Aviation Investigation Final Report

Location:	Phoenix, Arizona	**Accident Number:**	WPR10FA383
Date & Time:	August 4, 2010, 06:04 Local	**Registration:**	N146CK
Aircraft:	CIRRUS DESIGN CORP SR22	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Shortly after takeoff, the pilot notified the tower air traffic controller that he needed to return to the airport to “close a door” on the airplane. The pilot acknowledged the landing clearance and declined further assistance. Review of recorded radar data revealed that after the airplane’s departure, it remained within the airport traffic pattern and ascended to an altitude of about 528 feet above ground level near the downwind-to-base leg of the flight. In addition, a pilot-rated witness located adjacent to the accident site reported observing the airplane depart and remain within a left traffic pattern for the runway. The witness stated that the airplane appeared to be traveling slowly as it began to initiate a left turn from the base leg to final approach before stalling and entering a spin to the left. Security camera images captured the accident airplane in a left-wing-low, nose-down attitude just before impact with the ground. In addition, the left cabin door was observed in an open position before impact. A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. Witness reports and findings from the wreckage examination are consistent with a loss of control and subsequent aerodynamic stall and spin. It is likely that the pilot was distracted by the open door and failed to maintain sufficient airspeed while turning from the base leg to final approach and lost control of the airplane.

Review of the pilot’s Federal Aviation Administration (FAA) medical records showed that the pilot did not report any mental disorders, depression, or anxiety. However, the pilot’s personal medical records revealed that he had been treated for depression for several years, including several episodes of acute exacerbation. Postaccident toxicology testing found venlafaxine and nortriptyline (both used in the treatment of depression) in the postmortem cavity blood that exceed the toxic ranges for peripheral blood set by the FAA Civil Aerospace Medical Institute. However, substances undergo redistribution after death and these results are unlikely to be the

result of toxic overdose.

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 airspeed and airplane control during a turn from the base leg to final approach due to his diverted attention.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Personnel issues	Attention - Pilot

Factual Information

History of Flight

Initial climb	Miscellaneous/other
Approach-VFR pattern final	Loss of control in flight (Defining event)
Approach-VFR pattern final	Aerodynamic stall/spin
Approach-VFR pattern final	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On August 4, 2010, about 0604 mountain standard time, a Cirrus SR-22 airplane, N146CK, was substantially damaged when it impacted terrain adjacent to a building while on final approach to the Phoenix Deer Valley Airport (DVT), Phoenix, Arizona. The airplane was registered to Magneto Investments LLC., Phoenix, and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. The commercial pilot, the sole occupant of the airplane, was fatally injured. Visual meteorological conditions prevailed and no flight plan was filed. The cross-country flight originated about 3 minutes prior to the time of the accident, with an intended destination of Tennessee.

Multiple witnesses located adjacent to the accident site reported observing the airplane bank to the left and descend in a nose low attitude.

A pilot-rated witness, located south of DVT, reported that while driving westbound on Deer Valley Road, he observed the accident airplane depart the runway [07L] to the east. The witness continued to watch the airplane turn left to a left downwind leg for the runway, and climb to an estimated altitude of about 500 feet above ground level (agl). The witness stated that he momentarily lost sight of the airplane until reestablishing visual contact with it, which was on base leg for runway 07. The witness noted that the airplane appeared to be traveling slow as it began a left turn to final for the runway. The witness further stated that the airplane appeared to have been "cranked to the left" and the "left wing stalled" as it entered a "left spin." The witness estimated that the airplane performed about a quarter turn spin prior to losing site of it below adjacent buildings. The witness further reported that shortly after losing sight of the airplane, he observed a plume of smoke and fire originating from the general area of where visual contact with the airplane was lost.

Review of recorded air traffic control tower radio communications revealed that the pilot was cleared to take off on runway 07L. About 34 seconds later, the pilot transmitted to the tower controller, "I need to return to close the door." The controller subsequently cleared the pilot to land on runway 07L and asked if he needed any assistance. The pilot acknowledged the landing clearance and declined additional assistance. No further radio transmissions were received from the pilot.

Review of recorded radar data revealed that the airplane departed runway 07L, and entered a left turn traffic pattern. The data depicted that the airplane ascended throughout the crosswind and downwind legs, to a maximum altitude of about 500 feet agl just prior to a left turn to base leg. A descent was then observed during the base leg and subsequent left turn to final, to an altitude of about 100 feet agl. The last recorded radar target was located about 460 feet northwest of the accident site and about 2,970 feet west northwest of the approach end of runway 07L.

Review of video recordings from a security camera located adjacent to the accident site revealed the accident airplane in a left wing low, nose down attitude prior to impact with the ground. In addition, the left cabin door was observed in an open position prior to impact.

PERSONNEL INFORMATION

The pilot, age 67, held a commercial pilot certificate with airplane single-engine land, multiengine land, instrument airplane, and glider ratings. A third-class airman medical certificate issued on November 4, 2008, with the limitations stated "must wear corrective lenses for near and distant vision. Review of an insurance renewal form revealed that the pilot reported as of August 18, 2009, he had accumulated 2,535 hours of total flight time; 957 hours in the accident make model of airplane. Review of the pilot's personal logbook revealed that as of the most recent logbook entry, dated July 31, 2010, he had accumulated 2,692.2 total flight hours of which 52.4 were within the preceding 90 days to the accident.

AIRCRAFT INFORMATION

The four-seat, low-wing, fixed-gear airplane, serial number (S/N) 3377, was manufactured in 2009. It was powered by a Teledyne Continental Motors IO-550-N (60) engine, serial number 1000383, and was equipped with a Hartzell three-bladed adjustable pitch propeller. The airplane is equipped with two cabin doors (left and right side respectively). Each cabin door is equipped with an upper and lower door latch. The lower latch release is directly controlled by a handle within the arm rest. A cable from the lower latch release mechanism extends to the upper latch. When the door handle is actuated, both the upper and lower latches will release.

The Pilot Operating Handbook's (POH) before takeoff checklist in section 4, Normal Procedures, page 4-13, outlines the before takeoff procedures. Item number one on the checklist states in part "...Doors.....Latched."

The expanded procedure for a door open in flight found in section 3A of the POH, page 3A-2, Flight Environment, Door Open In Flight, states in part..."The doors on the aircraft will remain 1-3 inches open in flight if open. If discovered on takeoff roll, abort takeoff if practical. If already airborne: 1. Airspeed.....REDUCE TO 80 – 90 KIAS, 2. Land as soon as practical."

Review of copies of the airframe and engine maintenance logbook records showed an annual

inspection was completed June 30, 2010, at a recorded HOBBS times of 294.4 hours, and an engine and airframe total time of 247.5 hours. The logbook entry for the annual inspection stated in part "...Adjusted doors at latches and strike points. IAW Cirrus MM 57-10. Operational check was good."

METEOROLOGICAL INFORMATION

A review of recorded data from the Deer Valley Airport automated surface observation station (ASOS), revealed at 0553, conditions were wind from 080 degrees at 5 knots, visibility 10 statute miles, clear sky, temperature 86 degrees Fahrenheit, dew point 55 degrees Fahrenheit, and an altimeter setting of 29.89 inches of mercury.

AIRPORT INFORMATION

The Phoenix Deer Valley Airport (DVT) is a tower-controlled airport with a field elevation of 1,478 feet msl. The airport is equipped with two asphalt runways, runway 07R/25L (8,197-foot long and 100-foot wide runway surface) and runway 07L/25R (4,508-foot long and 75-foot wide runway surface).

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site by the NTSB investigator-in-charge (IIC) revealed that the airplane impacted an asphalt parking lot adjacent to a building structure about 2,570 feet west of the approach end of runway 07L. The main wreckage came to rest on a heading of about 354 degrees magnetic at an elevation of about 1,438 feet mean sea level (msl). Wreckage debris remained within an approximate 100-foot radius to the main wreckage. No impact related damage was observed on the building structure or surrounding trees around the perimeter of the parking lot. The main wreckage and surrounding area, including the building structure, exhibited fire damage.

Examination of the wreckage revealed that the fuselage was mostly consumed by fire. The engine remained attached to the firewall and exhibited impact damage. The left and right wing remained attached to the fuselage and were mostly consumed by fire. Fiberglass and carbon fiber cloth remained from the wing skins, torque box structure, and main spar. The left outboard section of left wing was separated at the outboard end of the left flap, and was located adjacent to the main wreckage.

Control continuity was established from the cockpit controls to the left and right ailerons. The left aileron control cable was separated between the left wing root and the left aileron actuation pulley. The areas of separation exhibited splayed signatures, consistent with tension overload.

The vertical stabilizer remained attached to the empennage, and was mostly consumed by fire. The rudder was separated from the vertical stabilizer, and located adjacent to the vertical

stabilizer. The rudder exhibited impact and fire damage. Rudder control cable continuity was established from the rudder to the cockpit controls.

The horizontal stabilizer remained attached to the empennage, and exhibited impact and fire damage. The left and right elevators remained attached to the horizontal stabilizer, and exhibited impact and fire damage. Elevator control cable continuity was established from the elevator control surfaces to the cockpit controls. The pitch trim setting was not determined due to impact and fire damage.

The left cabin door was separated from the fuselage, and was mostly consumed by fire. The upper and lower door latches were both observed in the open position. When actuated by hand, the lower latch would click shut and lock in the closed position. The latch could be opened by hand by moving the actuation arm at the door handle. Latch control cable continuity was established from the lower latch to the upper door latch. Damage was observed to the upper door latch, which prevented the normal range of motion of the upper door latch when actuated by hand. The upper latch could only be locked in place when pressure was added to the end of the upper rotary latch to assist in locking the latch in a closed position. Once locked, it was possible to unlatch the mechanism by applying pressure to the upper rotary arm to aid in moving the cable as would occur if full cable movement were possible.

The right cabin door was found separated from the airframe, and located about 15 feet to the right of the main wreckage. The upper door hinges remained attached to separated portions of the upper cabin roof structure. The upper and lower door latches were intact and undamaged. The door latches functioned normally by hand.

The baggage door was not observed, and was presumed to be consumed by fire.

The cabin area of the fuselage was mostly consumed by fire. Remains of various avionics and instruments were observed within the main wreckage. Impact and fire damage precluded documentation of the cockpit instruments, switch, and avionics settings.

Examination of the recovered IO-550-N (60) engine, serial number 1000383, revealed the engine exhibited extensive fire and impact damage. All of the engine accessories were separated from the engine except for the engine driven fuel pump, propeller governor, standby alternator, and the left and right turbo chargers. The aft portion of the crankcase halves was crushed and portions of the accessory case were separated. All cylinders and exhaust system exhibited fire and impact damage.

The rocker box covers, top spark plugs, and remaining engine accessories were removed from the engine. The crankshaft was rotated with extreme difficulty using a pipe wrench attached to the remaining portion of the crankshaft. Movement of all six pistons was verified as the crankshaft was rotated. The cylinders were examined internally using a lighted borecope, and exhibited very light deposits on the piston heads and cylinder combustion domes. The number

four cylinder was removed and found unremarkable.

The propeller was separated from the engine crankshaft along with the crankshaft propeller flange. The spinner was crushed and exhibited thermal damage. Two of the three blades were separated from the propeller hub. The remaining propeller blade was melted outboard of the mid span point. The remaining portion of crankshaft exposed from the front of the engine case exhibited extensive spiral cracking throughout half of its respective circumference.

The oil sump was removed from the engine, and exhibited impact damage. A 2- inch hollow cylinder like object was observed within the sump. The object was oil coated.

No anomalies were observed with the engine that would have precluded normal operation and the production of power.

For more information regarding the accident site, airframe, and engine examination, see the summary within the public docket for this accident.

MEDICAL AND PATHOLOGICAL INFORMATION

The Maricopa County Coroner conducted an autopsy on the pilot on August 6, 2010. The medical examiner determined that the cause of death was "....multiple blunt force injuries."

The FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma, performed toxicology tests on the pilot. According to CAMI's report, cyanide, volatiles, and drugs were tested, and had positive results for the following:

11 (mg/dL, mg/hg) ETHANOL detected in Blood (Cavity)
2 (mg/dL, mg/hg) METHANOL detected in Muscle
2 (mg/dL, mg/hg) METHANOL detected in Brain
1 (mg/dL, mg/hg) METHANOL detected in Blood (Cavity)
Desmethylvenlafaxine (O-) detected in Liver
0.747 (ug/mL, ug/g) Desmethylvenlafaxine (O-) detected in Blood (Cavity)
Nortriptyline detected in Liver
4.226 (ug/ml, ug/g) Nortriptyline detected in Blood (Cavity)
Venlafaxine detected in Liver
1.321 (ug/ml, ug/g) Venlafaxine detected in Blood (Cavity)

The toxicology report noted that the ethanol found in this case is from sources other than ingestion.

Review of the autopsy, FAA Airman Medical records, and the pilot's personal medical records were reviewed by the NTSB Chief Medical Officer. The review of the pilot's FAA blue ribbon medical file revealed that he did not report any medications until 1993, when he reported (and continued to report on later exams) the use of allopurinol for gout. On his last medical

certification, dated November 4, 2008, he additionally reported the use of simvastatin (marketed under the trade name Zocor) for elevated cholesterol.

The pilot's personal medical records revealed a history of treatment for depression, including a series of medications. From 2002 forward, the pilot was prescribed venlafaxine (marketed under the trade name Effexor) 75 mg and nortriptyline (marketed under the trade name Pamelor) 75mg daily for his depression. Also, in 2005, the pilot underwent a sleep study that documented moderate obstructive sleep apnea. Continuous positive airway pressure (CPAP) and bilevel positive airway pressure (BiPAP) were tried without improvement, and no clear treatment regimen was defined.

The pilot began to use a dental device and intermittently CPAP while sleeping. In March, 2009, he underwent a repeated sleep study that documented mixed obstructive and central sleep apneas that were significantly improved with CPAP. In December, 2009, his primary physician documented that the pilot reported using his CPAP.

Venlafaxine is a serotonin-norepinephrine reuptake inhibitor antidepressant that is used in the treatment of major depression. O-desmethylvenlafaxine is its major active metabolite. Recommendations for initial dosing include that patient's refrain from operating hazardous machinery until they are certain the drug does not affect their abilities, and to avoid the concomitant use of alcohol. Nortriptyline is a tricyclic antidepressant used in the treatment of depression.

For more information regarding the Medical Review, see the Medical Factual Report within the public docket for this accident.

TESTS AND RESEARCH

The removable data module (RDM) and SD Card were removed from the fuselage and subsequently shipped to the NTSB Vehicle Recorders Laboratory for further examination. No data was able to be extracted from the RDM or SD memory card.

A series of in-flight maneuvers in the accident make/model airplane with the left side door open and free to flow within the slipstream were performed by a Cirrus Aircraft test pilot and the NTSB IIC. No abnormalities were observed during the conduct of the flight, and the specific maneuvers, which included left and right 15-degree and 30-degree bank turns at various power settings, flap settings, and airspeed. During these tests, the door remained partially closed, approximately 2 inches ajar at the tailing edge of the door at airspeeds above 80 knots indicated. During stall tests, the door was observed opening to about 6 inches ajar at the trailing edge. No difficulty in maintaining airplane control was noted throughout any of the tested maneuvers.

Pilot Information

Certificate:	Commercial	**Age:**	67,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	November 4, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 24, 2009
Flight Time:	2692 hours (Total, all aircraft), 1114 hours (Total, this make and model), 52 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CIRRUS DESIGN CORP	**Registration:**	N146CK
Model/Series:	SR22	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3377
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 30, 2010 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	248 Hrs as of last inspection	**Engine Manufacturer:**	CONT MOTOR
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-550-N
Registered Owner:	MAGNETO INVESTMENTS LLC	**Rated Power:**	310 Horsepower
Operator:	James R Freeman III	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DVT,1478 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	05:33 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.88 inches Hg	**Temperature/Dew Point:**	30°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Phoenix, AZ (DVT)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	
Departure Time:	06:01 Local	**Type of Airspace:**	

Airport Information

Airport:	Phoenix Deer Valley Airport DVT	**Runway Surface Type:**	Asphalt
Airport Elevation:	1478 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	07L	**IFR Approach:**	None
Runway Length/Width:	4508 ft / 75 ft	**VFR Approach/Landing:**	Full stop;Precautionary landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	33.688056,-112.082496(est)

Administrative Information

Investigator In Charge (IIC):	Cawthra, Joshua
Additional Participating Persons:	Gary Hendrickson; Federal Aviation Administration; Scottsdale, AZ Brad Miller; Cirrus Aircraft; Duluth, MN John Kent; Continental Motors; Mobile, AL
Original Publish Date:	July 18, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=76854