National Transportation Safety Board
Aviation Accident Final Report

Location:	Gainesville, FL	**Accident Number:**	MIA06FA090
Date & Time:	04/16/2006, 1153 EDT	**Registration:**	N999DE
Aircraft:	Beech B-60	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airplane crashed into the terminal building following a loss of control on takeoff initial climb from runway 25. Witnesses reported that shortly after takeoff, the airplane banked sharply to the left, then it seemed to momentarily stabilize and commence a climb before beginning to roll to the left again. The airplane rolled to an inverted position, entered a dive, collided with the airport terminal building and exploded on impact. The entire airplane sustained severe fire and impact damage. Examination of the engines and propellers revealed no evidence of any discrepancies that would preclude normal operation. All the propeller blades displayed signatures indicative of high rotational energy at the time of impact, indicating that both propellers were rotating, not feathered, and the engines were operating at high power at the time of impact. Components of the autopilot system, specifically the pitch servo assembly and a portion of the roll servo assembly, were identified in the wreckage. The portion of the roll servo assembly found remained attached to a piece of skin torn from the airframe and consisted of the mounting bracket for the roll servo with the capstan bolted to the bracket, clearly indicating that this component had been reinstalled and strongly suggesting that the pilot reinstalled/reactivated all of the removed autopilot components the day before the accident. Maintenance personnel started an annual inspection on the airplane the month prior to the accident and found an autopilot installed in the airplane without the proper paperwork. The pilot explained to them that he designed and built the autopilot and was in the process of getting the proper paperwork for the installation of the system in his airplane. During the inspection, a mechanic found the aileron cable rubbing on the autopilot's roll servo capstan so the mechanic removed the roll servo along with the capstan. Additionally, mechanics disabled the autopilot's pitch servo and removed the autopilot control head. They were in the process of completing the inspection when the pilot asked for the airplane stating that he needed it for a trip. The pilot also asked that the airplane be returned to him without the interior installed. Two days before the accident, the airplane was returned to the pilot with the annual inspection incomplete. The autopilot control head, roll servo and capstan were returned to the pilot in a cardboard box on this date. A friend of the pilot reported that the day before the accident, the pilot completed reinstalling the seats and "other things" in order to fly the airplane the next day. It is possible that improper installation or malfunction of the autopilot resulted in the loss of control; however, the extent of damage and fragmentation of

the entire airplane wreckage precluded detailed examination of the flight control and autopilot systems and hence a conclusive determination of the reason for the loss of control.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of control for an undetermined reason.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
2. OBJECT - BUILDING(NONRESIDENTIAL)

Factual Information

HISTORY OF FLIGHT

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On April 16, 2006, about 1153 eastern daylight time, a Beech B-60 Duke, N999DE, registered to and operated by Ocem Avionics Inc., a company owned by the pilot, crashed into the terminal building following a loss of control on takeoff initial climb from runway 25 at Gainesville Regional Airport, Gainesville, Florida. Visual meteorological conditions prevailed, and no flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The private pilot and the two passengers received fatal injuries, and the airplane was destroyed. The flight was originating at the time of the accident.

One witness stated that while driving north on Waldo Road, he observed the airplane, and upon liftoff, it banked sharply to the left. He stated that the airplane then seemed to stabilize and commence a climb to the east. He further stated that the airplane then began to roll to the left again and rolled into an inverted position. The airplane finally went into a sharp dive and impacted the west end of the terminal and exploded on impact.

Another witness stated that she was a passenger in the front seat of an ambulance that was traveling north on Waldo Road, and as they passed the airport, her partner said "that was a bad takeoff." She looked and saw a low flying small airplane. She said she looked away and then shortly thereafter heard a loud bang, and upon looking again, saw a massive fireball erupting from the airport in the vicinity of the main gate.

A witness in the back of the ambulance stated that she observed the accident airplane "flip and nose-dive into the airport terminal."

According to an air traffic controller in the control tower, after clearing the airplane for takeoff, there were no further radio communications with the airplane. The controller said he last saw the accident airplane in wings level flight, about even with the Flight Service Station. He then changed from observing the accident airplane to observing two other aircraft in the area. When he next looked in the direction where he had last observed the accident airplane he saw smoke which he later learned was from the accident site. He stated that at no time had there been any indication that the accident airplane had experienced a problem.

According to information obtained from University Air Center (UAC), a fixed base operator at the Gainesville Regional Airport, the pilot of the accident airplane had used the self serve tanks to purchase 31 gallons of fuel, and according to information obtained by detectives, the pilot was proceeding on a short personal flight.

PERSONNEL INFORMATION

The pilot, age 69, held a private pilot certificate, with airplane single and multiengine land and instrument ratings, issued on December 11, 1981. He also held an FAA third class medical certificate, issued on September 3, 2004, with the stated limitation that "the holder shall wear corrective lenses." The pilot's personal logbook was not obtained. According to information obtained from the pilot's last record of a medical examination, he reported having accumulated about 1,500 flight hours as of September 3, 2004. As of the time of the completion of this factual report, no information was obtained relative to the pilot's last flight review.

AIRCRAFT INFORMATION

N999DE was a Beech B-60 Duke, serial number P-447, which was manufactured in 1977. The most recent annual inspection of the airplane documented in the aircraft logbooks was performed on February 9, 2005. At the time of this inspection the airplane had accumulated about 2,901 hours. The airplane was equipped with two wing mounted Lycoming TIO-541 series, 380 horsepower engines, and at the time of the annual inspection on February 9, 2005, they had each accumulated about 1,266 hours since major overhaul. The left and right propellers were both 3-bladed constant speed Hartzell propellers, and both had last received major overhauls on September 20, 2004.

According to information provided by UAC, their maintenance personnel started an annual inspection on the airplane on March 20, 2006. According to the director of maintenance for UAC, an autopilot was found installed in the airplane without the proper paperwork. The pilot told UAC that he designed and built the autopilot and was in the process of getting the proper paperwork for the installation of the system in his airplane. The pilot further told UAC that he had sold the design to a company called Chelton Aviation and was finishing up the research and development so the system could be installed on a number of different models of airplanes. During the inspection, a UAC mechanic found the aileron cable rubbing on the autopilot's roll servo capstan so the mechanic removed the roll servo along with the capstan. This maintenance action was documented as item 3 on a Work Order Discrepancy Form provided by UAC. Additionally, UAC reported that they disabled the autopilot's pitch servo and removed the autopilot control head.

UAC was in the process of completing the inspection when the pilot asked for the airplane stating that he needed it for a trip. The pilot also asked that the airplane be returned to him without the interior installed. On April 14, 2006, UAC released the airplane to the pilot with the annual inspection incomplete. The autopilot control head, roll servo and capstan were returned to the pilot in a cardboard box on this date.

A list of the repair items accomplished by UAC personnel and those remaining to be accomplished on the airplane when it was released to the pilot was provided by UAC. The list of 28 items accomplished included the following item related to the autopilot: "Performed conformity inspection for previously installed autopilot servo installation per engineering drawings and forms removed roll servo due to contact with aileron cables and disabled pitch servo. Autopilot control head removed to disable system due to no STC for B60." The list of 7 items remaining to be accomplished included the following items: "inspect carpet, seats, seat belts and misc. interior trim for proper installation", "Form 337 for pitch servo mounting", and "log book entries airframe engine and prop".

A friend of the pilot stated that "University Air completed the inspection and released the aircraft to [the pilot] either Friday or Saturday. On Saturday night [the pilot] completed reinstalling the seats and other things in order to fly on Sunday when the accident occurred."

A representative of Chelton Aviation reported that the company was not a participant in the pilot's effort to acquire FAA approval of the autopilot system installation in the airplane. The representative further reported that the company had begun to provide "drawing/documentation drafting support only of the component installation" at the pilot's request.

Several Chelton Aviation documents were found with the airplane's maintenance records. One of these documents was numbered MS-012-09, dated March 15, 2006 and written by the pilot. In its Introduction section, the document stated, in part, "this report provides structural substantiation for installation of a Chelton Aviation Corp (CAC) AP-3C roll and pitch servos in Raytheon 60, A60, B60 aircraft. This document is in support of FAA Field Approval limited to the installation on aircraft Be B60 Serial N.P447, registration N999DE."

METEOROLOGICAL INFORMATION

Visual meteorological conditions prevailed at the time of the accident. The Gainesville Regional Airport 1153 surface weather observation was wind from 240 degrees at 11 knots, visibility 10 miles, sky condition clear, temperature 25 degrees C, dew point 16 degrees C, altimeter 30.00 inches.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted the west end of the terminal building in the area of a baggage conveyor belt. As the airplane impacted the building and a parked vehicle, an explosion and fire ensued. During the impact sequence, the vehicle was pushed into the terminal building wall, knocking down the wall and creating about a 20-foot opening in the wall. As a result of the breached terminal building wall, smoke entered the terminal building, and the sprinkler system in the vicinity operated. Airport crash fire rescue personnel responded and extinguished the fire.

The entire airplane sustained severe fire and impact damage. The impact crushed the airplane's nose, pushing the instrument panel aft into the cabin space. The right wing separated from the fuselage, and the left wing remained attached to the fuselage. Continuity of flight controls could not be confirmed due to the extensive damage and fragmentation of the entire airplane wreckage.

Examination of the nose and right main landing gear actuators confirmed that the landing gear was in the extended position at the time of impact. The right flap actuator was extended 2 inches, consistent with the flaps being retracted. Examination of the rudder trim actuator showed a measurement of 2.25 inches, or 20 degrees tab right.

On the control quadrant, the throttles were located about mid range, the propeller controls were midrange, the left mixture control was midrange, and the right mixture control was full forward. The left fuel selector handle was pointing toward the 11 o'clock position, and the right handle was pointing toward the 10 o'clock position. The turn and bank indicator showed about a 15 degree right turn. All other instruments and avionics were destroyed.

Components of an autopilot system were found in the wreckage. By comparing the recovered components to drawings in Chelton Aviation document number MS-012-09, it was determined that the components found were the pitch servo assembly and a portion of the roll servo assembly. The portion of the roll servo assembly found remained attached to a piece of skin torn from the airframe and consisted of the mounting bracket for the roll servo with the capstan bolted to the bracket.

The left engine was separated from the engine nacelle. The engine sustained severe fire and impact damage. The propeller remained attached at the hub, and one propeller blade separated from the hub. The crankcase displayed multiple fractures, and the #2 cylinder head was impact damaged. The spark plugs and valve covers were removed, and a bore scope exam of the top end components revealed no pre-impact anomalies. Access openings created by impact damage

were used to visually examine the power section of the crankcase, and internal continuity of the reciprocating components was established.

The right engine was separated from the engine nacelle. The engine sustained severe fire and impact damage. The propeller separated at the aluminum hub extension, and one propeller blade separated from the hub. The crankcase displayed multiple fractures. The spark plugs and valve covers were removed, and a bore scope exam of the top end components revealed no pre-impact anomalies. Access openings created by impact damage were used to visually examine the power section of the crankcase, and internal continuity of the reciprocating components was established.

The propellers were retained for further examination.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was conducted by the District 8 Medical Examiner Office, Gainesville, Florida. The autopsy findings listed multiple blunt traumatic injuries. Toxicology tests were conducted by the FAA's Toxicology and Accident Research Laboratory. The tests detected no carbon monoxide, cyanide, ethanol, or drugs. Glucose was detected at 176 mg/dL in urine (above 100 mg/dL is abnormal). No glucose was detected in vitreous (above 125 mg/dL is abnormal). Hemoglobin A1C was measured at 4.9% in blood (above 6% is abnormal).

Review of the pilot's FAA medical records revealed that he had a history of renal glycosuria, a condition in which glucose is excreted in the urine despite normal or low blood glucose levels.

TESTS AND RESEARCH

Both propellers were examined at the facilities of Hartzell Propeller Inc. in Piqua, Ohio, on May 4, 2006, under the supervision of an FAA inspector. Both propellers exhibited similar damage. The blade damage was noted to be severe, including spiral bending, rotational scoring, and tearing at the blade tips, which are signatures indicative of high rotational energy at the time of impact. No discrepancies that would preclude normal operation were noted. The Hartzell representative concluded that both propellers were rotating, not feathered, and operating at high power at the time of impact.

Pilot Information

Certificate:	Private	**Age:**	69, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With Waivers/Limitations	**Last FAA Medical Exam:**	09/01/2004
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1500 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N999DE
Model/Series:	B-60	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	P-447
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	02/01/2006, Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	2901 Hours as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	TIO-541-E1C4
Registered Owner:	Ocem Avionics Inc.	**Rated Power:**	380 hp
Operator:	Ocem Avionics Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	GNV, 149 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	1153 EDT	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	25°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Gainesville, FL (GNV)	**Type of Flight Plan Filed:**	None
Destination:	(GNV)	**Type of Clearance:**	VFR
Departure Time:	1153 EDT	**Type of Airspace:**	

Airport Information

Airport:	Gainesville Regional (GNV)	**Runway Surface Type:**	Asphalt
Airport Elevation:	152 ft	**Runway Surface Condition:**	Dry
Runway Used:	25	**IFR Approach:**	None
Runway Length/Width:	4158 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-Ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	29.690000, -82.271667

Administrative Information

Investigator In Charge (IIC):	John W Lovell	**Report Date:**	03/31/2008
Additional Participating Persons:	Michael Curtis; FAA FSDO; Orlando, FL Edward Rogalski; Lycoming; Williamsport, PA Tim Rainey; Raytheon; Wichita, KS		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		