Aviation Investigation Final Report

Location:	Leshara, Nebraska	**Accident Number:**	CEN16FA282
Date & Time:	July 24, 2016, 15:00 Local	**Registration:**	N55NE
Aircraft:	Beech 95 B55 (T42A)	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot and the designated pilot examiner departed in the multi-engine airplane to conduct an airline transport pilot checkride. Radar data indicated that they proceeded to the practice area and performed two 360° turns. The airplane then slowed, consistent with the pilots' intention of performing a stall. As the airspeed decreased, the airplane entered a rapid descent, and it was observed by a witness as it spun clockwise in a nose-low attitude to ground impact. Impact signatures were consistent with a slightly nose-low, near-flat attitude. Postaccident examination of the engines and airframe did not reveal evidence of any anomalies that would have precluded normal operation of the airplane. Polishing of the propeller blades from both the left and right propeller assemblies indicated that both engines were likely running at impact; however, the right propeller had more signatures of power when compared to the left propeller.

A performance study revealed that the airplane departed controlled flight about 80 knots, which was the airplane's minimum controllable airspeed with one engine inoperative. It could not be determined if an engine was momentarily inoperative resulting in a loss of control inflight. Both fuel selector valves were found in the auxiliary positions, which according to the operating handbook was for level flight only. It could not be determined if this contributed to the accident sequence. It also possible that an improper stall recovery resulted in an inadvertent spin entry.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of airplane control during a practice stall maneuver, which resulted in a spin that continued to ground impact.

Findings

Personnel issues	Aircraft control - Pilot
Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Maneuvering	Unknown or undetermined
Maneuvering	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On July 24, 2016, about 1500 central daylight time, a Beech 95-B55 airplane, N55NE, impacted terrain near Leshara, Nebraska. The commercial pilot and the designated pilot examiner were fatally injured, and the airplane was substantially damaged. The airplane was owned by the United States Air Force and operated by the LeMay Aero Club under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91 as an airline transport pilot (ATP) checkride. Visual meteorological conditions prevailed for the flight, and flight following services were provided. The local flight departed from the Millard Airport (KMLE), Omaha, Nebraska, about 1430.

According to radar and air traffic communication information obtained from the Federal Aviation Administration (FAA), at 1433, the pilot contacted air traffic control and reported departing from KMLE. At the pilot's request, the controller cleared the flight to proceed to and enter the west practice area.

Radar tracked the flight as it transitioned into the west practice area, which was located about 17 miles northwest of KMLE. The airplane made a level, left 360° turn followed by a level, right 360° turn. The airplane then tracked north-northwest and began slowing while at 5,500 ft mean sea level (msl). The airplane drifted slightly left as it slowed. At 1458:10, the airplane was at 5,500 ft msl, and 9 seconds later, it was at 4,700 ft msl, indicating that it was descending at a rate of about 5,000 ft per minute (fpm). Ten seconds after that, the airplane was at 3,600 ft msl and had reversed heading. The last radar return with an associated altitude occurred 9 seconds later when the airplane was at 2,500 ft msl, indicating that it was descending at a rate of about 6,000 fpm. No distress calls were received from the airplane.

A private-pilot-rated witness near the accident site heard an airplane and then heard "the engine[s] drop to idle" for about 2 to 3 seconds. The engine sound then increased for about 5 seconds. He heard sputtering and then the sound decreased again. At that point, the witness looked for the airplane and saw it "descending in a spiral, nose pointed downward, like a stall spin." The witness lost sight of the airplane as it descended behind trees and buildings; as he ran to go inside to notify emergency services, he heard the impact and saw black smoke.

Pilot Information

Certificate:	Commercial; Military	**Age:**	27,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	May 19, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 28, 2016
Flight Time:	952 hours (Total, all aircraft), 14.3 hours (Total, this make and model), 64.5 hours (Last 90 days, all aircraft), 33.9 hours (Last 30 days, all aircraft), 2.5 hours (Last 24 hours, all aircraft)		

Check pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	61,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	March 24, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:			

Commercial Pilot

The commercial pilot, age 27, held a commercial pilot certificate with ratings for airplane single-engine land, airplane multi-engine land, and instrument airplane. He was issued a first-class medical certificate on May 19, 2016, with the limitation "must wear corrective lenses." He was a US Air Force pilot based at Offutt Air Force Base in Omaha and his most recent flight review was completed in a military Boeing RC-135 airplane on June 28, 2016. He had accumulated military flight experience of 672.6 hours in RC-135s and 265.1 hours as a military student pilot. His civilian pilot logbook had 7 entries from July 6 to July 23, 2016. According to the times entered, the pilot had flown at least 14.3 hours in the accident airplane.

Designated Pilot Examiner (DPE)

The designated pilot examiner (DPE), age 61, held an ATP certificate with ratings for airplane single-engine land, airplane multi-engine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single-engine land, airplane multi-engine land, and instrument airplane. In addition, he was a ground instructor and a DPE. He was employed as a flight instructor and DPE for the LeMay Aero Club. His pilot logbook was not made available during the investigation. A

Contractor Crewmember Record, Department of Defense Form 1821, indicated that the DPE's total flight experience as of July 15, 2016, was 12,777 hours of which 10,799 hours were in multi-engine airplanes. On the form, the DPE listed a combined time in Beech 95-B55 and Cessna 310 airplanes of 412 hours of which 271 hours were as an instructor. His most recent flight review was conducted in a Fairchild Swearingen SA227 on July 15, 2016. He was issued a first-class medical certificate on March 24, 2016, with the limitation "must wear corrective lenses."

Aircraft and Owner/Operator Information

Aircraft Make:	Beech	**Registration:**	N55NE
Model/Series:	95 B55 (T42A)	**Aircraft Category:**	Airplane
Year of Manufacture:	1965	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	TF-5
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	July 16, 2016 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	16066 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-470-L
Registered Owner:	UNITED STATES AIR FORCE	**Rated Power:**	260 Horsepower
Operator:	LeMay Aero Club	**Operating Certificate(s) Held:**	Pilot school (141)

The airplane was manufactured in 1968 as a Beechcraft T-42A Cochise, serial number TF-5. It was acquired by the LeMay Aero Club in December 1988 and registered with the FAA as a Beechcraft 95-B55. According to the Aero Club, the airplane logbooks were kept in the airplane. Fire-damaged logbooks were located in the wreckage. According to the logbooks, the airplane's last inspection was a 100-hour inspection completed on July 16, 2016. As of the date of this inspection, the airframe had accumulated 16,066 total hours, and each engine had accumulated 2,128 total hours and 434 hours since overhaul.

The airplane was equipped with two auxiliary fuel tanks. The fuel pickup points for the auxiliary tanks are located in the forward inboard corners of the tanks. According to the airplane operator's manual, the auxiliary fuel and crossfeed systems are for use in level flight only.

Regarding the stall warning indicator, the airplane operator's manual states, "As an impending stall is approached, a stall warning indicator triggered by a sensing vane in the left wing sounds a warning horn while there is ample time for the pilot to correct his attitude."

The performance specifications and limitations section of the manual states that the single-engine minimum controllable airspeed is 80 knots (kts), and the power-off stall speed for a 5,100-pound airplane in level flight with landing gear and flaps extended is 51 kts. According to14 CFR 23.149, the

single-engine minimum controllable airspeed is defined as the calibrated airspeed at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with that engine still inoperative, and thereafter maintain straight flight at the same speed with an angle of bank of not more than 5°.

The normal operating procedures section of the manual states, in part:

The T-42A airplane is intended for only nonaerobatic passenger and cargo operations. Only those maneuvers incidental to NORMAL flying include[ing] stalls (except whip stalls) and turns in which the angle of bank does not exceed 60° are permitted. During a normal stall approach, a slight buffeting will provide a sufficient warning to permit a normal recovery; the severity of this warning will increase slightly with power on. In addition, the stall warning indicator gives aural indication of an impending stall approximately 5 to 10 mph (4 to 9 kts) above the actual stall. If a spin is entered inadvertently, cut the power on both engines. Apply full rudder opposite the direction of rotation and then move elevator forward until rotation stops. When the controls are fully effective, bring the nose up smoothly to a level flight attitude. Don't pull out too abruptly.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KFET,1203 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	14:55 Local	**Direction from Accident Site:**	332°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.04 inches Hg	**Temperature/Dew Point:**	29°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	OMAHA, NE (MLE)	**Type of Flight Plan Filed:**	VFR
Destination:	OMAHA, NE (MLE)	**Type of Clearance:**	VFR flight following
Departure Time:	14:30 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	41.3325,-96.438613

The airplane impacted a bean field about 17 miles northwest of KMLE. A postimpact fire consumed a majority of the fuselage and the inboard portions of both wings. The left propeller had separated from the left engine and was partially buried in the soil at the initial impact point. The airplane came to rest about 4 ft from the left propeller aligned with a magnetic heading of 020°. The empennage was twisted about 80° to the right. The full length of the leading edges of both wings exhibited light upward and aft crushing.

Flight control continuity was established to all primary flight controls. The landing gear actuator was in the landing gear extended position. Flap position could not be determined due to fire damage. The fuel selector handles were broken, and the fuel selectors were opened to determine the selector valve positions; both valves were selected to their respective auxiliary tanks.

The left propeller was removed from the soil. All three blades remained intact and attached to the propeller hub. One blade was bent rearward near the blade root. The other two blades were relatively undamaged. All three blades displayed leading edge polishing near the blade tips.

The right propeller remained attached to the right engine. All three blade roots remained attached to the hub. One blade was relatively undamaged; one blade was partially consumed by fire; and one blade was fractured near the blade root. The separated blade exhibited leading edge polishing and chordwise scratches.

The engines were removed and transported to the engine manufacturer's facility in Mobile, Alabama, for further examination. Both engines had sustained damage that precluded running them on a test bed, but they were completely torn down and examined. The examinations found no evidence of any preimpact malfunctions or anomalies with either engine that would have precluded the normal production of power.

The airplane's stall warning switch and JPI EDM 760 Engine Analyzer were removed from the airplane and shipped to the NTSB laboratory in Washington, DC. The stall warning switch failed an initial continuity check. The electrical contacts appeared fouled by an undetermined substance. The switch's continuity was checked a second time, and the switch passed testing. The reason for the switch's failure of the first continuity check could not be determined.

The EDM 760 was examined by the NTSB Vehicle Recorders Laboratory. The memory components exhibited heavy thermal damage. As of June 2018, attempts to retrieve data have been unsuccessful but will be continued. If information is retrieved, this report will be amended.

Medical and Pathological Information

Commercial Pilot

The Douglas County Morgue, Omaha, Nebraska, conducted an autopsy on the pilot. According to the autopsy report, the pilot's cause of death was massive blunt trauma. No preexisting conditions which could have contributed to the accident were identified.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilot; testing was negative for ethanol and drugs.

Designated Pilot Examiner (DPE)

The Douglas County Morgue, Omaha, Nebraska, conducted an autopsy on the DPE. According to the autopsy report, the DPE's cause of death was massive blunt trauma. The autopsy report noted atherosclerotic coronary artery disease (focal 51% to 75% narrowing of the mid-left anterior descending coronary artery) and myocardial hypertrophy. Sectioning of the heart did not identify any focal lesions in the myocardium. There was no evidence of an acute coronary thromboemboli.

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the DPE. Testing was negative for ethanol. Valsartan was detected in the liver and urine.

On the pilot's most recent FAA medical application, he reported the use of aspirin, atorvastatin, and valsartan. Valsartan is a prescription medication used alone or in combination with other medications to treat high blood pressure. It is not generally considered to be impairing.

Tests and Research

Airplane performance modeling using radar and weather information was conducted by the NTSB Vehicle Performance Division. The modeling determined that the airplane's heading fluctuated as the airplane slowed. The airplane began a rapid descent and heading change when the airplane's airspeed dropped below the airplane's single-engine minimum controllable airspeed of 80 kts.

Additional Information

After the accident, members of the LeMay Aero Club found a planned flight profile for the accident flight that included the following practice area maneuvers: clearing, steep turns, stalls, unusual attitude, and engine fail/feather/restart.

Another pilot was completing his ATP certificate about the same time as the accident pilot and took his ATP checkride in the accident airplane with the DPE 2 days before the accident. This pilot reported that the DPE was very thorough, used only the most current pilot training standards, and always used a

checklist. During his checkride, they did airwork that included three stalls. During the stalls, the stall warning system failed to operate. They used the auxiliary tanks during all the airwork maneuvers, which included an engine shutdown. During the final landing, the stall warning system activated just before touchdown. This pilot reported that the stall warning system worked during the preflight and had always worked during his prior training flights in the airplane.

Administrative Information

Investigator In Charge (IIC):	Aguilera, Jason
Additional Participating Persons:	Owen Grimm; FAA FSDO; Lincoln, NE John Hirsch; Textron Aviation ; Wichita, KS Chris Lang; Continental Motors; Mobile, AL
Original Publish Date:	October 1, 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=93666