National Transportation Safety Board
Aviation Accident Final Report

Location:	Fairmont, OK	**Accident Number:**	CEN16FA278
Date & Time:	07/21/2016, 1840 CDT	**Registration:**	N511GS
Aircraft:	HARRIS-RUNYAN Skybolt 300	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The commercial pilot and pilot-rated passenger departed on a local flight with the intention of performing aerobatic maneuvers. According to a witness near the accident site, the airplane was performing aerobatic maneuvers. He stated that the airplane flew over at a high altitude and performed a barrel roll. The airplane continued south and then pitched up to climb straight up. The nose of the airplane came down through the horizon and the airplane started "tumbling". He stated that 1/3 of the way through the tumble the airplane rolled over on its back and entered an inverted flat spin.

Damage to the airplane and witness marks on the ground were consistent with the airplane impacting the ground in an inverted, nose low attitude. No anomalies consistent with a preimpact failure or malfunction were observed. The witness did not see the final seconds of the flight and it is unknown if or when the pilot may have initiated a recovery from the intentional maneuver. It is likely that the pilot waited too long to recover from the aerobatic maneuver.

Probable Cause and Findings

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

The pilot's delay in recovering from an aerobatic maneuver resulting in collision with terrain.

Findings

Aircraft	Altitude - Not attained/maintained (Cause)
Personnel issues	Delayed action - Pilot (Cause) Aircraft control - Pilot (Cause)

Factual Information

History of Flight

Maneuvering-aerobatics	Loss of control in flight (Defining event)
	Collision with terr/obj (non-CFIT)

On July 21, 2016, about 1840 central daylight time, a Harris-Runyan Skybolt 300 experimental amateur-built airplane, N511GS, was substantially damaged when it impacted terrain northeast of Fairmont, Oklahoma. The commercial-rated pilot and pilot-rated passenger were fatally injured. The airplane was registered to and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan. The flight originated from Enid Woodring Regional Airport (WDG), Enid, Oklahoma, at 1834.

The pilot-rated passenger was a 1st Lieutenant T-38 instructor pilot in the US Air Force and was stationed at Vance Air Force Base (AFB). According to his wife, the flight was arranged on the day prior to the accident when a spot on the flight became available. The pilot-rated passenger expected the flight to depart between 1800 and 1815 and last no more than 15 minutes, characterizing the flight to his wife as a "quick loop." His wife stated that there was "no expectation that he would be flying."

The pilot was a demonstration pilot for Bearfeat Aerobatics. He was scheduled to perform his acrobatic airshow at the 2016 Vance AFB Open House. According to the US Air Force, the pilot had given acrobatic rides to several other airmen on the day of the accident.

According to Federal Aviation Administration (FAA) records, on the day of the accident the pilot of the accident airplane contacted WDG local control at 1832 and requested clearance to taxi to runway 17. The pilot stated that he was going "to the east to do some air work for 10 to 15 minutes." At 1834, the pilot received clearance to takeoff on runway 17 and at 1835, the pilot acknowledged a frequency change. No other communications were recorded between the pilot and WDG controllers.

According to the US Air Force, the pilot was provided flight following by Vance AFB Approach at 1837 and was in radar contact. Neither primary nor secondary radar information was provided for the accident airplane and the exact route of flight could not be established.

A witness located ½ mile north of the accident location reported seeing the accident airplane flying earlier in the day. He also observed the accident airplane flying for 20 to 30 seconds prior to the accident. He stated that the airplane flew over his house at a high altitude and performed a barrel roll. The airplane continued south and then pitched up to climb straight up. "The nose of the airplane came down through the horizon and the airplane started tumbling," similar to what he had seen other aerobatic airplanes do. He stated that 1/3 of the way through the tumble the airplane rolled over on its back and entered an inverted flat spin. The airplane went behind the trees and he did not see the collision.

The witness stated that he heard the airplane's engine running until the sound of the airplane hitting the ground.

Pilot Information

Certificate:	Commercial	**Age:**	55, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With Waivers/Limitations	**Last FAA Medical Exam:**	09/21/2015
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 3591 hours (Total, all aircraft), 2000 hours (Total, this make and model)		

Pilot

The pilot, age 55, held a commercial pilot certificate with airplane single engine land and instrument airplane ratings. He also held a repairman – experimental aircraft builder certificate. His most recent FAA second class medical certificate was issued on September 21, 2015. The certificate contained the limitations "must wear corrective lenses." He reported 3,591 hours total time; 39 hours were logged in the previous 6 months.

The pilot held a Statement of Acrobatic Competency (SAC) card (FAA Form 8710-7), issued by the FAA on September 26, 2015, for the Skybolt S/D. The card was valid until December 31, 2016. The card contained the maneuver limitations "solo aerobatics, formation aerobatics", and the altitude limitation of Level 1, unrestricted. According to FAA Notice 8900.356, Level 1 designates the minimum altitude above ground level authorized to start and complete aerobatic maneuvers as unrestricted. While not required for the accident flight, the SAC was required for the airshow the pilot was performing in later in the week.

Pilot-rated Passenger

The pilot-rated passenger was a pilot and a 1st Lieutenant in the US Air Force, and had been flying since February of 2014. According to Air Force personnel, he had logged no less than 460 hours and was serving as a T-38 instructor pilot at Vance AFB. A review of FAA records showed that he held a civilian student pilot certificate.

Aircraft and Owner/Operator Information

Aircraft Make:	HARRIS-RUNYAN	**Registration:**	N511GS
Model/Series:	Skybolt 300	**Aircraft Category:**	Airplane
Year of Manufacture:	1993	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental	**Serial Number:**	HR30091001
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	04/03/2016, Condition	**Certified Max Gross Wt.:**	1950 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2183.2 Hours as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:		**Engine Model/Series:**	IO 540-K1G5D
Registered Owner:	On file	**Rated Power:**	300 hp
Operator:	On file	**Operating Certificate(s) Held:**	None

According to FAA records, the 1993 experimental amateur-built bi-plane, a Harris-Runyan Skybolt 300 (serial number HR30091001) was manufactured by the pilot/owner. It was registered with the FAA on a special airworthiness certificate in the experimental-amateur built category. A Lycoming IO 540-K1G5D engine rated at 300 horsepower at 2,700 rpm powered the airplane. The engine was equipped with a 2-blade, Hartzell propeller.

The airplane was registered to and operated by the pilot, and was maintained in accordance with an annual condition inspection. A review of the maintenance records indicated that a condition inspection was completed, by the pilot, on April 3, 2016, at an airframe total time of 2,183.2 hours. The airplane had flown about 23.7 hours between the last inspection and the accident and had a total airframe time of 2,206.9 hours.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	WDG, 1167 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	1850 CDT	**Direction from Accident Site:**	260°
Lowest Cloud Condition:	Few / 8000 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / 20 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	38°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Enid, OK (WDG)	**Type of Flight Plan Filed:**	None
Destination:	Enid, OK (END)	**Type of Clearance:**	None
Departure Time:	1830 CDT	**Type of Airspace:**	Class E; Class G

The closest official weather observation station was WDG, located 14 nautical miles (nm) west of the accident site. The elevation of the weather observation station was 1,167 ft msl. The routine aviation weather report (METAR) for WDG, issued at 1850, reported wind 170° at 10 knots gusting to 20 knots, visibility 10 miles, sky condition few clouds at 8,000 ft, temperature 38° Celsius (C), dew point temperature 18° C, and an altimeter setting of 29.98 inches of mercury.

Calculations of relevant meteorological data revealed that the density altitude was 4,217 ft.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	36.372222, -97.660833 (est)

The accident site was located in a dormant wheat field. The accident site was at an elevation of 1,140 ft msl. The main wreckage came to rest inverted and included the left and right wing assemblies, the empennage, the fuselage, and the engine and propeller assembly. The wreckage came to rest oriented on a heading of 295°.

The upper right wing was crushed, torn, and broken and partially separated from the upper

fuselage. The right aileron strut between the upper and lower right aileron was bent at mid span and remained attached to the upper and lower right aileron. The right aileron control tubing was continuous from the lower right aileron inboard to the cabin area. The lower right wing remained partially attached to the fuselage.

Both the upper and lower left wings were crushed, twisted, and broken and remained partially attached to the fuselage. The left aileron strut between the upper and lower left aileron was bent at mid span and remained attached to the upper and lower left aileron. Left aileron control tubing was continuous from the lower left aileron inboard to the cabin area.

The upper forward fuselage was crushed down and aft into the cabin area. The fuel tank was crushed down and was compromised. The floor of the fuselage was crushed and broken. The entire fuselage was bent, twisted, crushed, and broken. The occupiable space, for the front and aft seats, was reduced. The cockpit instruments were impact damaged and did not convey reliable readings.

The upper portion of the rudder and the vertical stabilizer was crushed down and to the left. The elevator control tubing was continuous from the forward cabin aft to the elevator control. The rudder cables were continuous from the forward cabin aft to the rudder control surface. The horizontal stabilizer and elevator were bent and twisted.

The engine and propeller assembly remained attached to the fuselage. For identification purposes, the two propeller blades were arbitrarily marked as "A" and "B." Propeller blade "A" was bent aft 90° and embedded in the ground beneath the airplane. The blade exhibited faint leading edge scoring and scratches on the face of the propeller blade. Propeller blade "B" did not exhibit any visible damage.

The top portion of the engine, including the upper portion of the cylinders and the pushrod guides, was impact damaged. The fuel manifold and fuel injector lines were impact damaged. The upper bank of spark plugs were removed and signatures were consistent with normal operation when compared to a Champion Spark Plug chart.

The scope of the examination was limited by fragmentation due to impact damage; however, no anomalies consistent with a preimpact failure or malfunction were observed.

Medical And Pathological Information

The autopsy was performed on the pilot by the Board of Mediocolegal Investigations – Office of the Chief Medical Examiner – Oklahoma City, Oklahoma, on July 22, 2016. The autopsy concluded that the cause of death was multiple blunt force injuries and the report listed the specific injuries.

The FAA's Civil Aerospace Medical Institute (CAMI), Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological tests on specimens that were collected during the autopsy. Results were negative for carbon monoxide and ethanol. Cyanide tests were not performed. Azacyclonol and fexofenadine were detected in the urine; however, they were not detected in the cavity blood.

According to the CAMI Toxicology Drug Information, Azacyclonol is a metabolite of Fexofenadine. Fexofenadine, commercially referred to as Allegra, is a nonsedating antihistamine used for the treatment of hay fever and the common cold. The pilot reported using Allegra D and Flonase on his medical certificate application.

Additional Information

According to FAA Advisory Circular 91-45C an aerobatic maneuver is "an intentional maneuver in which the aircraft is in sustained inverted flight or is rolled from upright to inverted or from inverted to upright position." Aerobatic maneuvers include rolls, snap rolls, loops, immelmanns, cuban eights, spins, and hammerhead turns.

Administrative Information

Investigator In Charge (IIC):	Jennifer Rodi	**Report Date:**	05/31/2017
Additional Participating Persons:	Jose G Arizpe; FAA FSDO; Oklahoma City, OK Randolph Rushworth; US Air Force		
Publish Date:	05/31/2017		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=93657		