Aviation Investigation Final Report

Location:	Manassas, Virginia	**Accident Number:**	ERA09LA370
Date & Time:	June 26, 2009, 16:44 Local	**Registration:**	N2YT
Aircraft:	Michael J. Kohout Glassair III	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot/owner stated that he conducted a "thorough pre-flight inspection" of the experimental amateur-built airplane, which was fully fueled for the accident flight. Engine start, taxi, and all other preflight activities were unremarkable. Just after takeoff from the controlled airport, the passenger noticed fuel venting as the right wing fuel cap had separated from the filler neck, and he informed the pilot of his observation. The pilot requested an emergency landing on the departure runway, in the direction opposite the takeoff direction. The two tower controllers saw the airplane start to turn, and then descend "fast" into trees just beyond the airport. Total flight duration was approximately 1 minute. The pilot told investigators that the airplane handled "erratically" due to the venting fuel, and that he "decided to perform a forced off field landing." Postaccident examination revealed that the fuel caps and filler necks were not placarded in accordance with the kit manufacturer's guidance concerning cap orientation. Subsequent testing of the right main fuel cap did not reveal any anomalies. Available evidence did not support the pilot's perception that the fuel venting constituted an extremely time-critical situation that rapidly resulted in a significant fuel imbalance, and a lateral control problem. The pilot's response to the fuel venting resulted in his preoccupation with requesting and executing an immediate return to the airport.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain aircraft control while attempting an emergency landing after takeoff. Contributing to the accident was the pilot's inadequate preflight inspection and distraction due to a separated fuel cap in flight.

Findings

Personnel issues	Aircraft control - Pilot
Personnel issues	Preflight inspection - Pilot
Personnel issues	Task monitoring/vigilance - Pilot
Aircraft	(general) - Not specified

Factual Information

History of Flight

Prior to flight	Aircraft inspection event
Initial climb	Part(s) separation from AC
Emergency descent	Loss of control in flight (Defining event)

HISTORY OF FLIGHT

On June 26, 2009, about 1644 eastern daylight time, an experimental amateur-built Glasair III, N2YT, was substantially damaged when it impacted trees and terrain about 1 minute after takeoff from Manassas Regional Airport (HEF), Manassas, Virginia. The certificated private pilot/owner and the passenger were seriously injured. The personal flight, destined for Warrenton-Fauquier Airport (HWY), Warrenton, Virginia, was operated under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and a Washington DC "Special Flight Rules Area" (SFRA) flight plan was filed for the flight.

According to the pilot, the airplane was hangared at HEF. The airplane's most recent annual inspection was completed a few weeks prior to the accident, and it had been flown successfully several times since then. The airplane was last fueled by a fuel provider at HEF 4 days prior to the accident. Both tanks in the airplane were topped off, and fuel records indicated that a total of 28.9 gallons were uploaded.

According to Lockheed Martin, the SFRA flight plan was filed to the "FLUKY Gate" of the SFRA, with an en route time of 7 minutes. The flight plan indicated that the airplane had 4 hours of fuel on board at the time of departure. A Lockheed Martin flight briefer provided the pilot with a weather briefing for a flight from HEF to HWY, which was located 12 miles southwest of HEF.

The pilot stated that the purpose of the flight was to bring the airplane to a maintenance facility at HWY, in order to address a landing gear retraction-rate issue. Depending on the outcome of the examination, the pilot planned to either fly or drive back from HWY the same day. The pilot stated that 1 hour elapsed between the time he arrived at HEF and when he boarded the airplane. Prior to the flight, he conducted a "thorough pre-flight inspection" of the airplane, and it "passed" without any problems. The passenger arrived after the preflight was completed, and he did not examine or operate any mechanisms on the airplane.

The pilot taxied to the run-up area, and used his checklist to complete the engine run-up and other pre-takeoff procedures. He stated that "everything looked good," and shortly thereafter he initiated the takeoff roll on runway 16L. According to the passenger, after takeoff, when the airplane was approximately crossing over the end of the runway, he saw fuel venting from the right wing tank filler neck. He stated that the cap was completely displaced from the tank filler

neck, and was "flopping around" at the end of its lanyard. He notified the pilot about his observation. The passenger was aware that the airplane had "a lot of fuel on board," and he "was not concerned" about possible fuel exhaustion.

According to the pilot, he "couldn’t believe how the cap had come loose because [he] had checked that the gas caps were secure twice prior to our flight and there had never been any issues with them leaking or becoming loose before." In the pilot's opinion, "fuel was evacuating the plane at an alarming rate."

A review of the recorded air traffic control tower (ATCT) communications revealed that 1 minute and 11 seconds after the takeoff clearance was issued, a communication presumed to be from the accident airplane stated "Manassas tower, my fuel cap is off, emergency landing." About 11 seconds later, the pilot transmitted "Manassas tower, two yankee tango, I'm spilling fuel can I land on three four ri..." Two ATCT controllers saw the airplane start to turn, and then descend "fast" into the trees southeast of the airport. After that, and about 19 seconds after the pilot's first and only call that included the airplane identity, an ATCT controller transmitted a call to the airplane. No subsequent transmissions were received from the airplane.

According to the passenger, the pilot radioed HEF ATCT, but they did not respond immediately. The pilot again radioed the ATCT, and requested an emergency landing in the direction opposite the takeoff direction. Shortly thereafter, the pilot banked the airplane "to the southwest," and then he pulled up and made a "hard bank" to the right. The next thing that the passenger was aware of was the airplane "diving for the trees."

According to some personnel who responded to the accident, the airplane impacted trees and terrain approximately 2,000 feet southeast of the southern end of runway 16L. The tree and ground scars were consistent with a moderately steep descent, oriented along a heading of approximately 170 degrees. Another observer reported that the distance from the first tree strikes to the wreckage was approximately 180 feet, and was oriented on a heading of 130 degrees. There was no postimpact fire. The wreckage was subsequently recovered to a secure facility.

PERSONNEL INFORMATION

Federal Aviation Administration (FAA) records indicated that the pilot was issued a private pilot certificate, with an airplane single-engine land rating, in August 2008. He reported that he had approximately 175 total hours of flying experience, which included 55 hours of dual flight, and 5 hours of solo flight, in the accident airplane. The pilot's flight logbook was not located during the investigation. His most recent FAA third-class medical certificate was issued in August 2006.

AIRCRAFT INFORMATION

The Glasair III airplane was a two-place, low-wing monoplane design that was constructed

primarily of composite materials. Glasair III plans, kit components, and raw materials were available from the kit manufacturer, Stoddard-Hamilton Aircraft. The accident airplane was equipped with retractable tricycle-style landing gear, and was powered by a Lycoming IO-540-K six cylinder engine and a two-bladed, constant-speed propeller.

According to FAA records, the airplane airworthiness certificate and initial operating limitations were issued in June 1991. The Phase II operating limitations were issued in September 2004. The accident pilot purchased the airplane in July 2008. According to the airplane maintenance records, the most recent condition inspection was completed on June 9, 2009. The records indicated that the airplane had 363 total hours in service, and the tachometer registered 239.5 hours as of the annual inspection.

A pilot-rated acquaintance of the pilot, who was very familiar with the accident airplane, and who assisted the pilot in learning to fly the airplane, provided additional details regarding the airplane performance and operation. He stated that the pilot owned two different sets of wing tips for the airplane; the "long wing" and "short wing" tips. At the time of the accident, the "long wing" tips were installed. The normal takeoff procedure was to use 10 degrees of flaps, retract the landing gear first, and then retract the flaps. The maximum landing-gear-extended speed was 140 mph, and the maximum flaps-extended speed was 110 mph. The best glide speed for the airplane was 140 mph, which yielded a descent rate of approximately 2,500 feet per minute. The airplane's stall speed was 95 mph with the flaps and landing gear retracted, and approximately 90 mph with 10 degrees of flaps.

The airplane was equipped with an Advanced Flight Systems, Inc. "Pro" model angle of attack ("alpha") indicating system that utilized pressures from two dedicated ports on the wing, plus the airplane’s pitot and static pressures, to determine the angular difference between the relative wind and the zero lift angles. The system presented the information visually to the pilot via a liquid crystal display mounted in the upper center of the left-hand instrument panel. The system was capable of providing an audible warning, and the audible warning could be muted by the pilot. The investigation was not able to locate any warning system calibration data, or otherwise determine the accuracy of the alpha warning system as installed on the airplane. In addition, the investigation was not able to locate any airspeed system calibration data, or otherwise determine the accuracy of the airspeed indicating system as installed on the airplane.

METEOROLOGICAL INFORMATION

The 1655 recorded weather observation at HEF included winds from 220 degrees at 4 knots, few clouds at 7,000 feet, temperature 30 degrees C, dew point 20 degrees C, and an altimeter setting of 29.70 inches of mercury. Visibility was not reported.

COMMUNICATIONS

Copies of the communications between the HEF ATCT and the accident airplane were

obtained from the FAA. A review of these recordings and their transcripts revealed that all communications were normal, until just prior to the accident.

AIRPORT INFORMATION

HEF was equipped with two parallel runways whose centerlines were separated by approximately 750 feet. Runway 16L/34R was 5,700 feet long and 100 feet wide. Runway 16R/34L was 3,702 feet long and 100 feet wide. The thresholds of 16R and 16L were abeam one another. The airport elevation was 192 feet above mean sea level, and the ATCT was operating with at least two controllers at the time of the accident.

WRECKAGE AND IMPACT INFORMATION

The fuselage was separated from the wing structure, but remained on top of, and oriented parallel to, the left wing. The forward fuselage was highly fragmented and deformed. The engine remained partially attached to the engine mount and the firewall, and the propeller remained attached to the engine. The empennage and aft fuselage were relatively intact. The left wing and wing carry-through structure was relatively intact from the left wingtip to slightly outboard of the right wing root, and included the cockpit floor, the seat well for the left pilot's seat, and most of the two control sticks and associated linkage. The right wing was highly fragmented. The nose and main landing gear were separated from the airplane.

Four days after the accident, the wreckage was examined in greater detail. Elevator and rudder control continuity were established from the control surfaces to their respective linkage separation points in the mid fuselage. Left aileron control continuity was established from the aileron to the two control columns. The left flap and most of the right flap remained attached to their respective wing sections. Flap position at the time of impact could not be determined.

The two seats each consisted of a bottom and a back cushion. Each bottom cushion was normally positioned in a well on the cockpit floor, and each back cushion was normally attached directly to the aft cockpit bulkhead. All seat cushions were intact but separated from the airplane. The left seat lap belt was buckled and intact, but the shoulder harness clips were not attached to it. The right seat restraint harness buckle assembly, including both shoulder harness clips, was buckled. However, the woven fabric portion of the lap belt was no longer attached to the male end of the buckle assembly.

All three landing gear were found separated from the aircraft. The entire nose gear assembly was separated from its fuselage structure. The left main gear separation point was at the top of the strut, just below where the strut attached to the wing. The right main gear assembly separated as a unit from the wing, and wheel/axle assembly was separated from the bottom end of the strut.

The propeller hub and the underside of the engine, including the exhaust tubing, exhibited crush damage. The engine was equipped with an electronic ignition system instead of

magnetos. The top spark plugs on all six cylinders were removed and examined. All were clean and exhibited normal operation pattern and coloration. The fuel distribution block, was examined. The block input line was intact, the output line to the number five cylinder was fracture-separated, and output line to the number six cylinder line was crushed and bent. All other lines were intact. The block was disassembled; the diaphragm was clean and intact, but the block did not contain any fuel.

The fuel filter was impact-separated from airplane. The inlet, outlet, and filter drain lines were fracture-separated from the filter. The filter was opened and examined; it was clean and dry, and smelled faintly of aviation gasoline.

Both propeller blades remained affixed in the hub, and the hub remained attached to the crankshaft. One blade was bent approximately 30 degrees aft at a point approximately 10 inches from the blade root. The other blade was bent and twisted forward approximately 70 degrees at a point about 35 inches from the blade root. The propeller and internal engine components were easily rotated by hand through at least 1 1/2 revolutions, or approximately 540 degrees.

ADDITIONAL INFORMATION

Pilot Recollections

The pilot sustained serious injuries in the accident, and was hospitalized for several weeks. Some of his post accident recollections conflicted with information obtained from other sources. According to the pilot, after he made "a crosswind turn" for his attempt to return for an emergency landing, the airplane's "handling started to become a little shaky." By the time he was on "the downwind leg of the traffic pattern," the handling characteristics were "seriously compromised." He said that he attempted to "turn left base but was unable to." The pilot stated that he "could not get the plane to continue to turn without handling erratically." He believed that he "had few options but to land the plane in the immediate area," and therefore "decided to perform a forced off field landing into the woods." He did not recall any stall warning prior to impact.

The passenger's account did not refute or support the pilot's preflight inspection activities. Recorded ATCT communications contradicted the pilot's recollection of which controller issued the takeoff clearance, and which runway was used for the takeoff. No direct data was available to enable investigators to definitively determine the fidelity of the pilot's recollections of the airplane handling characteristics once the fuel cap became displaced.

Fuel Tank and Fuel Cap Design Information

The kit manufacturer's design drawings showed that the airplane was equipped with two separate fuel tanks. The 10-gallon header tank was located between the cockpit and the engine compartment. The 53-gallon main tank included most of the spanwise wing internal

volume forward of the main spar, and a portion of the wing internal volume between the main spar and the rear spar. Four ribs, which also functioned as fuel baffles, were located in the leading edge of each wing; these divided the leading edge portion of the main tank into one central bay, and four bays in each wing, for a total of nine bays. The inboard baffle on each wing was equipped with a flapper-type check valve that permitted fuel to flow from the wing bays into the central bay, but restricted the flow of fuel from the central bay to the wing bays. The check valve fuel passage was approximately 1 1/8 inches wide and 1 1/2 inches high. The three outboard baffles in each wing were equipped with four semi-circular cutouts of approximately 1-inch radius, to permit fuel to pass between the bays. Two cutouts in each baffle adjoined the lower wing skin, and two adjoined the upper wing skin. An additional fuel bay was located approximately mid-span in each wing; each of these bays was connected to a leading edge tank bay by a tunnel that adjoined the lower wing skin. Each tunnel was approximately 2 inches wide and 1/2 inch high, and permitted fuel to pass between the bays that each tunnel connected.

The main and header tanks were plumbed independently, and fuel could not be transferred between the two tanks in flight. The fuel selector valve had three positions, "MAIN", "HEADER", and "OFF," which precluded the engine from being provided with fuel from both tanks simultaneously. The fuel quantity gauge for the main tank was located on the instrument panel, and the fuel quantity gauge for the header tank was mounted externally, just forward of the windshield.

The airplane was equipped with three fuel fill ports. One fill port for the main tank was located on each wing, approximately 8 inches aft of the leading edge, and 4 feet inboard of the wing tip. The wing chord at that point was approximately 2 1/2 feet. The header tank fill port was located on the top of the fuselage, forward of the windshield. All three fuel cap assemblies were the same flush-fitting model that was specified in the kit manufacturer's design and assembly plans. Each filler cap consisted of three major components; a cap, a three-lobed retainer, and a lever assembly. Each cap nested into its respective tank filler neck sleeve, which had three cutouts that conformed to the lobes on the cap retainer. A gasket was installed on each cap to provide a seal between the cap and the filler neck sleeve. A metal braided cable, approximately 12 inches long and 1/32 inch diameter, served as a lanyard to attach each cap to its respective sleeve. The lanyard was not specified in the kit manufacturer's drawings.

Proper installation of the cap in the tank filler neck sleeve required several steps. First, the lever must be raised to the vertical position. Next, the cap must be oriented to align the cap retainer lobes with the sleeve lobe cutouts. Then the cap must be lowered into the sleeve, and rotated approximately 60 degrees clockwise until a stop pin is contacted. Finally, the lever must be depressed to the horizontal position, flush with the cap. This action raises the lobed retainer up against the sleeve cutout ring, which grips the cutout ring and secures the cap.

The kit manufacturer's plans specified that each fuel cap was to be marked with a "permanent index arrow" which was to be used to align the cap with two other markings on the airplane, "OPEN" and "CLOSED," in order to ensure proper cap orientation for opening and

closing/securing the cap. None of the fuel caps or their surrounding ports contained any of the alignment markings specified by the kit manufacturer's plans.

The header tank fuel cap was placarded with a "10 GALS" decal, and each main tank cap was placarded with a "26.5 GALS" decal. All three ports were placarded with "100 OCTANE LOW LEAD ONLY" decals.

Fuel Cap Loss Mechanisms

Two primary mechanism modes that could result in the loss of the fuel cap, operational and mechanical, were identified. Operational modes were those associated with user (pilot, airplane fueler, etc) error, and mechanical modes were those associated with mechanical deficiencies of the cap assembly. Operational mechanisms included rotation of the cap in the wrong direction, insufficient rotation of the cap in the correct direction, failure to rotate the cap at all, and failure to fully depress the locking lever. Mechanical mechanisms included improper locking lever tension adjustment, missing or damaged cap gasket, and improperly secured filler neck sleeve.

Post Accident Fuel System Examination

Both the main and header fuel tanks were significantly compromised by impact. The caps for the left main and header tanks were found properly installed and secured in their filler neck sleeves. The filler neck sleeve and the fuel cap from the right main tank were separated from the airplane, and separated from each other, but both were found at the impact site. The cable was swaged to the filler sleeve, but the other end of the cable exhibited features consistent with having been cut. The hole on the metal tab on the underside of the cap, which was used as the cable attach point, was torn open. The right cap gasket was present and undamaged, and a functional check of the locking lever revealed that it was properly adjusted for tension, and firmly secured the cap when actuated.

The fuel selector valve handle was found in the "MAIN" position. The handle and placard assembly was fracture-separated from the selector valve. The actual valve position was not determined.

Factors Affecting Airplane Lateral Stability and Control

Two factors that had the potential to affect airplane lateral stability and control were identified. These were the airflow disturbance over the right wing and aileron due to the displaced fuel cap, and the lateral weight imbalance due to the venting fuel.

The aileron span was approximately 3 feet, and the fuel port was located approximately 1 foot outboard of the inboard end of the aileron, and 2 feet forward of the aileron hinge line. A displaced fuel cap trailing in the relative wind at the end of its lanyard would be positioned approximately 1 foot forward of the aileron hinge line. A kit manufacturer representative stated

that the fuel cap lanyard was not specified in the design drawings, and therefore the kit manufacturer did not have any information regarding the effect of the wake of a trailing fuel cap on aileron effectiveness, or airplane lateral controllability.

Impact damage to the fuel tanks resulted in the dispersal of all fuel at the accident site, and therefore the presence of a fuel imbalance during flight could not be determined. In response to a query regarding fuel imbalance, and its effect on the airplane handling characteristics, the kit manufacturer representative provided the following information: "We are unaware of any reported issues involving fuel transfer rates from one side of the tank to the other," and "the fuel transfer rate throughout the main fuel tank could vary based upon how the builder made and installed the ribs, rib cutouts and fuel flapper valves." The kit manufacturer representative stated that the manufacturer did not have any flight test or analytical information regarding fuel imbalance limitations, that the manufacturer was "unaware of any reported issues involving lateral controllability with a fuel imbalance," and that "keeping the ball centered at all times" would keep "fuel imbalance issues to a minimum in single tank aircraft." The representative also stated that "As with any aircraft type or model, we have heard of a customer improperly closing (or failing to close) a fuel cap and the cap departing the wing on takeoff; however, we are unaware of any reported flight issues or problems with the cap coming off of a Glasair in flight, other than the loss of the cap and the fuel."

FAA Guidance Regarding Pilot Workload and Task Prioritization

Chapter 16, "Aeronautical Decision Making," of the Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25), provided pilots guidance regarding decision making and workload management. Aeronautical decision making (ADM) was defined as "a systematic approach to the mental process used by airplane pilots to consistently determine the best course of action in response to a given set of circumstances."

The FAA estimated that "approximately 75 percent of all aviation accidents are human factors related," where "an action or decision made by the pilot was the cause, or a contributing factor that led to the accident." It elaborated on the concept with "it is usually not a single decision that leads to an accident, but a chain of events triggered by a number of factors...sometimes referred to as the error chain." FAA Advisory Circular (AC) 60-22, entitled "Aeronautical Decision Making," provided background references, definitions, and other pertinent information about ADM training in the general aviation environment.

With regard to workload management and task prioritization, Chapter 16 stated "During any situation, and especially in an emergency," pilots should "remember the phrase 'aviate, navigate, and communicate.' This means that the first thing the pilot should do is to make sure the airplane is under control. Then begin flying to an acceptable landing area. Only after the first two items are assured should the pilot try to communicate with anyone."

Chapter 16 cautioned pilots on the importance of "managing workload," particularly "recognizing a work overload situation." It then stated that as "workload increases, attention

cannot be devoted to several tasks at one time, and the pilot may begin to focus on one item. When a pilot becomes task saturated, there is no awareness of inputs from various sources, so decisions may be made on incomplete information, and the possibility of error increases."

The chapter defined situational awareness as "the accurate perception of the operational and environmental factors that affect the airplane [and] pilot... during a specific period of time," and stated that maintaining situational awareness "requires an understanding of the relative significance of these factors and their future impact on the flight." It added "When situationally aware, the pilot...is not fixated on one perceived significant factor," and that items to be considered included "an awareness of...spatial orientation of the airplane, and its relationship to terrain, traffic, weather, and airspace." Under the sub-heading of 'Choosing a Course of Action,' the chapter stated that after "the problem has been identified, the pilot must evaluate the need to react to it and determine the actions that may be taken to resolve the situation in the time available. The expected outcome of each possible action should be considered and the risks assessed before deciding on a response to the situation."

Pilot Information

Certificate:	Private	**Age:**	24,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	August 29, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	175 hours (Total, all aircraft), 60 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Michael J. Kohout	**Registration:**	N2YT
Model/Series:	Glassair III	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	3120
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	June 9, 2009 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	363 Hrs at time of accident	**Engine Manufacturer:**	
ELT:		**Engine Model/Series:**	
Registered Owner:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HEF,192 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	16:55 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Few / 7000 ft AGL	**Visibility**	
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.7 inches Hg	**Temperature/Dew Point:**	30°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manassas, VA (HEF)	**Type of Flight Plan Filed:**	VFR
Destination:	Warrenton, VA (HWY)	**Type of Clearance:**	None
Departure Time:	16:44 Local	**Type of Airspace:**	

Airport Information

Airport:	Manassas Regional HEF	**Runway Surface Type:**	
Airport Elevation:	192 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:	16L	**IFR Approach:**	None
Runway Length/Width:	5700 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	38.712223,-77.501945(est)

Administrative Information

Investigator In Charge (IIC):	Huhn, Michael
Additional Participating Persons:	Wayne Skaggs; FAA/FSDO; Washington, DC
Original Publish Date:	July 22, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74148

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