Aviation Investigation Final Report

Location:	Russell, Iowa	**Accident Number:**	CEN14LA424
Date & Time:	August 9, 2014, 13:10 Local	**Registration:**	N92BF
Aircraft:	BARGER STEVE M RV-7A	**Aircraft Damage:**	Destroyed
Defining Event:	VFR encounter with IMC	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The noninstrument-rated pilot was conducting a cross-country flight. GPS data indicated that the airplane departed and then proceeded west-southwest at an initial altitude of about 4,500 ft mean sea level (msl). About 20 minutes later, the airplane's track deviated from its initial heading, and the airplane began to climb. The airplane continued to climb at a slower groundspeed and reached a maximum recorded altitude of 7,769 ft msl; the groundspeed had slowed to 75 knots. The airplane then began a descending right turn, during which it reached a maximum groundspeed of 208 knots. During this time, the airplane was descending through 5,364 ft msl, and its descent rate reached more than 3,000 ft per minute (fpm). The last recorded point showed the airplane descending through 4,094 ft msl. During the last 52 seconds of the recorded data, the airplane lost 3,675 ft of altitude, and the descent rate had increased to more than 4,000 fpm. The airplane impacted a field, and examination of the wreckage revealed evidence consistent with a near vertical impact.

Postaccident examination of the airplane did not reveal any preimpact anomalies. A mechanic reported that the airplane's mechanical fuel pump had been replaced a few days before the accident; however, if the mechanical fuel pump had failed it would not have caused the steep descent during the final portion of the flight. Additionally, the electric fuel pump was operational and would have supplied the fuel necessary for engine operation.

The pilot was receiving flight-following services from air traffic control during the accident flight. In his last communication, the pilot reported to a controller that he had entered instrument meteorological conditions (IMC) and was trying to get "back on track"; he made this communication about the same time as the GPS data showed the airplane in the steep descending right turn. The controller advised the pilot to maintain visual flight rules, but the pilot did not respond. Weather conditions in the area at the time of the accident included overcast ceilings of 1,200 to 1,300 ft above ground level. No record was found indicating that the pilot received a preflight weather briefing; however, it could not be determined if the pilot obtained weather information using other sources. The restricted visibility conditions would

have been conducive to the development of spatial disorientation, and the airplane's rapidly descending turn were consistent with the noninstrument-rated pilot inadvertently entering IMC and then losing airplane control due to spatial disorientation.

Toxicological testing of the pilot's specimens detected ethanol in the muscle and liver; however, it was likely produced postmortem.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The noninstrument-rated pilot's inadvertent entry into instrument meteorological conditions, which resulted in his spatial disorientation and the subsequent loss of airplane control.

Findings

Personnel issues	Spatial disorientation - Pilot
Aircraft	(general) - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Environmental issues	Low ceiling - Effect on operation

Factual Information

History of Flight

Enroute-cruise	VFR encounter with IMC (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT
On August 9, 2014, about 1310 central daylight time, an amateur-built Barger RV-7A airplane, N92BF, was destroyed when it impacted terrain near Russell, Iowa. The pilot and passenger received fatal injuries. The airplane was owned and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as personal flight. Marginal visual meteorological conditions existed in the immediate area of the accident site and the flight was operated on a visual flight rules (VFR) flight plan. The flight originated from the Ottumwa Regional Airport (OTM), Ottumwa, Iowa at an unconfirmed time, and was bound for the Meadow Lake Airport (FLY), Colorado Springs, Colorado when the accident occurred.

Tracking data was recovered from a handheld GPS receiver found within the wreckage. The recorded data began at 1242:18 at OTM. The aircraft departed and proceeded west/southwest at an initial altitude of about 4,500 feet. About 1304, the airplane turned to the right to a more westerly track. This westerly track continued until about 1306. Shortly after the aircraft turned to the west, it began a climb at a slower groundspeed, to a maximum recorded altitude of 7,769 feet at 1308:15, when the groundspeed had slowed to 75 knots. During this climb, the aircraft track turned left towards the southwest; however, the southwesterly track exhibited about three fluctuations to the left and right. About 1308:15, the airplane began a descent from its maximum recorded altitude. The track data depicted a descending right turn of increasing groundspeed, reaching a maximum computed groundspeed of 208 knots by 1308:57. At this time the airplane was descending through 5,364 feet in excess of 3,000 feet per minute. The last recorded point was at 1309:07 when the aircraft was descending through 4,094 feet. During the last 52 seconds of the recorded data, the airplane lost 3,675 of altitude, resulting in a calculated average rate of descent for this time period in excess of 4,000 feet per minute.

PERSONNEL INFORMATION
The pilot, age 53, held a private pilot certificate with a single engine land airplane rating. He did not have an instrument rating. His second class airman medical certificate was issued on June 14, 2014. The limitations section of the medical certificate noted that the pilot must wear corrective lenses when exercising the privileges of his pilot certificate. The pilot's flight logbook was not available for review during the investigation; however, on the application for that medical certificate, the pilot reported having 117 hours total flight experience and 33 hours in the 6 months preceding his medical examination.

AIRCRAFT INFORMATION
The airplane was an amateur-built RV-7A airplane that was constructed from a kit. The airplane was a low-wing monoplane with a fixed tricycle landing gear arrangement. It was constructed primarily of aluminum, seated two occupants in a side-by-side seating arrangement, and was powered by a 180

horsepower Superior O-360-A1A engine, serial number 1053-SPS,. The propeller was a 3-blade Catto propeller assembly with composite skin, wood core blades.

According to airworthiness documents, the airplane limitations included the following

Never exceed speed 230 mph
Maximum structural cruising speed 193 mph
Maneuvering speed 142 mph
Best rate of climb speed 110 mph
Best angle of climb speed 80 mph
Stall speed (clean) 64 mph
Stall speed (landing configuration 58 mph)

METEOROLOGICAL INFORMATION
There was no record of the pilot obtaining a weather briefing from the FAA contract Automated Flight Service Center (AFSS) or from any of the Direct User Access Terminal System (DUATS) providers. It is not known if the pilot obtained weather information from a different source.

At 1255, the weather conditions at the Chariton Municipal Airport (CNC), Chariton, Iowa, about 16 miles northwest of the accident site were: wind from 90 degrees at 4 knots; 9 miles visibility, overcast ceiling at 1,300 feet above ground level (agl), temperature 22 degrees Celsius (C); dew point 19 degrees C; altimeter setting 30.07 inches of mercury.

At 1315, the weather conditions at CNC were: wind from 80 degrees at 8 knots; 9 miles visibility, overcast ceiling at 1,300 feet agl, temperature 22 degrees C; dew point 19 degrees C; altimeter setting 30.07 inches of mercury.

At 1255, the weather conditions at the Centerville Municipal Airport (TVK), Centerville, Iowa, about 18 miles southeast of the accident site were: wind from 100 degrees at 4 knots; 10 miles visibility, overcast ceiling at 1,200 feet agl, temperature 22 degrees C; dew point 20 degrees C; altimeter setting 30.08 inches of mercury.

At 1315, the weather conditions at TVK were: wind from 140 degrees at 3 knots; 10 miles visibility, overcast ceiling at 1,200 feet agl, temperature 22 degrees C; dew point 20 degrees C; altimeter setting 30.08 inches of mercury.

At 1253, the weather conditions at the Ottumwa Regional Airport (KOTM), Ottumwa, Iowa, about 42 miles east-northeast of the accident site were: wind from 110 degrees at 6 knots; 10 miles visibility; broken ceiling at 4,600 feet agl, overcast ceiling at 8,500 feet agl; temperature 24 degrees C; dew point 18 degrees C.

COMMUNICATIONS
The pilot was receiving VFR flight following services from the Chicago Air Route Traffic Control Center (ZAU ARTCC). The pilot contacted the Chicago Center shortly after his departure from OTM. When the pilot initially contacted Chicago Center he reported that the airplane was at an altitude of 4,500 feet above mean sea level (msl). The controller later confirmed radar contact when the airplane was about 10 miles west of OTM at an altitude of 4,500 feet msl. About 6 minutes after the initial contact, the Chicago Center controller made repeated attempts, but was unable to communicate with the

accident airplane. The pilot of another airplane volunteered and was able to relay a message from the Chicago Center controller to the accident airplane and communications between Chicago Center and the accident airplane were restored. About 1808, the controller contacted the pilot to inquire about the airplane's route of flight. The pilot responded and informed the controller that he had entered IMC conditions and was "trying to get back on track". The controller advised the pilot to maintain visual flight rules conditions (VFR). About one minute later, the controller made repeated attempts to contact the pilot, inquiring about the airplane's altitude, but no reply was received. No further communications were received from the accident airplane.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted a level field near Russell, Iowa. Examination revealed fragmentation of the entire airframe. The leading edges of both wings were crushed rearward to the main spar, indicative of a near vertical impact. All of the primary flight control surfaces were located within the wreckage debris recovered from the accident site. The flight control system was examined to the extent possible and no preimpact defects were identified.

The engine was rotated and compression was noted on all cylinders. The magnetos had separated from the engine. Both magnetos produced spark when rotated by hand. Examination of the carburetor did not reveal any preimpact defects and the carburetor bowl was clean with no debris.

The engine's mechanical fuel pump had separated from the engine and the casting portion that contained the pump arm had fractured. As a result, a functional test of the mechanical fuel pump was not possible. Another mechanical fuel pump was found in a plastic bag within the wreckage. The pump exhibited no externally identifiable defects. Since the pump was not mounted on the engine, a functional test was not performed. An electric fuel pump was located within the wreckage debris. During the postaccident examination, the electric fuel pump was powered and was able to pump liquid with no anomalies noted..

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot listed the cause of death as multiple blunt force injuries resulting from the accident.

A toxicological report listed 39 (mg/dL, mg/hg) Ethanol detected in Muscle tissue, and 18 (mg/dL, mg/hg) Ethanol detected in Liver tissue.

ADDITIONAL INFORMATION

Information was provided that indicated the airplane had undergone maintenance at a facility in Cumberland, Wisconsin. The mechanic that performed the maintenance reported that the accident airplane arrived on August 4, 2014, and the pilot reported erratic fuel pressure readings. The mechanic reported that the fuel system was examined and fuel flow from the electric fuel pump was confirmed. No defects were found, but the mechanical fuel pump was removed and replaced with a new unit because on-site field testing could not determine the condition of the pump that was subsequently replaced. The new fuel pump was installed and a ground test run conducted by the pilot. The pilot subsequently departed in the airplane, but returned a short while later reporting that the fuel pressure readings in the cockpit were erratic. The mechanic reported that a T-fitting with an external fuel pressure gauge was connected to the airplane's fuel system. A ground run confirmed that the cockpit readings were erratic and did not match the external gauge. The mechanic reported that he provided the pilot with tape so that the pilot could fabricate a placard for the erratic gauge.

Pilot Information

Certificate:	Private	**Age:**	53
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:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 13, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	117 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	BARGER STEVE M	**Registration:**	N92BF
Model/Series:	RV-7A A	**Aircraft Category:**	Airplane
Year of Manufacture:	2010	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	72904
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Aerosport
ELT:	C91A installed, not activated	**Engine Model/Series:**	O-360-A1A
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CNC,1051 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	18:15 Local	**Direction from Accident Site:**	315°
Lowest Cloud Condition:		**Visibility**	9 miles
Lowest Ceiling:	Overcast / 1300 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	22°C / 19°C
Precipitation and Obscuration:			
Departure Point:	Ottumwa, IA (OTM)	**Type of Flight Plan Filed:**	VFR
Destination:	Colorado Spring, CO (FLY)	**Type of Clearance:**	VFR flight following
Departure Time:		**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	40.883609,-93.183891

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Michael Heenan; FAA-Des Moines FSDO; Des Moines, IA
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Investigation Class:	Class
Note:	
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