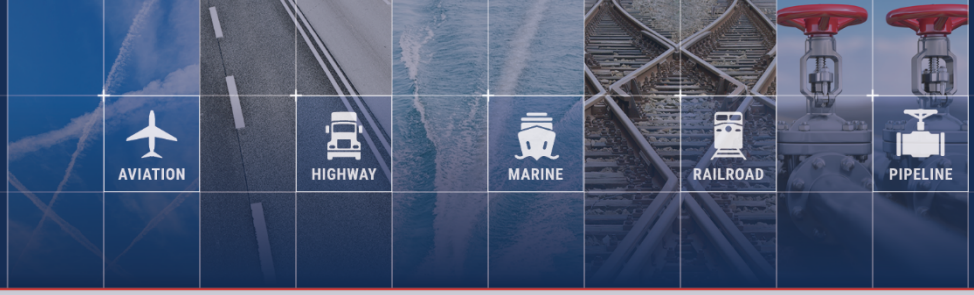

Aviation Investigation Final Report

Location:	Davenport, Iowa	**Accident Number:**	CEN12LA602
Date & Time:	September 1, 2012, 13:30 Local	**Registration:**	N139GS
Aircraft:	Aero Vodochody L39C	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of control in flight	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Air race/show		

Analysis

The accident airplane was part of a 3 airplane airshow demonstration performance. After overflying the spectators and flying away from the flightline, the airplanes were executing a crossover break maneuver, which the accident airplane was in the left wing position. During the crossover break maneuver, the lead airplane first entered a climbing maneuver, the left wing position airplane entered a right turn, and then the right wing position airplane entered a left turn with adequate longitudinal spacing. During the maneuver, the accident airplane entered the right turn, descended, and impacted the terrain. A post-impact fire ensued. No evidence of any in-flight collision with the other airplanes was observed. Witnesses reported that they did not observe any movement of the airplane's flight control surfaces prior to the airplane impacting terrain, which would be inconsistent with the pilot attempting to recover from the descent. No preaccident mechanical malfunctions or failures were noted with the airplane that would have precluded normal operation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of aircraft control for undetermined reasons.

Findings

Aircraft	(general) - Not attained/maintained
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Maneuvering-aerobatics	Loss of control in flight (Defining event)

On September 1, 2012, approximately 1330 central daylight time, an Aero Vodochody L39C single-engine turbo-jet airplane, N139GS, was destroyed when it impacted terrain while maneuvering during an air show performance at the Davenport Municipal Airport (DVN), Davenport, Iowa. The commercial pilot sustained fatal injuries. The airplane was registered to the Warbird Education Foundation, Frisco, Texas, and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as an air show flight. Visual meteorological conditions prevailed and a flight plan was not filed. The flight originated from DVN approximately 1315.

Video and witness information documented the flight of three L-39 airplanes during their air show performance. According to the lead pilot, the three airplanes were traveling in a westerly direction away from the spectators and were executing a crossover break maneuver, which the accident airplane was in the left wing position. During the crossover break maneuver, the lead airplane first entered a climbing maneuver, the left wing position airplane entered a right turn and then the right wing position airplane entered a left turn with adequate longitudinal spacing. During the maneuver, the accident airplane entered the right turn, descended, and impacted the terrain. A post-impact fire ensued. No evidence of any in-flight collision with the other airplanes was observed. No communication or distress call were received by either the lead or right wing position pilot from the accident pilot.

Witnesses reported that they did not observe any movement of the airplane's flight control surfaces prior to the airplane impacting terrain.

Review of several videos showed that after the crossover break maneuver turns were performed, the lead and right wing position airplanes turned off their smoke and the left wing position airplane's smoke continued to remain on until the impact. According to a team representative, the right wing position airplane pilot calls for the break and smoke on/off.

Pilot Information

Certificate:	Commercial; Private	**Age:**	59,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Front
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 2 Without waivers/limitations	**Last FAA Medical Exam:**	May 29, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	2500 hours (Total, all aircraft), 600 hours (Total, this make and model)		

The pilot, age 59, held a commercial pilot certificate with airplane single-engine land, airplane single-engine sea, airplane multi-engine land, and instrument airplane ratings. The pilot held type ratings for L-39, Mikoyan-Gurevich MiG-15 and MiG-17 airplanes.

His most recent Federal Aviation Administration (FAA) second class medical certificate was issued on May 29, 2012, without limitations.

The pilot's logbooks were not located during the investigation. According to a friend of the pilot, he had accumulated approximately 2,500 total flight hours and 600 hours in jet airplanes.

Friends of the pilot reported he was in excellent health, rarely consumed alcohol, and exercised regularly.

A friend noted the pilot had a history of G-tolerance issues. The friend reported the pilot blacked out momentarily during a formation flight and may have experienced G-related issues on two other occasions. The pilot attended ground school training on G awareness and also reviewed United States Air Force documentation on G training.

Aircraft and Owner/Operator Information

Aircraft Make:	Aero Vodochody	**Registration:**	N139GS
Model/Series:	L39C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	432833
Landing Gear Type:	Retractable - Tricycle	**Seats:**	1
Date/Type of Last Inspection:	Unknown	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo jet
Airframe Total Time:		**Engine Manufacturer:**	IVCHENKO
ELT:	Installed, not activated	**Engine Model/Series:**	AL-25TL
Registered Owner:	On file	**Rated Power:**	3792 Lbs thrust
Operator:	On file	**Operating Certificate(s) Held:**	None

The Aero Vodochody L-39 Albatross was a high-performance tandem seat jet trainer aircraft serial number 432833, manufactured in 1984. The airplane was powered by a single turbo fan Ivchenko AI-25TL 3,792-lb thrust engine.

The airplane was issued an experimental exhibition special airworthiness certificate on January 14, 2009. The airplane was registered to the owner on December 31, 2008.

The airplane logbooks were not located during the investigation. The most recent inspection and total aircraft times could not be determined. According to friends of the pilot, the airplane was in immaculate condition and there were no recent maintenance issues.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	DVN,751 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	13:47 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Scattered / 2300 ft AGL	**Visibility**	9 miles
Lowest Ceiling:	Overcast / 4000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	22°C / 20°C
Precipitation and Obscuration:	In the vicinity - None - Rain		
Departure Point:	Davenport, IA (DVN)	**Type of Flight Plan Filed:**	None
Destination:	Davenport, IA (DVN)	**Type of Clearance:**	None
Departure Time:	13:15 Local	**Type of Airspace:**	

At 1347, the DVN automated surface observing system reported the wind from 070 degrees at 14 knots, visibility 9 miles, decreasing rain, scattered clouds at 2,300 feet, sky overcast at 4,000 feet, temperature 22 degrees Celsius, dew point 20 degrees Celsius, and an altimeter setting of 29.97 inches of Mercury.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	41.610279,-90.588333(est)

Examination of the accident site by Federal Aviation Administration inspectors showed the airplane was severely fragmented and consumed by fire. The main wreckage came to rest 1.2 miles from DVN in a field. The airplane was recovered from the field and brought to a secure location for further examination.

Examination of the airplane by FAA inspectors and representatives familiar with L-39 airplanes revealed several disconnects in the flight control system due to impact and postaccident thermal damage. All major components of the airplane were accounted for at the accident site and no preaccident mechanical malfunctions or failures were noted with the airplane that would have precluded normal operation.

Two small video recorder devices were found at the accident site. The recorders were recovered and sent to the NTSB Vehicle Recorders laboratory in Washington, DC, for data extraction. Due to damage, no information was recovered from the video recorder devices.

Medical and Pathological Information

On September 3, 2012, an autopsy was performed on the pilot by the Iowa Office of the State Medical Examiner, Ankeny, Iowa. The pilot's death was attributed to multiple blunt force and thermal injuries.

Toxicological testing was performed by the FAA Civil Aerospace Medical Institute (CAMI), Oklahoma City, Oklahoma. The report revealed that testing for carbon monoxide and cyanide was not performed. Ethanol was detected in the liver, spleen, muscle, and heart. N-Propanol was detected in the spleen. These volatiles were consistent with postmortem production of alcohols.

Additional Information

On February 29, 1984, the FAA released Advisory Circular 91-61, A Hazard In Aerobatics: Effects Of G Forces On Pilots. The document stated in part:

"...One little known, but important, aspect of tolerance of G's is the effect of rapid changes from +Gz to -Gz, or vice versa. Because aerobatics induce such rapid changes, tolerance to changes could be highly significant. It is known, for example, that when one is subjected to -Gz, blood pressure receptors in the head and chest respond to the increased pressure and cause a reflex slowing of the heart. A rapid change to +Gz (for example, when the pilot executes a half-roll during a maneuver) would suddenly drop blood pressure in these receptors and there would be a rapid speeding up of the heart to maintain pressure; but because the reflex system requires some time to sense the need, the heart could be delayed in responding to this demand and blood flow to the brain might suddenly decrease...anything that reduces blood volume or cardiovascular response may reduce G tolerance. Dehydration, excessive sweating, severe sunburn, low blood pressure, prolonged standing or sitting, hypoxia, infection (even minor illnesses), and medications all lower G tolerance. Alcohol and hangovers will reduce your ability to perform aerobatic maneuvers. Make sure you are as fit as your aircraft...."

G Induced Loss of Consciousness (GLOC)

The average threshold of a pilot to blackout is 4.7 g's and laps in to unconsciousness at 5.4 g's. The rate of g on-load is a significant factor in establishing the amount of g load a pilot can withstand (AC-91-61).

Administrative Information

Investigator In Charge (IIC):	Sauer, Aaron
Additional Participating Persons:	Harrison McNaughton; Federal Aviation Administration; Des Moines, IA
Original Publish Date:	January 13, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84919