



National Transportation Safety Board Aviation Accident Final Report

Location:	Holly Ridge, NC	Accident Number:	ERA15FA245
Date & Time:	06/21/2015, 1532 EDT	Registration:	N35EP
Aircraft:	CZECH SPORT AIRCRAFT AS PIPER SPORT	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Earlier on the day of the accident, a condition inspection of the light-sport airplane had been completed, and the purpose of the flight was to relocate the airplane to its home base airport. About 1500, the pilot's wife dropped the pilot off at the airport. The temperature was in the "upper 90s," and, since the airplane was equipped with a clear cockpit canopy, it would have been hot inside of the airplane. According to the pilot's wife, it was the pilot's habit to leave the canopy up when it was hot until he was ready to depart.

About 1530, the pilot called his wife from the airplane before he took off and advised her that it would take him 15 minutes to fly to the home base airport and that he would wait for her to pick him up in the air-conditioned office of the fixed-base operator (FBO) at the field. However, when she arrived at the FBO, he was not there. A search was initiated, and the airplane wreckage was found in a wooded area about 1.1 miles west of the departure airport.

Recorded data downloaded from a portable GPS unit that was onboard the airplane revealed that the airplane was airborne about 1 minute before reaching a peak GPS altitude of 309 ft and a derived groundspeed of 104 knots. This was the final recorded position.

Examination of the accident site and wreckage revealed that the airplane struck trees in a steep, nose-low attitude and that the pilot was ejected from the cockpit. Examination of the damage to the canopy, the cockpit sill, and the canopy locking mechanism indicated that the canopy was not closed and locked when the airplane impacted the trees. This most likely occurred due to the pilot delaying closing of the canopy due to the high temperature (as was his habit) and then forgetting to lock it. Although the airplane's Pilot's Operating Handbook advised that the canopy could not be closed in flight and that there would be no change of flight characteristics with the canopy open, it is likely that the pilot was attempting to close the canopy in flight and lost control of the airplane, which resulted in an uncontrolled descent into the trees.

The pilot's four-point harness was intact and attached to its attachment fittings; however, the center buckle assembly was found unlatched. This may have been the result of the pilot forgetting to buckle the harness, or he may have unlatched it so he could reach the canopy sill and/or the latching mechanism in an attempt to close the canopy in flight. Other indicators that the pilot may have been in a hurry to get airborne due to the high temperature included his failure to arm the emergency locator transmitter, which was found in the "off" position, and to remove the ballistic recovery system activation handle safety pin with its "REMOVE BEFORE FLIGHT" flag, which was found in place.

The pilot's autopsy revealed that his heart was mildly enlarged, and his coronary arteries were significantly narrowed by atherosclerotic plaques. Microscopic evaluation of heart tissue also demonstrated mild interstitial fibrosis. Toxicological testing revealed medications that were consistent with the pilot's heart disease. Although the pilot's heart disease put him at risk for physical symptoms, such as chest pain, shortness of breath, or a heart rhythm that could not produce enough blood pressure to stay awake, neither the heart disease nor his medications would have impaired his judgment or increased his risk of becoming distracted by the canopy issue. Thus, the pilot's medical conditions and medications most likely did not contribute to the cause of this accident.

Probable Cause and Findings

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

The pilot's failure to maintain airplane control after the cockpit canopy opened during initial climb. Contributing to the accident was the pilot's failure to securely lock the canopy before takeoff.

Findings

Aircraft	Performance/control parameters - Not attained/maintained (Cause) Passenger/crew doors - Incorrect use/operation (Factor)
Personnel issues	Aircraft control - Pilot (Cause) Use of equip/system - Pilot (Factor) Predisposing condition - Pilot Use of medication/drugs - Pilot

Factual Information

History of Flight

Prior to flight	Miscellaneous/other
Initial climb	Miscellaneous/other Attempted remediation/recovery Loss of control in flight (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On June 21, 2015, about 1532 eastern daylight time, a Czech Sport Aircraft Piper Sport, N35EP, was substantially damaged when it impacted trees and terrain after a loss of control during climb after departing from Topsail Airpark (O1NC), Holly Ridge, North Carolina. The private pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the 14 *Code of Federal Regulations (CFR)* Part 91 personal flight, which was destined for the Albert J. Ellis Airport (OAJ), Jacksonville, North Carolina.

According to his wife, on the day of the accident, the pilot went to the airport to check on the airplane after they had lunch together. When he arrived at the airport, he met with the mechanic who was completing the condition inspection on the airplane, paid him for his services, and received a receipt. The pilot then went home but planned to return later and fly the airplane back to OAJ where it was based.

About 1500, the pilot's wife dropped him off at the airport. The temperature was in the "upper 90s;" the humidity was high, and there was little or no breeze. According to the pilot's wife, due to the airplane's "clear roof" (canopy), it would get hot inside of the airplane, and it was her husband's habit to leave the canopy up when it was hot until he was ready to depart.

The pilot's wife reported that he called her from the airplane before he took off at 1524 and advised her that it would take 45 minutes for her to reach OAJ, and he would be there in 15 minutes. He also advised her that he would meet her in the air-conditioned office of the fixed base operator (FBO) at OAJ. However, when she arrived at the FBO, he was not there.

At 1711, one of the two mechanics who had performed the condition inspection on the airplane received a call from the owner of O1NC who said that he had received a telephone call from the pilot's wife and that the pilot had not arrived at OAJ. The mechanic determined that the airplane was not at O1NC. After not finding the airplane around the area adjacent to the airport, the mechanic called 911. A search for the airplane by federal, state, and local authorities was initiated. About 2130, the wreckage of the airplane was discovered in a wooded area about 1.1 miles west of O1NC.

Pilot Information

Certificate:	Private	Age:	89, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last FAA Medical Exam:	07/24/2013
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1850 hours (Total, all aircraft)		

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with a rating for airplane single-engine land. His most recent FAA third-class medical certificate was issued on July 24, 2013. He reported on that date that he had accrued 1,850 total hours of flight experience.

Aircraft and Owner/Operator Information

Aircraft Make:	CZECH SPORT AIRCRAFT AS	Registration:	N35EP
Model/Series:	PIPER SPORT	Aircraft Category:	Airplane
Year of Manufacture:	2010	Amateur Built:	No
Airworthiness Certificate:	Special Light-Sport	Serial Number:	P1001059
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	06/21/2015, Condition	Certified Max Gross Wt.:	1320 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	74.7 Hours as of last inspection	Engine Manufacturer:	Rotax
ELT:	C126 installed, not activated	Engine Model/Series:	912 ULS
Registered Owner:	On file	Rated Power:	100 hp
Operator:	On file	Operating Certificate(s) Held:	None

The light-sport airplane was a single-engine, low-wing monoplane of conventional metal construction. It was equipped with a fixed-tricycle undercarriage with a castering nose wheel, and was powered by a 100-horsepower, Rotax 912 ULS engine, driving a three-bladed Woodcomp ground-adjustable propeller.

The fuselage consisted of a semi-monocoque structure. The cockpit frame and canopy frame were constructed of carbon fiber. The canopy was made of Plexiglass. It was hinged at the front and was equipped with a sliding window on each side.

The fuselage also contained a ballistic recovery system (BRS) with a parachute to be deployed in case of emergency. The BRS consisted of a rocket-deploying container that was located just forward of the cockpit in the nose section of the fuselage. A cable ran from this container to an activation handle just to the right of the pilot's seat on the instrument panel. Once the activation handle had been pulled, the rocket would exit the fuselage and accelerate away from the airplane. After the parachute was completely extracted and exposed to the relative wind, it would begin to inflate, generating drag forces to decelerate the airplane. When the parachute had fully deployed, the airplane would descend at a rate of about 1,000 to 1,500 ft per minute.

According to FAA and maintenance records, the airplane was manufactured in 2010. Its most recent condition inspection was completed on the day of the accident. At the time of the inspection, the airplane had accrued 74.7 total hours of operation.

According to one of the two mechanics who performed the condition inspection, on June 19, 2015, the pilot flew the airplane to O1NC on a ferry permit. The ferry permit was required because the pilot had been sick and could not fly the airplane somewhere to have the condition inspection performed when it was due.

On June 20, 2015, the two mechanics began the condition inspection. On that date, the pilot advised the mechanics that he had accidentally "put oil" into the coolant fill port on top of the engine because he thought the oil level was low. The mechanics flushed the cooling system and added new coolant. The mechanics also noticed that the bushings holding the radiator onto the engine were cracked and replaced them.

The pilot told the mechanics that the engine oil had been changed 23 hours earlier and that the oil should not be changed. The mechanics then discovered that the spark plugs needed cleaning, but, after advising the pilot of the cost of new spark plugs, the pilot had them install new plugs instead of cleaning the old ones.

According to the mechanic, on the day of the accident, as part of the inspection, the mechanics opened all the inspection panels on the airplane, closed them, and the airplane was returned to service about 1400. The mechanics then locked up the hangar and went home.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	NCA, 26 ft msl	Distance from Accident Site:	16 Nautical Miles
Observation Time:	1556 EDT	Direction from Accident Site:	45°
Lowest Cloud Condition:	Scattered / 5000 ft agl	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/ None
Wind Direction:	230°	Turbulence Severity Forecast/Actual:	/ N/A
Altimeter Setting:	29.94 inches Hg	Temperature/Dew Point:	34° C / 22° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	HOLLY RIDGE, NC (01NC)	Type of Flight Plan Filed:	None
Destination:	JACKSONVILLE, NC (OAJ)	Type of Clearance:	None
Departure Time:	1524 EDT	Type of Airspace:	Class G

At 1556, the recorded weather at the New River Marine Corps Air Station (NCA), Jacksonville, North Carolina, located 16 nautical miles northeast of the accident site, included: wind 230° at 6 knots, 10 miles visibility, scattered clouds at 5,000 ft, temperature 34°C, dew point 22°C, and an altimeter setting of 29.94 inches of mercury.

Airport Information

Airport:	TOPSAIL AIRPARK (01NC)	Runway Surface Type:	Grass/turf
Airport Elevation:	65 ft	Runway Surface Condition:	Dry
Runway Used:	21	IFR Approach:	None
Runway Length/Width:	3200 ft / 75 ft	VFR Approach/Landing:	None

01NC was an uncontrolled, privately-owned airport, located 2 miles southwest of Holly Ridge, North Carolina.

The field elevation was 65 ft above mean sea level. The airport had two runways oriented in a 18/36 and 3/21 configuration. Runway 21 was turf covered, in good condition, and measured 3,200 ft long and 75 ft wide.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	34.471389, -77.603333

Examination of the accident site revealed that the airplane struck trees in a steep, nose-low attitude, and the pilot was ejected from the cockpit. The airplane then fell nose first to the forest floor below, impacted in a 90° nose-down attitude, nosed over, and came to rest inverted.

Numerous areas of crush and compression damage to the fuselage and wings were noted, and there was evidence of fuel staining on the leading edges of the wings. There was no evidence of any inflight structural failure, inflight fire, or inflight explosion.

Examination of the cockpit canopy revealed that it was detached from its mounting location and was lying underneath the aft portion of the inverted fuselage. The majority of its clear bubble was broken into multiple pieces; however, the pieces were not scattered around the accident site but were collocated with the canopy frame. One of the canopy lift struts was missing and was not recovered. The damage patterns observed on the canopy frame and cockpit sill did not match and could not be correlated with each other. The canopy latching mechanism hooks were found to be partially retracted, the canopy locking mechanism and activation handle were in the "OPEN" position, and the slots in the canopy frame that the hooks engaged when the canopy was closed and locked showed no evidence of tear-out.

Both wing fuel tank caps were closed, both wing locker doors were closed and secured, all the inspection panels were closed and secured, and the pitot tube was clear and free of debris. The wing flaps were in the up position, and flight control continuity was established from the ailerons, elevator, and rudder to the control stick and rudder pedals in the cockpit. The aileron, elevator, and rudder trims, were about neutral.

The pilot's four-point harness was intact and attached to its attachment fittings; however, the center buckle assembly was unlatched. The emergency locator transmitter had not been armed, and the ballistic recovery system activation handle safety pin with its "REMOVE BEFORE FLIGHT" flag was still in place.

The master switch, strobes switch, landing light switch, and electric fuel pump switch were all in the on position. The magneto switch was in the both position; the throttle was in the full throttle position; and the choke lever was in the off position. The fuel selector was in the right tank position. The carburetor heat control was in the off position.

Examination of the propeller speed reduction unit (PSRU) revealed that it was impact damaged, and the case had been breached. Examination of the propeller, the PSRU propeller gear assembly, and the PSRU overload clutch, revealed evidence of rotation. Smearing was

evident on the metal faces of the overload clutch. The propeller drive shaft was also sheared, displayed a 45° conical break at the shear face, and showed evidence of torsional rotation.

Examination of the engine revealed that it was impact damaged; both carburetors had separated from their mounting locations, and the float bowls had separated from the carburetors. Portions of the air intake system, exhaust system, and the ignition harnesses had separated from their mounting positions.

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot was an 89-year-old male, who, as of his last FAA medical exam, was 68 inches tall and weighed 187 pounds. The pilot had first applied for a medical certificate in 2004 and reported to the FAA a medical history that included coronary artery disease treated with a stent in 2002 and coronary artery bypass grafting in 2004. In addition, he had hypertension and a history of a period of atrial fibrillation. After additional detailed information was reviewed, the pilot received a special issuance third-class medical certificate in 2005 with the limitation that it was valid for 1 year.

The pilot continued to renew his special issuance medical certificate annually, providing detailed information requested by the FAA. He developed recurrent atrial fibrillation in 2008 when an atrial clot was also diagnosed. He was treated with rate control medication and blood thinners. With a few periods of being deferred because he needed to get better control of his rate or degree of blood thinning, the pilot generally continued to receive special issuance third-class medical certificates. At the time of his last exam, he reported using warfarin (a blood thinner), diltiazem (a blood pressure medicine also used to control the heart rate in patients with atrial fibrillation), and febuxostat (a medication to prevent attacks of gout) and received a special issuance third-class medical certificate limited by a requirement for corrective lenses and marked, "not valid for any class after 07/31/2014." At the time of the accident, the pilot was flying an airplane that met the definition of a light sport aircraft; thus, he was required only to hold a valid driver's license.

According to the autopsy performed by the Brody School of Medicine at East Carolina University, Division of Forensic Pathology, the pilot's cause of death was multiple extreme injuries due to aircraft crash, and the manner of death was accident. The evaluation of natural disease was limited. The heart was described as "mildly enlarged" and weighed 430 grams (average for a 185-pound man is 358 grams with a range of 271-473 grams). The coronary arteries were significantly narrowed by atherosclerotic plaques including 80% stenosis of the left main and left anterior descending, 90% stenosis of the first diagonal, 70% stenosis of the circumflex, and 30% of the right coronary, which was fed by a patent coronary artery bypass graft. The septum was 1.5 centimeters thick (average is 1.3 centimeters). Microscopic evaluation of heart tissue demonstrated mild interstitial fibrosis.

The FAA's Bioaeronautical Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing, but it and was limited by the absence of available blood. The evaluation for volatiles identified 79 mg/hg of ethanol in muscle and 19 mg/hg in liver as well as N-butanol and N-propanol in muscle. Ethanol may be ingested in beer, wine, and liquor but may also be produced by microbial action after death. The alcohols N-butanol and N-propanol are only produced by microbial action after death. In addition, atenolol, verapamil, its metabolite

norverapamil, and warfarin were detected in liver, and verapamil and warfarin were detected in muscle. Atenolol and verapamil are prescription medications used to treat hypertension and control the heart rate in atrial fibrillation. Warfarin is a blood thinner used to prevent clot formation and resulting strokes in patients in atrial fibrillation. None of these medications are impairing.

TESTS AND RESEARCH

The airplane manufacturer's published Pilot's Operating Handbook (POH) for the airplane stated that "Before engine starting," the canopy should be "clean, closed, and locked" and that the pilot should "tighten" the safety harness. The POH also stated that "Before takeoff," the cockpit canopy should be "closed and locked," recommended to "manually check by pushing the canopy upwards," and again stated to "tighten" the safety harness.

Review of Section 7 (Description of Airplane and Systems) in the POH revealed guidance regarding the canopy that stated, "make sure that the canopy is latched and mechanism is securely locked into position on both sides before operating the aircraft." Section 7 also provided guidance regarding the safety harness that stated, "adjust the buckle to a central position on the body."

Supplement 03 to the POH, issued September 2010, advised that, if a canopy inadvertently opened on an airplane, it would not be possible to close the canopy, but the airplane would be fully functional. The supplement indicated the following:

- During takeoff: the canopy would open about 2-inches.
- During climb and descent (with the airspeed at 60-75 knots): the canopy would stay open 2-3.2 inches.
- During horizontal flight (with airspeed at 60-80 knots): the canopy would stay open 2-3.2 inches.

The supplement advised that in all of the above-mentioned cases, there would be no flight problems, no vibrations, good aircraft control, and no change of flight characteristics. It recommended that, before takeoff, the pilot should "manually check the canopy is locked by pushing on the canopy upwards," and cautioned that, with the canopy open in flight, "do not perform any slipping."

Flight Recorders

The airplane was equipped with a Garmin GPSMAP 696 portable multifunction display that was mounted in a recess in the instrument panel. The unit consisted of a GPS receiver with a 7-inch diagonal high resolution liquid crystal display.

The unit could store data including, date, time, latitude, longitude, and altitude information for multiple flights in non-volatile memory (NVM).

Data recovered from the unit included track logs from June 5, 2011, through June 21, 2015. The last track log corresponded to the accident flight and contained data from 1525:57 to 1531:35.

According to the data, the airplane began its takeoff roll on runway 21 at 1530:19 and became airborne about 1530:38. The airplane continued to climb while turning to the west until about 1 minute after the takeoff, and, at 15:31:35, the airplane reached a GPS altitude of 309 ft and a derived groundspeed of 104 knots. This was the final recorded position.

Administrative Information

Investigator In Charge (IIC):	Todd G Gunther	Report Date:	07/12/2017
Additional Participating Persons:	Cecil Land; FAA / FSDO; Greensboro, NC Stansilav Suchy; Air Accidents Investigation Institute Jiri Konecny; Czech Sport Aircraft		
Publish Date:	07/12/2017		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=91406		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).