Aviation Investigation Final Report

Location:	Palmer Lake, Colorado	**Accident Number:**	CEN16FA116
Date & Time:	March 2, 2016, 08:00 Local	**Registration:**	N6464
Aircraft:	Curtiss Wright TRAVEL AIR 4000	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot and the pilot-rated passenger were flying the biplane to a fly-in gathering in another state. Witnesses saw the airplane flying over a frozen lake at a low altitude and low airspeed. One witness saw the airplane "listing" left and right before it entered a left turn, and he lost sight of it. Other witnesses saw the airplane turn left and nose-dive into the ground. A postimpact fire consumed most of the airplane. Damage to the wreckage indicated that the airplane impacted the ground in a nose-down attitude. The examination did not reveal evidence of any preimpact anomalies with the airframe, engine, or the control system of the airplane.

A witness reported that, at the time of the accident, the wind was from the south about 30 miles per hour. However, a burnt area extending east from the airplane's impact point indicated the wind was from the west. Additionally, although wind information from nearby weather stations varied in direction and intensity. One station, about 14 miles west-northwest of the accident site reported calm wind., However, another station, located about 11 miles south of the accident site, recorded wind from the west at 11 knots with gusts to 27 knots about the time of the accident and wind from the west at 33 knots with gusts to 48 knots about an hour after the accident. Further, the forecast for the accident area called for wind gusts to 40 knots from the west-northwest. Therefore, it is likely that strong gusty west winds prevailed in the accident area at the time of the accident.

Although some witnesses speculated that the pilot may have been attempting to land the airplane on the frozen lake, the airplane was not equipped to land on ice, and the reason the pilot was maneuvering at a low altitude in strong gusty winds could not be determined. Based on the witness observations and the damage to the wreckage, it is likely that the pilot allowed the airspeed to decrease to a point where the critical angle of attack was exceeded, and the airplane entered an aerodynamic stall/spin.

Although the pilot was known to have heart disease, it is unlikely that his medical condition contributed to the accident. The witness observations indicate that the pilot was actively flying the airplane before the loss of control.

Toxicology testing showed the presence of chlorpheniramine in the pilot's blood at a level that was likely in the therapeutic range. Chlorpheniramine is a sedating antihistamine available in a number of over the counter products, and it carries the warning, "May impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)." Because of its sedating effect, chlorpheniramine may slow psychomotor functioning and cause drowsiness. It has also been shown in a driving simulator (after a single dose) to suppress visual-spatial cognition and visual-motor coordinating functions when compared to placebo. Such functions would have been necessary for the pilot to maintain control of the airplane while maneuvering close to the ground in the strong gusty wind conditions. Therefore, it is likely that the pilot's ability to safely operate the plane was impaired by the effects of chlorpheniramine.

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 sufficient airspeed while maneuvering at low altitude in strong gusting winds, which resulted in exceedance of the airplane's critical angle of attack and an aerodynamic stall/spin. Contributing to the accident was the pilot's impairment due to the effects of a sedating antihistamine.

Findings

Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Capability exceeded
Personnel issues	OTC medication - Pilot
Environmental issues	High wind - Effect on operation
Environmental issues	Gusts - Effect on operation

Factual Information

History of Flight

Enroute-cruise	Loss of control in flight (Defining event)

HISTORY OF FLIGHT

On March 2, 2016, about 0800 mountain standard time, a Curtis Wright Travel Air 4000 airplane, N6464, was destroyed when it impacted the ground in an uncontrolled descent near Palmer Lake, Colorado. The pilot and the pilot-rated passenger were fatally injured. The airplane was registered to and operated by the pilot under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal flight; no flight plan had been filed. Visual meteorological conditions prevailed near the accident site. The flight originated from the Vance Brand Airport, near Longmont, Colorado, about 0715. An acquaintance of the pilot reported that the airplane was en route to a fly-in gathering at the Casa Grande Municipal Airport, Casa Grande, Arizona.

A witness, who had about 35 to 40 hours flight experience, reported seeing the airplane flying south over Palmer Lake at a low altitude and low airspeed. He stated that it appeared as if the airplane was making a "low slow scenic pass" over the lake. He said that the airplane was going "pretty slow," but it was flying south into a headwind of about 30 mph. He said that, while flying over the lake, the airplane started a left turn when it was near the south end of the lake at an altitude of about 200 ft above the ground. He said that the turn was about 20° to 30° in bank and that the airplane then "slid" before going out of view behind trees. He stated that as soon as he saw the airplane begin to turn he became very concerned. He drove to the scene and saw the airplane in flames.

Another witness reported seeing the airplane heading south at a low altitude over the north end of the lake. He stated that the airplane seemed to be out of control, back under control, and then it turned toward the north. He speculated that the pilot may have been trying to land on the frozen lake. The airplane then turned to the south again, banked left, and nosedived into the ground.

A third witness reported seeing the airplane flying above the lake. She reported that it seemed to "struggle" and then seemed to level out. The airplane then went out of control again, banked left, nosedived into the ground, and caught fire.

A fourth witness reported seeing the airplane flying southbound over the railroad tracks, about 100 ft above the ground. He stated that the airplane seemed to be floating in the air and did not seem to have a lot of power. He further stated that the airplane was "listing left and right greatly." He saw the airplane turn toward the east just past the lake. The turn appeared to be controlled, and he thought the airplane was possibly trying to land. By this time, the airplane had descended to about 15 to 20 f above the ground. He did not see or hear the impact.

PERSONNEL INFORMATION

Pilot

The pilot held a commercial pilot certificate with airplane single-engine land and airplane multiengine land ratings. The multiengine rating was limited to private pilot privileges. The pilot's most recent third class medical certificate was issued on June 10, 2013, with the following limitations: "Must wear corrective lenses. Not valid for any class after June 30, 2015." At the time of the accident, this medical certificate had expired for all classes and had not been renewed. The pilot reported having 5,000 hours total flight experience and 50 hours in the 6 months preceding his most recent airman medical examination. The pilot's flight logbooks were not available for review during the investigation.

Pilot-rated Passenger

The passenger held a commercial pilot certificate with airplane single-engine land, airplane single-engine sea, airplane multiengine land, and instrument airplane ratings. His most recent third class medical certificate was issued on October 14, 2010, with the limitation: "Must wear corrective lenses." At the time of the accident, this medical certificate had expired for all classes and had not been renewed.

AIRCRAFT INFORMATION

The airplane was a 1928 Curtis Wright Travel Air 4000 airplane. It was a two-seat biplane with a conventional (tailwheel) landing gear arrangement. The wings were constructed of wood with a fabric covering. The fuselage used a steel tube structure with fabric covering. A 235-horsepower Wright Whirlwind, model R-760-8, seven-cylinder radial engine powered the airplane.

The most recent aircraft logbooks were not located during the investigation; however, the mechanic who certified the most recent annual inspection reported that it was completed on July 1, 2015.

The type certificate data sheet for the Travel Air 4000 indicated that the airplane was originally equipped with a Wright J-5, 220-horsepower, nine-cylinder radial engine. Research for aircraft specifications relating to the accident airplane did not reveal those for an airplane with the same engine model installation as the accident airplane. Specifications found for a Travel Air 4000 with a 165-horsepower Wright J-6 radial engine were as follows:

Engine: Wright J-6 "Whirlwind" five-cylinder radial, 165 hp at 1,800 rpm
Length overall: 24 ft. 1 in.
Height overall: 8 ft. 11 in.
Wingspan (upper): 33 ft.
Wingspan (lower): 28 ft. 9 in.
Wing chord (upper): 5 ft. 6 in.
Wing chord (lower): 4 ft. 8 in.
Wing area (upper): 171 sq. ft.
Wing area (lower): 118 sq ft.
Gross weight: 2,702 lbs.
Empty weight: 1,695 lbs.
Useful load: 1,007 lbs.
Payload with full fuel (67 gal.): 392 lbs.
Performance with full load
Maximum Speed: 120 mph
Cruise Speed (sl.): 103 mph

Rate of climb: 720 ft. per minute
Surface ceiling: 13,000 ft.
Landing speed: 48 mph.
Normal cruising range: 650 miles
Fuel capacity: 67 gal.
Oil capacity: 6 gal.

METEOROLOGICAL INFORMATION

A weather observation station was located at the United States Air Force Academy Airfield (AFF) about 11 miles south-southeast of the accident site at an elevation of about 6,550 ft.

At 0758, AFF reported wind from 250° at 11 knots with gusts to 27 knots, visibility of 10 statute miles or greater, sky clear, temperature of 13°C, dew point temperature of -9°C, and altimeter setting of 29.86 inches of mercury. The remarks section of the observation included peak wind of 33 knots from 220° at 0720.

At 0848, AFF reported a wind from 270° at 33 knots with gusts to 48 knots, visibility of 10 statute miles or greater, squall, sky clear, temperature of 12°C, dew point temperature of -8°C, and altimeter setting of 29.84 inches of mercury.

An Automated Weather Observing System was located at Kelly Air Park (MNH) about 14 miles northwest-west of the accident site at an elevation of about 7,050 ft. At 0756, MNH reported a calm wind, visibility of 10 statute miles or greater, sky clear, temperature of 7°C, dew point temperature of -6°C, and altimeter setting of 29.91 inches of mercury.

An area forecast that included Colorado was issued at 0445. The portion of the area forecast that covered the accident area called for wind gusts of 40 knots from the west-northwest about the time of the accident.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest on the crest of an embankment near a set of railroad tracks. A debris field was on a bearing of 110° where small articles and a postimpact fire had spread from the impact crater.

The main wreckage came to rest in its impact crater. The propeller was partially driven into the ground with the engine angled and the fuselage lying on the ground. The postimpact fire had consumed nearly all the airplane's fabric and wooden wing spars. Multiple pools of material consistent with solidified molten aluminum were found throughout the wreckage.
The left rudder cable remained attached to the rudder and was traced to an overload break near the aft left rudder pedal. Following the break, the remainder of the broken cable led to the aft left rudder pedal. The right cable remained attached to the rudder and was traced to the right aft rudder pedal. Both rudder cables also remained connected to the tail wheel. Elevator cable continuity was established from the elevator to both control sticks. Both control sticks interfaced with the end caps beneath the cockpit area. The aileron push-pull rods were largely consumed by fire. The remaining pieces had signatures consistent with overload. The end caps near both lower aileron surfaces remained attached to their turnbuckles, and both aileron interconnect rods were traced to the upper aileron surfaces.

The postimpact fire consumed most of the cockpit area, and no gauges could be found. All webbing of the restraint systems was thermally destroyed, and only the metal portions remained. The front seat restraint system was unbuckled at the lap belt connector, but both shoulder harness latches remained in the tongue of the lap belt. The rear occupant restraint system remained latched. The airplane's data plate was not found at the accident site.

The oil screen was fractured loose from the engine and contained soil and rocks consistent with the soil at the accident site; no obviously metal flakes were seen on the screen. The carburetor was fractured from the engine, and bent cowl pieces precluded an on scene examination. Both metal propeller blades remained attached at the flange. The propeller could not be rotated by hand. Both blades remained relatively straight. One blade displayed twisting toward the non-cambered side. When the engine was moved, fuel and oil poured from an area aft of the engine.

Further examination of the engine was conducted after its removal from the accident site. The propeller and fragmented portions of the crankcase were removed to facilitate engine rotation. The engine was then rotated by hand using a tool on the crankshaft splines. Compression was verified on all cylinders, and valve train continuity was established. The engine magnetos had sustained substantial fire damage that precluding testing.

The examination of the wreckage did not reveal any evidence of preimpact anomalies with the airframe, engine, or the control system of the airplane.

MEDICAL AND PATHOLOGICAL INFORMATION

Pilot

The 77-year old male pilot had a complicated history of coronary artery disease that had required 5-vessel bypass surgery, diabetes, and multiple surgeries. As of his last medical exam, he reported using simvastatin (also called Zocor) and niacin (also called Niaspan) to treat his high cholesterol, metoprolol (also called Lopressor and Toprol) and lisinopril (also called Zestril or Prinivil) to treat his hypertension and prevent a heart attack, and pioglitazone (known as Actos) as well as the combination of sitagliptin and metformin (commonly marketed as Janumet) to treat his diabetes. None of these medications are generally considered impairing.

According to the autopsy performed by the El Paso County Coroner, the pilot's cause of death was a combination of smoke inhalation, thermal burns, and multiple blunt force injuries, and the manner of death was accident. The airways were described as covered in "dense black soot," and the carboxyhemoglobin level measure by the Coroner's office was 19.5%.

Examination of the body for natural disease identified an enlarged heart with previous coronary artery bypass grafts as well as underlying severe atherosclerotic heart disease in the native vessels. Four out of five grafts were widely patent but the graft to the posterolateral circumflex artery was completely thrombosed with hyaline changes on microscopy indicating this had occurred a long time before the accident. The left ventricular free wall contained numerous scattered foci of perivascular and interstitial fibrosis, also indicating ischemia long (months to many years) before the accident. There was no evidence of recent ischemia.

Toxicology testing performed by the Federal Aviation Administration's (FAA) Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, identified a carboxyhemoglobin level of 19% in cardiac blood as well as 0.066 ug/ml of chlorpheniramine and metoprolol. In addition, chlorpheniramine, metoprolol, diphenhydramine, and salicylate (a metabolite of aspirin) were identified in urine.

Chlorpheniramine is a sedating antihistamine available in a number of over-the-counter products, and it carries the warning, "May impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)."

Pilot-rated Passenger

At the time of his last medical exam, the 60-year old male pilot-rated passenger reported no chronic medical issues or any chronic medication use to the FAA.
According to the autopsy performed by the El Paso County Coroner, the pilot-rated passenger's cause of death was blunt force injuries of the chest, and the manner of death was accident. There was no soot in his airways. No significant natural disease was identified by autopsy.

Toxicology testing performed by the El Paso Coroner's Office identified naproxen and one of its urinary metabolites as well as metoprolol in the pilot-rated passenger's urine. In addition, they rated "probable" the finding of chlorpheniramine in urine. Cardiac blood tested negative for ethanol and carboxyhemoglobin. Toxicology testing performed by the FAA's Bioaeronautical Sciences Research Laboratory identified only salicylate (a metabolite of aspirin) in urine.

Pilot Information

Certificate:	Commercial; Private	**Age:**	77,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Waiver time limited special	**Last FAA Medical Exam:**	June 10, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	5000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Curtiss Wright	**Registration:**	N6464
Model/Series:	TRAVEL AIR 4000 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1928	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	785
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	July 1, 2015 Annual	**Certified Max Gross Wt.:**	2702 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Wright
ELT:		**Engine Model/Series:**	J-6
Registered Owner:	On file	**Rated Power:**	165 Horsepower
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:	COS	**Distance from Accident Site:**	20 Nautical Miles
Observation Time:	14:54 Local	**Direction from Accident Site:**	150°
Lowest Cloud Condition:	Few / 12000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	9°C / -9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	LONGMONT, CO (LMO)	**Type of Flight Plan Filed:**	None
Destination:	Casa Grande, AZ (CGZ)	**Type of Clearance:**	None
Departure Time:	07:15 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	2 Fatal	**Latitude, Longitude:**	39.1175,-104.910003

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Ron Budnick; FAA - Denver FSDO; Denver, CO
Original Publish Date:	November 28, 2017
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=92796