Aviation Investigation Final Report

Location:	Collegedale, Tennessee	**Accident Number:**	ERA13LA183
Date & Time:	March 29, 2013, 15:46 Local	**Registration:**	N999NA
Aircraft:	ANDREWS ZODIAC	**Aircraft Damage:**	Minor
Defining Event:	Miscellaneous/other	**Injuries:**	1 Fatal, 1 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The pilot had recently purchased the experimental amateur-built airplane and was not familiar with it. The flight instructor reported that, before the pilot's first instructional flight in the airplane, they were unable to start the engine. The pilot unlatched and raised the canopy to call for assistance from ground personnel. As the ground person started to attach the battery charger to the engine, the pilot unbuckled his seatbelt to assist; however, the ground person told the pilot that he did not need to get out of the airplane. The pilot then hastily attempted to refasten his seatbelt, and the pilots lowered the canopy. The flight instructor stated that the canopy appeared to be flush with the fuselage and latched properly; however, about 9 minutes into the flight, the canopy opened, and the airplane entered a negative G dive, at which point, the pilot was pulled out of his seat and the airplane. The flight instructor remained in his seat with the seatbelt fastened and landed the airplane uneventfully. Examination of the pilot's seatbelt and the canopy latch did not reveal any malfunctions or failures that would have precluded normal operation. Therefore, it is likely that the pilots did not latch the canopy properly before takeoff and that the pilot did not properly fasten his seatbelt, which allowed him to be pulled from the airplane due to the high G forces after the canopy opened in flight.

Probable Cause and Findings

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

The pilot's failure to ensure that his seatbelt was fastened and the pilots' failure to ensure that the canopy was latched properly, which resulted in the pilot's ejection from the cockpit following the opening of the canopy and the subsequent in-flight upset.

Findings

Aircraft	Flight compartment equipment - Incorrect use/operation
Personnel issues	Use of equip/system - Pilot
Aircraft	(general) - Unintentional use/operation
Personnel issues	Incorrect action performance - Pilot

Factual Information

History of Flight

Prior to flight	Ground handling event
Enroute-cruise	Miscellaneous/other (Defining event)

HISTORY OF FLIGHT

On March 29, 2013, about 1546 eastern daylight time, an experimental amateur-built Zodiac 601XL, N999NA, operated by a private individual, sustained minor damage during an in-flight upset near Collegedale Municipal Airport (FGU), Collegedale, Tennessee. The flight instructor was not injured and the private pilot was fatally injured. The instructional flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that departed FGU about 1537.

According to the flight instructor's written statement, the private pilot purchased the airplane about 3 weeks before the accident and was not familiar with it. The flight instructor agreed to provide instruction in the airplane and first wanted familiarize himself with it. The flight instructor flew the airplane solo uneventfully on two occasions, for a total of approximately 2 hours, with the second flight ending just before the accident flight began. After his second solo flight, the flight instructor shut down the engine and reviewed the airplane's characteristics with the private pilot. They then returned to the airplane, took their time entering the cockpit, fastened their seatbelts and secured the canopy; however, they were unable to start the engine.

The private pilot subsequently unlatched and raised the canopy to call for assistance from ground personnel. A ground person provided a charger for the airplane's battery. As he started to attach the charger, the private pilot unbuckled his seatbelt to assist; however, the ground person stated that the private pilot did not need to get out of the airplane as he did not require any help. The private pilot then put his seatbelt back on, more hastily than the first time, and appeared to fasten it again. The flight instructor thought he heard a "click," but could not see the private pilot's seatbelt with the center console between them. The pilots lowered the canopy and latched it a second time for the planned 20-minute flight.

About 5 minutes into the flight, the flight instructor heard a wind noise from behind their heads, which he did not hear on previous flights and thought that perhaps the canopy did not have a perfect seal to the fuselage. As the flight progressed, the canopy seemed like it may have opened a little more. By that time, the flight was headed back to the airport. The canopy then pulled up enough on the latches that the flight instructor could see daylight through the openings between the canopy and fuselage. The flight instructor attempted to pull the canopy down, but it instead opened completely and the airplane entered a negative g dive. He was not sure if the change in airflow or a control input by the private pilot caused the dive. The private pilot lifted out of his seat and ejected out of the cockpit. The flight instructor was able to grab the control stick, arrest the dive and land back at FGU uneventfully. Emergency responders later recovered the private pilot in a wooded area about 4 miles east of FGU.

PERSONNEL INFORMATION

The private pilot, age 77, 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 January 13, 2012. At that time, he reported a total flight experience of 150 hours.

The flight instructor, age 45, held an airline transport pilot certificate with a rating for airplane multiengine land. He also held a commercial pilot certificate with ratings for airplane single-engine land and rotorcraft helicopter. He held a flight instructor certificate, with ratings for airplane single-engine, rotorcraft helicopter and instrument airplane. His most recent FAA second-class medical certificate was issued on October 29, 2012. The flight instructor reported a total flight experience of 4,750 hours; of which, 2,793 hours were in single-engine airplanes and 2 of those hours were in the accident airplane.

AIRCRAFT INFORMATION

The experimental, amateur-built, two-seat, low-wing, fixed tailwheel airplane, serial number 6222, was assembled in 2009. It was powered by a Jabiru 3300A, 110-horsepower engine. The airplane's most recent conditional inspection was completed on November 13, 2012. At that time, the airplane had accumulated a total flight time of 57.8 hours.

METEOROLOGICAL INFORMATION

Lovell Field (CHA), Chattanooga, Tennessee, was located about 13 miles west of the accident site. The recorded weather at CHA, at 1553, included wind from 360 degrees at 8 knots and a broken ceiling at 10,000 feet.

WRECKAGE AND IMPACT INFORMATION

Examination of the airplane by an FAA inspector revealed minor damage to the fuselage and canopy. Examination of the canopy and the private pilot's seatbelt did not reveal any failures. The inspector was able to secure and release both the canopy and seatbelt without difficulty. The inspector also noted that the canopy fit was not aligned on the accident airplane and that safety wire and turnbuckles had been installed to the bottom rear edges of the canopy, to aide in the latching of it. While securing and releasing the canopy, she had difficulty determining when the canopy was latched or not.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the private pilot by the Bradley County Medical Examiner's Office, Cleveland, Tennessee, on April 1, 2013. Toxicological testing was performed on the private pilot by the FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma. Review of the toxicological report revealed:

"Amlodipine detected in Liver
Amlodipine detected in Blood"

ADDITIONAL INFORMATION

A Garmin GPSMAP 296 was recovered from the airplane and forwarded to the NTSB Vehicle Recorders Laboratory, Washington, DC, for data download. Data were successfully downloaded and plotted. Review of the plots revealed that the airplane departed FGU at 1537 and flew an approximate 6-mile right arc, around and back to the airport. At a GPS time of 1546:06, the airplane was at a GPS altitude of 2,356 feet and traveling at 99 knots. About 9 seconds later, the airplane had descended to a GPS altitude of 2,047 feet, in the vicinity of the accident site. During the following 3 seconds, the airplane had descended another 259 feet to an altitude of 1,788 feet at 1546:18, before the descent was corrected (for more information, see GPS Factual Report in the public docket).

Flight instructor Information

Certificate:	Airline transport; Commercial	**Age:**	45
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Helicopter; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	October 29, 2012
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	February 25, 2013
Flight Time:	4750 hours (Total, all aircraft), 2 hours (Total, this make and model), 4412 hours (Pilot In Command, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	77
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	None
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:**	January 13, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	150 hours (Total, all aircraft), 0 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	ANDREWS	**Registration:**	N999NA
Model/Series:	ZODIAC 601XL	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	6222
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	November 13, 2012 Condition	**Certified Max Gross Wt.:**	1320 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	58 Hrs as of last inspection	**Engine Manufacturer:**	Jabiru
ELT:	Installed, not activated	**Engine Model/Series:**	3300
Registered Owner:	David T Richardson	**Rated Power:**	110 Horsepower
Operator:	David T Richardson	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CHA,682 ft msl	**Distance from Accident Site:**	13 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.26 inches Hg	**Temperature/Dew Point:**	14°C / -1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Collegedale, TN	**Type of Flight Plan Filed:**	None
Destination:	Collegedale, TN	**Type of Clearance:**	None
Departure Time:	15:37 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 None	**Aircraft Damage:**	Minor
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 1 None	**Latitude, Longitude:**	35.044445,-85.019996(est)

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Pamela K Charles; FAA/FSDO; Nashville, TN
Original Publish Date:	January 30, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=86547