Aviation Investigation Preliminary Report

Location:	Union City, TN	**Accident Number:**	ERA24FA038
Date & Time:	November 15, 2023, 10:40 Local	**Registration:**	N42XM
Aircraft:	XTREMEAIR GMBH XA42	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

On November 15, 2023, about 1040 central standard time, an Xtremeair GMBH XA42, N42XM, was substantially damaged when it was involved in an accident near Union City, Tennessee. The private pilot receiving instruction and a flight instructor were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The airplane was recently purchased by the private pilot and two other pilots. The flight instructor was providing instruction to all three owners for familiarization and to meet insurance requirements. The goal was to meet the insurance requirements and increase each pilot's individual proficiency. The other two co-owners witnessed the accident, and their description of events was consistent throughout.

The airplane departed on the accident flight from Everett-Stewart Regional Airport (UCY), Union City, Tennessee, completed traffic pattern work at a nearby airport, and returned to UCY to perform aerobatic maneuvers in the airport's aerobatic "box." The co-owners observed the airplane's approach and entry into the box and described the engine sound as smooth and continuous throughout.

One of the co-owners stated that the airplane was flying north to south and was conducting an "avalanche" maneuver, which comprised a loop during which a snap roll is performed at the top.

He estimated that the airplane entered the maneuver at an altitude of about 1,200 ft above ground level (agl) and reached the top of the loop around 2,000 ft agl. He stated that, rather than completing a 360° snap roll at the top of the loop, the airplane's roll continued through 540°, and the airplane was upright when it should have finished the roll inverted and continued through the remainder of the loop. By this time, the airplane had slowed considerably, the engine was at full power, and the gyroscopic effect of the propeller pulled the nose down, with no airspeed, and the airplane entered a spin. Once in the spin, the rotation stopped, then the

airplane entered a secondary spin and descended to ground contact. He estimated that the airplane descended in a nose-down attitude of about 75°.

The other co-owner stated that the engine “sounded great” as the airplane entered the avalanche maneuver. During the snap roll, “the nose did an extra rotation in the roll axis,” and the airplane stopped upright and yawed to the left. He stated that it was possible that the airplane entered a “gyroscopic tumble” before entering a 1.25-turn spin. The airplane recovered from the spin about 500 ft agl, and the co-owner speculated that the pilots may have, “tried to pull out there,” before the airplane entered another spin. When asked, the co-owner said that the engine was running “at full power,” but that once the spin was fully developed, he could not recall what the engine sound was.

The pilot held a private pilot certificate with a rating for airplane single-engine land. His most recent Federal Aviation Administration (FAA) third class medical certificate was issued on May 23, 2022. He reported 650 total hours of flight experience on that date. Initial examination of excerpts from the pilot’s logbook could not reconcile his total experience; however, 6 flights totaling 8 hours of experience in the accident airplane were recorded between November 1 and 14, 2023.

The flight instructor held an airline transport pilot certificate with multiple type ratings and a flight instructor certificate with ratings for airplane single-engine, multiengine, and instrument airplane. His most recent FAA first class medical certificate was issued on July 25, 2023. He reported 6,800 total hours of flight experience on that date. His pilot logbook was located and his total flight experience in the accident airplane make and model was not determined.

According to FAA and maintenance records, the airplane was manufactured in 2015 and was powered by a Lycoming AEIO-580-B1A, 315-horsepower engine. The airplane’s most recent annual inspection was completed on November 3, 2023, at 57 total aircraft hours.

The airplane came to rest upright on flat terrain in a solar farm on the west side of UCY. The airplane rested in its initial impact crater on a 325° heading, consistent with the vertical descent described by the witnesses and as viewed in surveillance video.

The front and rear cockpit areas were deformed, and the composite structure was fractured throughout. The wings were fractured and partially separated at their roots, but attached by structure, wires, and push-pull tubes. The empennage remained largely intact. The vertical and horizontal stabilizers, rudder, and elevator were all damaged by impact. Flight control continuity could not be established initially because the controls were impinged against structure by upward impact forces. Once the airplane was lifted, and as wings and structure was separated, flight control continuity was confirmed from the flight controls, through several breaks, to the flight control surfaces. All fractures were consistent with impact and overstress fracture.

Both main fuel tanks, the “Acro” fuel tank, and the fuel header tank were breached by impact and did not contain fuel. Fuel was ponded in the impact depression beneath the left wing.

The engine was partially buried in its impact crater. Two of the three propeller blades were fractured at their roots. All three blades showed chordwise smearing (mud). Once lifted, the engine starter case showed rotational smearing and scoring in the approximate arc of the starter ring gear.

The engine oil sump was fractured and destroyed by impact. The fuel servo was separated by impact but remained attached by cabling and fuel lines. The inlet screen was removed, contained fuel, and was absent of water and debris.

The engine was separated from the airframe and examined at the scene. The crankshaft was rotated by hand at the propeller, and continuity was confirmed through the powertrain and valvetrain to the accessory section. Compression was confirmed on each cylinder using the thumb method. The magnetos were secure in their mounts, but damaged by impact. They were removed, rotated by an electric drill, and each produced spark at all terminal leads.

The fuel selector handle was mounted in the aft cockpit and was connected to the fuel selector valve by a control tube. The valve was mounted near the engine firewall. The control tube was fractured, and the handle moved freely in its mount. The valve was removed, and compressed air flowed freely from the “Acro” inlet port to the engine outlet port. The left main and right main ports were occluded.

An engine data monitor and a GPS were retained and forwarded to the NTSB Recorders Laboratory in Washington, DC.

Aircraft and Owner/Operator Information

Aircraft Make:	XTREMEAIR GMBH	**Registration:**	N42XM
Model/Series:	XA42	**Aircraft Category:**	Airplane
Amateur Built:			
Operator:	MAX ACRO INC	**Operating Certificate(s) Held:**	None
Operator Designator Code:			

Meteorological Information and Flight Plan

Conditions at Accident Site:	VMC	**Condition of Light:**	Day
Observation Facility, Elevation:	KUCY,341 ft msl	**Observation Time:**	10:30 Local
Distance from Accident Site:	0 Nautical Miles	**Temperature/Dew Point:**	19°C /5°C
Lowest Cloud Condition:	Clear	**Wind Speed/Gusts, Direction:**	8 knots / , 180°
Lowest Ceiling:	None	**Visibility:**	10 miles
Altimeter Setting:	30.3 inches Hg	**Type of Flight Plan Filed:**	None
Departure Point:	Union City, TN	**Destination:**	Union City, TN

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	36.382254,-88.992288

Administrative Information

Investigator In Charge (IIC):	Rayner, Brian
Additional Participating Persons:	Brad Gottschalk; FAA/FSDO; Memphis, TN
Investigation Class:	Class 3
Note:	