Aviation Investigation Final Report

Location:	Española, New Mexico	**Accident Number:**	CEN16FA122
Date & Time:	March 11, 2016, 16:27 Local	**Registration:**	N28GX
Aircraft:	REMOS ACFT GMBH FLUGZEUGBAU REMOS GX	**Aircraft Damage:**	Destroyed
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was conducting a personal flight in the airport traffic pattern. A witness reported seeing the single-engine airplane enter left traffic for runway 16 and land. The airplane then made a second takeoff and continued to make left turns. The witness reported that, while airplane was turning from the crosswind leg to the downwind leg, he heard a reduction in engine power and saw the airplane descend toward the ground. Another witness reported that he heard the airplane takeoff from the airport and then saw the airplane make a left turn. He stated that, while the airplane was in the left turn, it pitched nose-down and descended toward the ground. The witness also noted that the airplane's engine sounded normal during the flight.

A postaccident examination established that the airplane had impacted the ground in a nose-low attitude and was destroyed by impact and postimpact fire damage. The examination did not reveal any anomalies that would have precluded normal operation of the airplane during the flight. Based on the witness descriptions and the impact geometry, it is likely that the pilot did not maintain adequate airspeed during the left turn, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall at a low altitude.

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 adequate airspeed while operating in the airport traffic pattern, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall at a low altitude.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Not attained/maintained

Factual Information

History of Flight

Approach-VFR pattern crosswind	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)
Post-impact	Fire/smoke (post-impact)
Post-impact	Explosion (post-impact)

On March 11, 2016, about 1627 mountain standard time, a Remos Aircraft GmbH Flugzeugbau Remos GX airplane, N28GX, impacted terrain following a loss of control in the airport traffic pattern at the Ohkay Owingeh Airport (E14), Española, New Mexico. The private pilot and the pilot-rated passenger were fatally injured, and the airplane was destroyed. The airplane was registered to and operated by New Mexico Sport Aviation, LLC, under the provisions of Title 14 *Code of Federal Regulations* (*CFR*) Part 91. Day visual meteorological conditions prevailed for the personal flight that departed E14 about 1620 with the intended destination of Santa Fe Municipal Airport (SAF), Santa Fe, New Mexico.

According to the operator, the airplane was based at SAF, and the pilot rented it to gain familiarity with the takeoff-and-landing procedures used at the Los Alamos Airport (LAM), Los Alamos, New Mexico. Because of the restricted airspace immediately to the south of the runway and the noise-sensitive residential area just west of the runway, LAM employs a non-standard traffic pattern. All landings are made on runway 27, and all departures are made in the opposite direction on runway 9.

A review of available Federal Aviation Administration (FAA) air traffic control (ATC) radar data established that the airplane departed SAF about 1350, flew north-northwest toward LAM, and landed about 1405 on runway 27 at LAM. At 1417:25, the airplane reappeared on radar after it departed LAM on runway 9. The airplane flew about 8.5 miles northeast of LAM before it returned to land on runway 27 about 1427. At 1433:25, the airplane reappeared on radar after it departed LAM on runway 9. The airplane again flew about 8.5 miles northeast of LAM before it returned to land on runway 27 about 1443. At 1449:13, radar data indicated that the airplane had departed LAM and that it continued northeast toward E14. At 1455:29, the airplane descended below available radar coverage about 3.3 miles southwest of E14.

The airplane was equipped with a GlobalStar SPOT satellite tracking device, which reported its position every 5 minutes when activated. According to available track data, the device recorded the airplane on the ramp at E14 about 1503. During the next 15 minutes, the device recorded three stationary data points, consistent with the airplane parked on the airport ramp. No position reports were recorded between 1518 and 1627. At 1627:31, a final data point was recorded near the approach end of runway 16. The GlobalStar SPOT data did not include any altitude information. Additionally, there was no recorded ATC radar data for the accident flight because the airport traffic pattern altitude at E14 was below available radar coverage for the area.

There were two witnesses to the accident flight. Both witnesses were standing outside a residence

located about 0.4 mile southeast of the runway 16 departure threshold at E14. The first witness reported seeing the airplane enter left traffic for runway 16 and land. The airplane then made a second takeoff and continued to make left turns. The witness reported that, while the airplane was turning from the crosswind leg to the downwind leg, he heard a reduction in engine power and saw the airplane descend toward the ground in a level pitch attitude. The witness reported seeing an explosion shortly after the airplane descended behind a hill. The second witness reported that he heard the airplane takeoff from the airport and then saw the airplane make a left turn. He stated that, while the airplane was in a left turn it pitched nose-down and descended toward the ground. He reported that there was a large explosion and ascending fireball when the airplane impacted terrain. He also noted that the airplane's engine sounded normal during the flight.

Pilot Information

Certificate:	Private	**Age:**	46,Female
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 4, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 2, 2016
Flight Time:	132.8 hours (Total, all aircraft), 127 hours (Total, this make and model), 41.7 hours (Pilot In Command, all aircraft), 36.7 hours (Last 90 days, all aircraft), 12.5 hours (Last 30 days, all aircraft)		

Pilot-rated passenger Information

Certificate:	Private	**Age:**	53,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	April 13, 2006
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 300 hours (Total, all aircraft)		

--- Pilot ---

According to FAA records, the 46-year-old pilot held a private pilot certificate with a single-engine land airplane rating. Her most recent FAA third-class medical certificate was issued on May 4, 2015, with a limitation for corrective lenses. A search of FAA records showed no previous accidents, incidents, or enforcement proceedings.

The pilot's flight history was established using her logbook. The final logbook entry was dated March 9, 2016, at which time she had 132.9 hours total flight time, all of which occurred in the year before the accident. All logged flight time had been completed in single-engine airplanes. The pilot had flown 127.1 hours in the accident airplane make/model. She had logged 41.8 hours as pilot-in-command, 4.6 hours at night, and 4.1 hours in simulated instrument conditions. She had flown 89.5 hours during the 6 months before the accident, 36.8 hours during the 90 days before the accident, and 12.5 hours during the month before the accident. The logbook did not contain any recorded flight time for the 24-hour period before the accident flight. The pilot's most recent flight review, as required by 14 *CFR* 61.56, was completed upon the issuance of her private pilot certificate dated January 2, 2016.

--- Pilot-Rated Passenger ---

According to FAA records, the 53-year-old passenger held a private pilot certificate with a single-engine land airplane rating. His most recent FAA third-class medical certificate was issued on April 13, 2006, with no limitations. The medical certificate expired on April 30, 2008. On the application for the expired medical certificate, the passenger reported having accumulated 300 total hours of flight experience, of which 35 hours were flown within the previous 6 months. A pilot logbook for the passenger was not located during the investigation.

Aircraft and Owner/Operator Information

Aircraft Make:	REMOS ACFT GMBH FLUGZEUGBAU	**Registration:**	N28GX
Model/Series:	REMOS GX	**Aircraft Category:**	Airplane
Year of Manufacture:	2009	**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	356
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	March 1, 2016 Condition	**Certified Max Gross Wt.:**	1320 lbs
Time Since Last Inspection:	18 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2916.7 Hrs as of last inspection	**Engine Manufacturer:**	Rotax
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	912 ULS
Registered Owner:	New Mexico Sport Aviation, LLC	**Rated Power:**	100 Horsepower
Operator:	New Mexico Sport Aviation, LLC	**Operating Certificate(s) Held:**	None

The 2009-model-year airplane, serial number 356, was a high-wing monoplane of composite carbon-fiber monocoque construction. The airplane was powered by a 100-horsepower, 4-cyinder Rotax 912 ULS reciprocating engine, serial number 6783105. The engine provided thrust through a ground-adjustable, three-blade, Neuform CR3-65-(IP)-47-101.6 propeller. The two-seat airplane was equipped with a fixed tricycle landing gear and wing flaps. The airplane had a maximum allowable takeoff weight

of 1,320 pounds. The special-light sport aircraft (S-LSA) was issued an airworthiness certificate on May 13, 2010. New Mexico Sport Aviation, LLC, purchased the airplane on February 21, 2011.

The airplane's recording hour meter was destroyed during the postimpact fire, which precluded a determination of the airplane's total service time at the time of the accident. However, according to dispatch documentation, the airplane's hour meter indicated 2,916.7 hours before the flight departed SAF. According to maintenance documentation, the airframe had a total service time of 2,916.7 hours, and the engine had accumulated 916.7 hours since new. The last condition and 100-hour inspection of the airplane were completed on March 1, 2016, at 2,898.8 total airframe hours. A postaccident review of the maintenance records found no history of unresolved airworthiness issues. The airplane had a total fuel capacity of 22 gallons contained in a single fuselage tank. A review of fueling records established that the fuel tank was topped-off before the accident flight departed SAF.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LAM,7171 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	16:35 Local	**Direction from Accident Site:**	230°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 16 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	18°C / -11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Española, NM (E14)	**Type of Flight Plan Filed:**	None
Destination:	Santa Fe, NM (SAF)	**Type of Clearance:**	None
Departure Time:	16:20 Local	**Type of Airspace:**	Class G

A postaccident review of available meteorological data established that day visual meteorological conditions prevailed at the accident site. The nearest aviation weather reporting station was located at LAM about 14 miles southwest of the accident site.

At 1615, about 12 minutes before the accident, the LAM automated surface observing system reported: wind 170° at 10 knots with wind gusts of 15 knots, a clear sky, 10 miles surface visibility, temperature 17°C, dew point -11°C, and an altimeter setting of 30.10 inches of mercury.

At 1635, about 8 minutes after the accident, the LAM automated surface observing system reported: wind 180° at 10 knots with wind gusts of 16 knots, a clear sky, 10 miles surface visibility, temperature 18°C, dew point -11°C, and an altimeter setting of 30.10 inches of mercury.

Airport Information

Airport:	Ohkay Owingeh Airport E14	**Runway Surface Type:**	Asphalt
Airport Elevation:	5790 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	16	**IFR Approach:**	None
Runway Length/Width:	5007 ft / 75 ft	**VFR Approach/Landing:**	None

E14, a public airport located about 3 miles northeast of Española, New Mexico, was owned and operated by the Ohkay Owingeh Tribal Council. The airport field elevation was 5,790 ft mean sea level. The airport was served by a single asphalt runway, runway 16/34, that measured 5,007 ft by 75 ft. The airport was not equipped with an air traffic control tower.

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:**	36.032775,-106.047225(est)

The accident site was in an open field located about 885 ft east of the runway 16 departure threshold. The damage to the airplane was consistent with it impacting the ground in a nose-down pitch attitude on a southeast heading. There was no appreciable wreckage propagation from the point-of-impact. The main wreckage consisted of the entire airplane. All major structural components and flight controls were identified at the accident site; however, a majority of the carbon-fiber composite fuselage, wings, and empennage were destroyed during the postimpact fire. The pitot tube, which was installed on the leading edge of the left wing, had penetrated the ground at a 45° angle. A majority of the flight control push-pull tubes for the elevator and ailerons were destroyed by the postimpact fire. Flight control cable continuity for the rudder was confirmed from the control surface to the cockpit. The entire cockpit and instrument panel were destroyed during the postimpact fire. Two of the three propeller blades exhibited impact and fire damage. The remaining propeller blade appeared undamaged.

The engine sustained extensive thermal damage during the postimpact fire. Disassembly of the engine revealed no mechanical failures of the crankshaft, camshaft, connecting rods, or pistons. Additionally, there were no anomalies observed with the cylinders or their respective valve assemblies. The sparkplugs and piston domes exhibited normal wear and combustion signatures. Both carburetors exhibited extensive thermal damage that was consistent with prolonged exposure to fire. The throttle and choke arms remained attached to the carburetor control cables. The ignition modules, secondary coil pack, and stator exhibited extensive thermal damage from the postimpact fire that precluded testing of the ignition system. The fuel pump remained intact with minor heat damage. A small amount of automobile fuel was ejected from the outlet fitting when the fuel pump was actuated by hand. Further disassembly of the fuel pump revealed no anomalies or contamination. The oil pump remained intact,

and its drive shaft rotated freely. The oil pump shaft drive pin was found fractured and was retained for additional testing. The engine disassembly revealed ample lubrication throughout the engine and there was no evidence of oil starvation. The coolant pump housing exhibited thermal damage that was consistent with prolonged exposure to fire. The coolant impeller remained attached to the drive shaft; however, the impeller had partially melted during the postimpact fire. The reduction gearbox assembly remained intact, and the drive gear exhibited no pitting or galling.

Medical and Pathological Information

The New Mexico Office of the Medical Investigator in Albuquerque, New Mexico, performed autopsies on the pilot and pilot-rated passenger. The cause of death for both individuals was attributed to multiple blunt-force injuries sustained during the accident.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicology tests on specimens obtained during each autopsy. The pilot's toxicology results were negative for carbon monoxide, ethanol, and all tested drugs and medications.

The pilot-rated passenger's toxicology results were negative for ethanol. Atorvastatin, losartan, and warfarin were detected in liver. Additionally, losartan and warfarin were detected in muscle. Atorvastatin, brand name Lipitor, is a prescription medication used for lowering high blood cholesterol. Losartan, brand name Cozaar, is a prescription medication used to treat high blood pressure. Warfarin, brand name Coumadin, is a prescription medication used to prevent clot formation. The detected substances are not generally considered performance-impairing.

Tests and Research

The engine crankcase, camshaft, oil pump shaft, and oil pump drive pin were submitted to the National Transportation Safety Board (NTSB) Materials Laboratory for additional examination. The examination indicated that the camshaft had a yoke machined into the end opposite the drive gear that drove the oil pump shaft. As designed, a drive pin passed through the body of the oil pump shaft, which engaged the camshaft yoke. The camshaft yoke did not exhibit any abnormal wear or deformation. The bearing bore in the crankcase that corresponded with the oil pump drive yoke exhibited scoring on the inner surface about mid-depth. The depth of the scoring was about 0.024 inch. The scoring was consistent with the profile of the oil pump shaft drive pin. The drive pin fractured inboard of the outer diameter of the oil pump shaft on both sides, leaving a portion of the drive pin within each side of the shaft. Examination of the fracture surfaces revealed crack arrest marks consistent with a fatigue fracture. Hardness measurements made across the diameter of the drive pin were consistent with the manufacturer's design specification. Although the drive pin had fractured, it remained engaged to the camshaft yoke and continued to rotate the oil pump shaft. Additionally, the postaccident engine disassembly revealed ample lubrication throughout the engine, and there was no evidence of oil starvation.

According to the engine manufacturer, a fractured oil shaft drive pin is indicative of an oil system with restrictive hoses and fittings that can result in a pulsating oil supply to the oil pump. The pulsating loading of the drive pin can result in a fractured drive pin. The Rotax 912 installation manual stipulates that oil hoses have an inside diameter of 11 millimeters. The oil hoses recovered with the wreckage had inside diameters that measured 9 millimeters. Additionally, the Rotax 912 installation manual stipulates full-flow angled fittings for oil hose connections. Examination of the oil cooler revealed a right-angle fitting that did not meet the engine manufacturer's full-flow fitting specification.

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	David A Jones; Federal Aviation Administration, ABQ FSDO; Albuquerque, NM
Original Publish Date:	January 23, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=92827