by first flushing the oil filter in a solution, and then draining the solution through a 1.2 micron filter. The debris collected can then be examined by a variety of methods, including, but not limited to, microscope, thermogravimetric analysis, x-ray fluorescence, and scanning electronic microscope.

A check of the elements tested for by the SOAP and PATCH tests revealed the same elements were quantified in both tests.

The PWC representative reported that the purpose of the SOAP test was not to evaluate solid contamination, or debris visible in the oil. In addition, an impending bearing failure produces larger particles, and has never been detected by use of the SOAP test.

Engine Certification

The type certificate for the engine was held by Pratt & Whitney (Canada). The responsible government agency for oversight on the engine was Transport Canada. On May 25, 2001, the Chief of the Continuing Airworthiness section of Transport Canada sent a letter to the FAA, New York certification office (ACO) about their concerns with the TRW Lucas starter generators and electrical discharge damage. The letter stated in part;

"...We are writing to you since it is a PT6 engine that can be eventually affected by a faulty S/G [starter-generator]. In this regard, we would like to be formally advised of the status of the work by the TRW Lucas and the FAA's position on this matter. If the NY ACO is not the FAA office responsible for the TRW Lucas facility addressing the EDD problem, we would appreciate your forwarding this request and advising us accordingly so that we may liaise with the responsible FAA office directly in the future...."

According to an email received from a representative of Transport Canada, Continuing Airworthiness section, the FAA never answered their letter.

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Australian Transport Safety Bureau

The Safety Board is also aware that the Australian Transport Safety Bureau (ATSB) has investigated five occurrences of No. 1 bearing failures in PT6A-60 series engines, which they attributed to EDD. On June 19, 2002, the ATSB released safety recommendations to the FAA, Transport Canada, and PWC.

The ATSB recommended that Transport Canada, "...should note the deficiencies identified relating to electrical discharge damage to the number-1 bearing of the Pratt and Whitney (Canada) PT engine models equipped with TR Lucas, model 23078 and 23085 starter-generators."

The ATSB recommended that the FAA, "...examine the circumstances of electrical discharge damage to the number-1 bearing of the Pratt and Whitney (Canada) PT6A engine models equipped with TRW Lucas starter-generators and develop an appropriate safety assurance strategy...."

On February 19, 2003, in response to the ATSB's recommendation, the FAA issued Special Airworthiness Information Bulletin CE-03-24, to alert the owners and operators of PWC PT6A-60 series engines to the possibility of engine failure caused by deterioration of the No. 1 bearing. The bulletin stated that there have been a total of 17 PT6A-60 series engine failures worldwide, including the five involving Australian operators, attributed to the failure of the No. 1 bearing because of EDD.

Other engines were identified as having experienced EDD. These included 5 events in Australia, and 2 events in the United States, all of which preceded the accident with N96WF. Each event occurred on a multi-engine airplane and resulted in an in-flight shutdown, followed by a single engine landing. None of the starter generators that were identified as the source of the EDD were original equipment manufacturer (OEM), and all had been previously overhauled. Additional engines were identified as having experienced EDD; however, the records on the engines were incomplete, and there was no starter generator history to review.

When Goodrich was queried about magnetized starter generator shafts, a representative of Goodrich reported that it was not unusual for starter generators to be returned and have magnetized shafts. They reported that a check of three starter generators shafts found gauss reading that ranged from 10 to 59 at the end of the starter generator that plugged into the accessory drive section.

Goodrich published an overhaul manual for the starter-generator. In the manual they stated that only Goodrich replacement parts should be used, and the use of non-Goodrich parts would void their warranty. However, there was no FAA requirement that the overhaul be conducted by an FAA approved repair station, or that only Goodrich parts be used as replacement items.

The Pilatus maintenance manual called for the starter-generator to be overhauled at 1,000-hour intervals. In addition, the maintenance manual required that the brushes be removed, cleaned, and checked every 200 hours.

There was no requirement to track total time on the starter-generator, only time since overhaul.

The airplane was released to the insurance adjustor on October 18, 2002. The engine was released to PWC on September 23, 2003, and the retained parts from the accessory gear box were released to PWC on January 22, 2004.

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Landing Facility/Approach Information

Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
Trenton Mercer	TTN	213 Ft. MSL	16	4800	150

Runway Surface Type: Asphalt

Runway Surface Condition: Wet

Type Instrument Approach: NONE

VFR Approach/Landing: Forced Landing

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
Pilatus	PC-12/45	139

Airworthiness Certificate(s): Normal

Landing Gear Type: Retractable - Tricycle

Homebuilt Aircraft?	Number of Seats:	Certified Max Gross Wt.	Number of Engines:
No	8	9965 LBS	1

Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:
Turbo Prop	Pratt & Whitney Canada	PT6A-67B	1200 HP

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
100 Hour	09/2002	32.6 Hours	2627 Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?
Yes	No	No

Owner/Operator Information

Registered Aircraft Owner	Street Address	City	State	Zip Code
Unionville, Aviation	345 Wall Street	Princeton	NJ	08540

Operator of Aircraft	Street Address	City	State	Zip Code
The Nielsen-Wurster Group, Inc.	Same as Reg'd Aircraft Owner			

Operator Does Business As:

Operator Designator Code:

- Type of U.S. Certificate(s) Held: None

Air Carrier Operating Certificate(s):

Operating Certificate:

Operator Certificate:

Regulation Flight Conducted Under: Part 91: General Aviation

Type of Flight Operation Conducted: Executive/Corporate

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First Pilot Information

Name	City	State	Date of Birth	Age
On File	On File	On File	On File	71

Sex: M | Seat Occupied: Left | Principal Profession: Civilian Pilot | Certificate Number: On File

Certificate(s): Airline Transport; Flight Instructor; Commercial; Flight Engineer

Airplane Rating(s): Multi-engine Land; Single-engine Land; Single-engine Sea

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): Airplane Multi-engine; Airplane Single-engine; Instrument Airplane

Type Rating/Endorsement for Accident/Incident Aircraft? No | Current Biennial Flight Review? 04/2002

Medical Cert.: Class 2 | Medical Cert. Status: Valid Medical--no waivers/lim. | Date of Last Medical Exam: 05/2002

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Mult-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	26274	563	3942	22155	6768	5504	239			
Pilot In Command(PIC)	15672	557	2500	10000	3500	5504	239			
Instructor	3476	220	1200	2276	800	300	50			
Last 90 Days	54	45	51	3	17	11				
Last 30 Days	21	15	21			4				
Last 24 Hours										

Seatbelt Used? Yes | Shoulder Harness Used? Yes | Toxicology Performed? No | Second Pilot? Yes

Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point	State	Airport Identifier	Departure Time	Time Zone
Same as Accident/Incident Location		TTN	1422	EDT

Destination	State	Airport Identifier
Washington	VA	IAD

Type of Clearance: IFR

Type of Airspace: Class D

Weather Information

Source of Briefing: National Weather Service

Method of Briefing: Telephone

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
TTN	1440	EDT	213 Ft. MSL	0 NM	0 Deg. Mag.

Sky/Lowest Cloud Condition: Ft. AGL

Condition of Light: Day

Lowest Ceiling: Overcast 800 Ft. AGL

Visibility: 3 SM

Altimeter: 29.35 "Hg

Temperature: 11 °C

Dew Point: 10 °C

Wind Direction: 340

Density Altitude: 317 Ft.

Wind Speed: 17

Gusts: 21

Weather Condtions at Accident Site: Instrument Conditions

Visibility (RVR): Ft.

Visibility (RVV) SM

Intensity of Precipitation: Light

Restrictions to Visibility: Fog

Type of Precipitation:

Accident Information

Aircraft Damage: Substantial

Aircraft Fire: None

Aircraft Explosion None

Classification: U.S. Registered/U.S. Soil

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot				1	1
Second Pilot				1	1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers			1	1	2
- TOTAL ABOARD -			1	3	4
Other Ground					
- GRAND TOTAL -			1	3	4

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB ID: NYC03FA008

Occurrence Date: 10/16/2002

Occurrence Type: Accident

Administrative Information

Investigator-In-Charge (IIC)

Robert L. Hancock

Additional Persons Participating in This Accident/Incident Investigation:

Robert V Drapala
Aviation Safety Inppsector
Federal Aviation Administration
Philadelphia, PA

Markus Kohler
Air Safety Investigator
Pilatus Aircraft Ltd
Stans/Switzerland,

Paul F Crosby
Air Safety Investigator
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