Aviation Investigation Final Report

Location:	Lakeview, Arkansas	**Accident Number:**	CEN09FA393
Date & Time:	June 26, 2009, 09:04 Local	**Registration:**	N38171
Aircraft:	Piper PA-32R-300	**Aircraft Damage:**	Substantial
Defining Event:	Collision during takeoff/land	**Injuries:**	3 Fatal, 1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

An employee who helped load the airplane thought it was “overloaded” and that the passengers seemed “tense" and “in a hurry to leave.” The pilot made a flaps-up takeoff. It was calculated that at takeoff, the airplane was 188 pounds over maximum certificated gross weight, and the aft c.g. limit was exceeded by 0.15 inches. It was calculated that the flaps up takeoff ground roll would be approximately 1,970 feet, and the flaps up takeoff distance over a 50-foot barrier would be approximately 3,190 feet. The grass runway was 3,200 feet long. Prior to takeoff, the pilot told a surviving passenger that they were going to need all of the runway for takeoff. The passenger said the airplane lifted off at the end of the runway, dropped down into a shallow valley, touched the ground, and lifted off again. It touched down a second time, hit a barbed wire fence and tree, and “rolled” several times. Witnesses said the airplane lifted off in a nose high attitude, disappeared into a shallow valley, then reappeared in a slight climb. The wings were "wig-wagging" and the airplane was "porpoising." GPS data indicates the airplane lifted off between 74 and 78 mph and climbed no more than 29 feet. A videotape of the takeoff corroborated witness' observations. Post-accident examination of the airplane and engine did not reveal any evidence of preimpact failure or malfunction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's poor judgment/decision making in attempting the no-flap takeoff, his failure to comply with weight and balance limitations, and his failure to calculate the airplane's performance under exiting conditions.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Performance calculations - Pilot
Personnel issues	Weight/balance calculations - Pilot
Aircraft	Climb capability - Capability exceeded
Environmental issues	High temperature - Effect on operation
Aircraft	Trailing edge flaps - Not used/operated

Factual Information

History of Flight

Initial climb	Collision during takeoff/land (Defining event)

HISTORY OF FLIGHT

On June 26, 2009, at 0904 central daylight time, a Piper PA-32R-300, N38171, registered to and operated by PropAire, Inc., of St. Louis, Missouri, and piloted by a private pilot, was substantially damaged when it struck a tree and impacted terrain shortly after taking off from Gaston's Air strip (3MO), Lakeview, Arkansas. Visual meteorological conditions prevailed at the time of the accident. The personal flight was being conducted under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91, and no flight plan had been filed. The pilot and two passengers were fatally injured. A fourth passenger was seriously injured, and a fifth passenger sustained minor injuries. The cross-country flight was originating at the time of the accident, and was en route to Spirit of St. Louis Airport (SUS), St. Louis, Missouri.

According to Global Positioning System (GPS) data retrieved from the airplane, the pilot and his party departed Spirit of St. Louis Airport at 0647 on June 23, and arrived at Gaston’s Airstrip at 0703. They were planning to go fishing for the next three days.

According to Lockheed Martin records, the pilot telephoned the flight service station (FSS) on June 26 at 0815 and obtained a weather briefing for the return flight to SUS. He did not file a flight plan.

The pilot and his passengers were driven to the airstrip by a Gaston employee. The employee said the passengers “wore plastic bags on their feet” and “had luggage on their laps.” He thought the airplane was “overloaded” and the passengers “were tense, [but] maybe [it was] just the heat.” They also appeared to be “in a hurry to leave.” He said the engine “didn’t sound right before takeoff,” and the airplane “didn’t appear to lift very well.”

A Baxter County sheriff’s deputy took a recorded statement from the passenger who was seated in the right front seat. He said that just before takeoff, the pilot told him they were going to need the entire runway. He said the airplane lifted off at the end of the runway, dropped down into a shallow valley, touched the ground, and lifted off again. It touched down a second time, hit a tree, and “rolled” several times. He climbed over the pilot (he said he could tell he was dead), got out of the airplane, and went back to where his son was sitting. He said his son could move but was “screaming in pain.”

One witness who observed the takeoff said the airplane “came from runway with nose up (sic), possibly 30 percent,” and “was losing altitude.” Other witnesses saw the airplane lift off and

disappear into a shallow valley. When it reappeared, it was in a slight climb, the wings were "wig-wagging" and the airplane was "porpoising." A witness who was fishing in a boat on the nearby White River said he heard the airplane take off and could see it through the trees. He could tell it “didn’t have much altitude.” Another witness fishing on the river said the airplane “sounded like it was barely moving. The plane was approximately 100 feet off the ground. The plane veered to the right. The back of the plane hit a tree (sheared left wing).”

The first 9-1-1 call was received at 0904.

PERSONNEL (CREW) INFORMATION

The pilot, age 52, held a private pilot certificate with airplane single-engine land and instrument ratings, dated April 22, 1992. He also held a third class airman medical certificate, dated March 17, 2008, with no restrictions or limitations.

The second of the pilot’s two logbooks was recovered from the wreckage. It contained entries October 18, 1993, to June 23, 2009, and indicated that the pilot had logged the following flight times:

Total time, 673.8
Airplane single–engine land, 673.8
Piper PA-32R-300, 165.3
Pilot-in-command, 567.4
Dual instruction, 122.3
Cross-country, 512.9
Night, 71.3
Actual instruments, 100.1
Simulated instruments, 62.7

His most recent flight review was accomplished on March 20, 2009, in the accident airplane.

AIRCRAFT INFORMATION

N38171 (s.n. 32R-7780392), and model PA-32R-300, was manufactured by the Piper Aircraft Corporation in 1977, and was owned and operated by PropAire, Inc., of St. Louis, Missouri. It was equipped with a Lycoming IO-540-K1G5D engine (s.n. L-16598-48A), rated at 300 horsepower, driving a Hartzell 3-blade, all-metal, constant-speed propeller (m.n. HC-C3YR-1RF).

According to the aircraft’s maintenance records, the last annual and 100-hour inspections of the airframe, engine, and propeller were accomplished on March 10, 2009, at a tachometer time of 2,107.91 hours. At that time, the airframe total time was 9,011.45 hours, and the engine total time since new and since major overhaul, which was done on May 11, 2000, was 8,390.50

hours and 2,107.91 hours, respectively. The propeller was overhauled on April 6, 1999, and dynamically balanced on February 24, 2004, at a tachometer time of 1,015.17 hours. The last IFR certification of the transponder, altimeter, encoder, and static system was on April 8, 2009.

METEOROLOGICAL INFORMATION

The following Aviation Routine Weather Report (METAR) was recorded at Ozark (Baxter County) Regional Airport (BPK), Mountain Home, Arkansas, located 5 miles east of the accident site, at 0853:

Wind, calm; visibility, 6, haze; sky condition, clear; temperature, 27 C.; dew point, 23 C.; altimeter setting, 29.91 inches of Mercury; Remarks: sea level pressure, 1011.6 mb.

The following Aviation Routine Weather Report (METAR) was recorded at Marion County Regional Airport (FLP), Flippin, Arkansas, located 5 miles south-southwest of the accident site:

Wind, calm; visibility, 10; sky condition, few clouds 6,000 feet; temperature, 28 degrees C.; dew point, 22 degrees C.; altimeter setting, 29.91 inches of Mercury.

Witnesses described the weather at the time of take off as being hot, hazy, and muggy.

Using the field elevation of 479 feet, a temperature and dew point of 27 and 23 degrees C. (81 and 73 degrees F.), respectively, and an altimeter setting of 29.91 inches of Mercury, the pressure altitude was computed to be 489 feet, the density altitude was calculated to be 2,367 feet, and the relative air density was calculated to be 93.25 percent at takeoff from Gaston's.

AERODROME INFORMATION

Gaston's Airstrip (3MO) is located one mile south of Lakeview at coordinates 36 degrees, 20.55' north latitude, and 092 degrees, 33.25' west longitude. It is situated at an elevation of 479 feet msl. It has one runway: 06-24, 3,200 feet x 55 feet, turf. The grass runway was well manicured. The height of the grass on the runway was approximately 1 inch.

WRECKAGE AND IMPACT INFORMATION

The on-site investigation commenced June 27 and terminated June 28, 2009.

The compass heading for runway 6 was 069 degrees and was 0.6 miles long (as measured by automobile odometer). The airplane wreckage was measured to be 0.7 miles past the end of the runway.

Examination of the accident site disclosed tire tracks in the tall grass, on a magnetic heading of 120 degrees, leading up to a barbed wire fence that had been torn down. Just beyond the fence was a large tree with chop marks consistent with propeller strikes. Most of the bark was missing. At the base of this tree were the airplane's left wing and left rear cargo door. Beyond the tree, on a heading of 128 degrees and twisting to a heading of 179 degrees, was the twisted airplane wreckage. The nose was aligned on a heading of 097 degrees and the tail was aligned on a heading of 031 degrees, magnetic. Numerous personal effects were found scattered on the ground.

The fuel selector was photographed and compared with an exemplar. It was determined that it was positioned on the left main tank. The landing gear control was in the DOWN position, and the bellcrank was extended. The flap handle lay flat on the floor, and the actuator was in the UP position. Examination of the elevator trim jackscrew revealed 8 threads exposed. According to the Piper Aircraft representative, 0 threads equates to FULL NOSE DOWN, 5 threads equates to the NEUTRAL position, and 16 threads equates to FULL NOSE UP. The ELT (emergency locator transmitter) was found ARMED with a battery expiration date of June 2010. Further examination of the cockpit disclosed the following:

Alternate Air – CLOSED
Suction – 0
Autopilot – OFF
Door Seals – ON
Backup Radio Master – ON
Guard – OFF
Attitude Gyro Switch – ON
Guard – ON
Outside Air Temperature – 9 degrees F. (15 degrees C.)
Master Switch – OFF
Fuel Pump – OFF
Anti-Collision Light – OFF
Landing Light – OFF
Pitot Heat – OFF
Airspeed Indicator – 0
No. 1 Artificial Gyro Horizon – Inverted, 15 degrees left bank/30 degrees nose up
No. 2 Artificial Gyro Horizon – 90 degrees left bank
Directional Gyro – 255 degrees
Altimeter – 800 feet, 29.90 inches of Mercury
Vertical Speed – 500 fpm, UP
No. 1 OBS – 030 degrees
No. 2 OBS – 120 degrees
Left/Right Fuel – 0
Fuel Pressure – 0
Manifold Pressure – 30 inches of Mercury

Fuel Flow – 0
Magnetos – BOTH
ADF – 355 degrees HEADING, 085 degrees BEARING, 227kHz
Transponder – 1200 Mode C

Examination of the engine revealed oil in the crankcase. Thumb compression was obtained on all cylinders. The spark plugs were of normal coloration, and the fuel screen and servo and oil filter were clean. Both magnetos produced spark when turned by hand. All three propeller blades were bent aft midspan, and the tips were curled forward. There were 90-degree chordwise scratches on the cambered surfaces of all the blades,

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Arkansas State Crime Lab in Little Rock Arkansas. According to the autopsy report, death was attributed to “multiple traumatic injuries.” The manner of death was “accident.”

FAA Civil Aeromedical Institute (CAMI) performed a toxicological screen. According to CAMI’s report, there was no evidence of carbon monoxide or cyanide in the blood, and there was no evidence of ethanol in vitreous. Ibuprofen was detected in the blood. Ibuprofen is a non-steroid anti-inflammatory drug used for pain relief and fever reduction, and as an analgesic.

TESTS AND RESEARCH

Attached to the airplane’s instrument panel was a Garmin 496 Global Positioning System (GPS) receiver. It had the capability of recording and saving flight data on a memory chip. The receiver was sent to NTSB’s Vehicle Recorder Laboratory in Washington, DC, for download. Attached to this report are pictorial representations of the accident flight. Below is the data from the accident flight:

Position	Time	Altitude	Length	Time	Speed	Course
N36 20.884	W92 33.627	09:55:52	573 ft			
N36 20.881	W92 33.628	09:59:11	500 ft	13 ft	0:03:19	0 mph 193°
N36 20.874	W92 33.648	09:59:26	499 ft	112 ft	0:00:15	5 mph 246°
N36 20.856	W92 33.659	09:59:39	496 ft	124 ft	0:00:13	7 mph 206°
N36 20.854	W92 33.654	09:59:51	494 ft	31 ft	0:00:12	2 mph 111°
N36 20.855	W92 33.655	10:03:43	492 ft	9 ft	0:03:52	0 mph 329°
N36 20.858	W92 33.637	10:04:01	497 ft	88 ft	0:00:18	3 mph 077°
N36.20.872	W92 33.583	10:04:07	497 ft	279 ft	0:00:06	32 mph 073°
N36.20.903	W92 33.485	10:04:14	494 ft	514 ft	0:00:07	50 mph 068°
N36.20.953	W92 33.342	10:04:22	496 ft	0.1 mi	0:00:08	65 mph 067°

N36.21.011 W92 33.156 10:04:31 194 ft	0.2 mi 0:00:09	74 mph	069°	
N36 21.071 W92 32.961 10:04:40 508 ft	0.2 mi 0:00:09	78 mph	069°	
N36.21.121 W92 32.786 10:04:48 508 ft	0.2 mi 0:00:08	77 mph	070°	
N36.21.133 W92 32.720 10:04:51 507 ft	333 ft 0:00:03	76 mph	077°	
N36.21.124 W92 32.536 10:04:59 497 ft	0.2 mi 0:00:08	77 mph	094°	
N36.21.086 W92 32.368 10:05:07 497 ft	0.2 mi 0:00:08	73 mph	106°	

NOTE: The time of the receipt of the first 9-1-1 call is slightly different than the recorded GPS times.

Weight and balance was computed, to wit:

Basic Empty Weight 1/	2,281	X	=	188,137.42
Pilot and Front Passenger 2/	397	X 85.5	=	33,943.50
Passengers (Center Seat, Aft Facing) 2/	332	X 119.1	=	39,541.20
Passengers (Rear Seats) 2/	143	X 157.6	=	22,536.80
Fuel (94 gal maximum) 3/	564	X 93.6	=	52,790.40
Baggage (forward) 4/	60	X 42.0	=	2,520.00
Baggage (aft) 4/	79	X 178.7	=	14,117.30
Baggage 5/	88	X 157.6	=	13,868.80
Takeoff weight from SUS	3,944			367,455.42
Maximum gross weight	3,600			
Overweight at SUS takeoff	344			

c.g. at takeoff from SUS 367,455.42/3944 = 93.17 in.
c.g. envelope = 91.4 in. FWD limit, 95 in. AFT limit

1/ Weight and Balance Revision, dated March 3, 2007
2/ Coroner's Report: (LF) W. Langford, 197
(RF) D. Berkerle, 200
(LC) J. Ritz, 182
(RC) D. Berkerle, 150
(LR) D. Langford, 143
3/ 6 pounds/gallon, topped off prior to departure from SUS
4/ Baxter County Sheriff (88 pounds of scattered personal effects were collected and weighed)
5/ It is not known where the miscellaneous 88 pounds of personal effects were stored. These were the items scattered at the accident site and collected by the sheriff's department. For computational purposes, they have been assigned the empty right rear seat arm (157.6).

According to PropAire's maintenance officer, club members flight plan for 16 gallons per hour and 5 gallons for takeoff and climb. This equates to roughly 26 gallons (1.3 X 16 = 20.8 + 5 = 25.5) of fuel consumed on the flight from SUS.

Basic Empty Weight	2,281	X	=	188,137.42

Pilot and Front Passenger	397	X	85.5	=	33,943.50
Passengers (Center Seat, Aft Facing)	332	X	119.1	=	39,541.20
Passengers (Rear Seats)	143	X	157.6	=	22,536.80
Fuel (68 gal)	408	X	93.6	=	38,188.80
Baggage (forward)	60	X	42.0	=	2,520.00
Baggage (aft)	79	X	178.7	=	14,117.30
Baggage	88	X	157.6	=	13,868.80
Takeoff weight from SUS	3,788				352,853.82
Maximum gross weight	3,600				
Overweight at Gaston's takeoff	188				
c.g. at takeoff from Gaston's	352,853.82/3788 = 93.15 in.				

The performance charts found in the Pilot's Operating Handbook were consulted. Based on a gross weight of 3,000 pounds, the computed flaps-up takeoff ground roll (paved, level, dry runway) would be approximately 1,700 feet, and the computed flaps-up takeoff distance over a 50-foot barrier (paved, level, dry runway) would be approximately 2,900 feet. According to PropAire, members assess 10 per cent (short grass) and 20 per cent (long grass) performance penalties when computing takeoff distances on grass or turf runways. Using these performance penalties, the computed flaps-up takeoff ground roll would be approximately 1,870 feet, and the computed flaps-up takeoff distance over a 50-foot barrier would be approximately 3,190 feet.

Using 25° of flaps for takeoff, the computed takeoff ground roll (paved, level, dry runway) would be approximately 1,210 feet, and the computed takeoff distance over a 50-foot barrier (paved, level, dry runway) would be approximately 1,700 feet. Applying the 10 per cent performance penalty, the computed takeoff ground roll and takeoff distance over a 50-foot barrier from a short grass runway would be 1,331 feet and 1,870 feet, respectively. The runway at Gaston's was 3,200 feet long.

It was noted that Section 5, "Performance," of the Piper PA-32R-300 Pilot's Operating Handbook (p. 5-1, excerpted) states: "The performance charts are unfactored (sic) and do not make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft. Effects of conditions not considered on the charts must be evaluated by the pilot, such as the effect of soft or grass runway surface on takeoff and landing performance. WARNING: Performance information derived by extrapolation beyond the limits of the charts should not be used for flight planning purposes."

ADDITIONAL INFORMATION

A guest at Gaston's videotaped the takeoff and the footage was made available to NTSB. According to the videotape, the nose wheel came off the ground as the airplane was approximately one-third down the runway. It maintained this attitude throughout the takeoff roll and lifted off at the end of the runway. At that point, the runway dropped off and the

airplane disappeared from sight. Moments later it reappeared, still in a nose high attitude, and the wings were “wig-wagging.”

The videotape was reviewed by PropAire officials. The following is an excerpt from their correspondence: “Based on reports of 4-6" grass, [the pilot’s] only hope to achieve takeoff speed would have been to keep the nose on the runway for almost 3/4ths of the runway length. With a nose high attitude, he actually never achieved flying speed, as evidenced by the speeds recorded by the [Garmin GPS] 496. His continuation of the takeoff put him on the back side of the power curve, 'hanging on the prop' in ground effect.

“Based on the video, he was either trying to horse it off the ground and most likely [paniced] at that point (about mid field), or the airplane itself may have contributed to the pitch up moment given the overweight and aft CG.”

Pilot Information

Certificate:	Private	**Age:**	52,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	March 17, 2009
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	March 20, 2009
Flight Time:	674 hours (Total, all aircraft), 165 hours (Total, this make and model), 567 hours (Pilot In Command, all aircraft), 1 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N38171
Model/Series:	PA-32R-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R-7780392
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	March 10, 2009 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	9011 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, not activated	**Engine Model/Series:**	IO-540-K1G5D
Registered Owner:	PROPAIRE, Inc.	**Rated Power:**	300 Horsepower
Operator:	PROPAIRE, Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BPK,928 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	08:53 Local	**Direction from Accident Site:**	76°
Lowest Cloud Condition:	Clear	**Visibility**	6 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	0 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	27°C / 23°C
Precipitation and Obscuration:			
Departure Point:	Lakeview, AR (3MO)	**Type of Flight Plan Filed:**	None
Destination:	St. Louis, MO (SUS)	**Type of Clearance:**	None
Departure Time:	09:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Gastons 3MO	**Runway Surface Type:**	Grass/turf
Airport Elevation:	479 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	06	**IFR Approach:**	None
Runway Length/Width:	3200 ft / 55 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Fatal, 1 Serious, 1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal, 1 Serious, 1 Minor	**Latitude, Longitude:**	36.351387,-92.539443

Administrative Information

Investigator In Charge (IIC):	Scott, Arnold
Additional Participating Persons:	David Hall; FAA Flight Standards District Office; Little Rock, AR
Original Publish Date:	April 22, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74157