National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA292	**05/20/2017 1730 PDT**	**Regis# N168AT**	**Casa Grande, AZ**	**Apt: Casa Grande Muni CGZ**
Acft Mk/Mdl AIRTIME AIRCRAFT INC CYGNET-NO		**Acft SN 00107**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 0 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: DENTON, WALTER G.		**Opr dba:**		**Aircraft Fire: NONE**

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Accident Rpt# CEN17LA181	**05/13/2017 1520 CDT**	**Regis# N358R**	**Blair, NE**	**Apt: Blair Municipal Airport BTA**
Acft Mk/Mdl AS+ LTD AC 4-NO SERIES		**Acft SN 025**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 1 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: PILOT		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Events

3. Takeoff - Loss of control in flight

Narrative

On May 13, 2017, about 1520 central daylight time, an experimental racing AS+ LTD AC 4 glider, N358R, impacted terrain after the canopy had opened during takeoff at Blair Municipal Airport, Blair, Nebraska. The glider sustained substantial damage. The private pilot received fatal injuries. The glider was registered to and operated by the pilot under 14 Code of Federal Regulations Part 91 as a personal flight that was not operating on a flight plan. Visual meteorological conditions prevailed at the time of the accident. The local flight was originating at the time of the accident.

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Accident Rpt# ERA16LA148 04/06/2016 1530 EDT	**Regis# N466CT**	**Hilton Head Isl, SC**	**Apt: Hilton Head HXD**	
Acft Mk/Mdl FLIGHT DESIGN CTSW	**Acft SN 07-02-12**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ROTAX 912ULS	**Acft TT 330**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: DOMINICK L. BONANNO	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: LTSP	

Summary

The sport pilot reported that, as he was approaching the landing runway, he retarded the throttle and descended from 1,300 to 1,000 ft mean sea level. He added that, a few seconds after retarding the throttle, the engine "ran rough" for a few seconds and then lost all power and would not restart. He did not attempt to apply carburetor heat, configured the airplane for best glide speed, and maneuvered for a forced landing on a golf course. After landing, the left wing struck a tree.

Postaccident examination of the airframe and engine revealed no evidence of preimpact mechanical failures or malfunctions that would have precluded normal operation, and there was sufficient fuel onboard at the time of the accident. A test run of the engine revealed no anomalies. Given that the weather conditions at the time of the accident were conducive to serious carburetor icing at glide power and the pilot chose not to apply carburetor heat after the engine initially lost power, it is likely that the engine lost power due to carburetor icing.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to apply carburetor heat following a loss of engine power due to carburetor icing.

Events

1. Approach-VFR pattern downwind - Loss of engine power (total)
2. Emergency descent - Off-field or emergency landing
3. Landing-landing roll - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Environmental issues-Conditions/weather/phenomena-Temp/humidity/pressure-Conducive to carburetor icing-Effect on equipment - C
2. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C

Narrative

On April 6, 2016, about 1530 eastern daylight time, a Flight Design Gmbh CTSW, N466CT, was substantially damaged during a forced landing near Hilton Head Island, South Carolina. The sport pilot and one passenger were not injured. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day, visual meteorological conditions prevailed, and no flight plan was filed. The flight originated from Cape Fear Regional Jetport (SUT), Oak Island, North Carolina about 1400, and was destined for Hilton Head Airport (HXD).

The pilot reported that he was approaching HXD from the west, and reported to tower personnel that he was 8 miles out. He made a midfield call, retarded the throttle to 4,200 rpm, and descended from 1,300 feet above mean sea level (msl) to 1,000 feet msl. A few seconds after reducing the throttle, the engine "ran rough" for a few seconds, then shut down and would not restart. The pilot did not attempt to apply carburetor heat. He set up for best glide speed and maneuvered for a forced landing on a golf course. After landing, the left wing struck a tree and the airplane came to a stop.

An inspector with the Federal Aviation Administration (FAA) responded to the accident site and examined the wreckage. The airplane struck a tree and came to rest upright. He observed structural damage to the composite leading edge of the left wing. The fuel system contained about 4.5 gallons of fuel. The fuel appeared to be free of contaminants and water. The air filter was clean and compression was observed on all cylinders.

Following the examination of the engine and fuel system, the owner leveled the airplane and started the engine with the FAA inspector providing oversight. The engine started, produced power, and no discrepancies were noted.

According to the 1550 weather observation at HXD, located about 2 miles southeast of the accident site, the temperature and dew point were 64 degrees F and 54 degrees F, respectively. According to the carburetor icing probability chart in FAA Special Airworthiness Information Bulletin CE-09-35 (Carburetor Icing Prevention), dated June 30, 2009, the temperature/dew point at the time of the accident was in the area of serious icing at glide power.

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Accident Rpt# ERA16FA031	**11/04/2015 1933 EST**	**Regis# N622BT**	**Queens, NY**	**Apt: N/a**	
Acft Mk/Mdl FLIGHT DESIGN GMBH CTLS-NO SERIES		**Acft SN 11-11-05**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ROTAX 912 ULS		**Acft TT 321**	**Fatal 1 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: MCGEE JAMES B		**Opr dba:**		**Aircraft Fire: NONE**	
				AW Cert: LTSP	

Summary

The noninstrument-rated private pilot departed on a cross-country flight in night visual meteorological conditions in the light sport airplane. After takeoff, the pilot leveled the airplane at an altitude about 1,400 ft mean sea level (msl) and continued toward the destination airport for about 30 minutes until he requested and was cleared by air traffic control to fly along a coastal shoreline at 400 ft msl, under the 500-ft shelf of Class Bravo airspace. About 1 minute after the pilot was cleared to descend, at an altitude of 700 ft and 0.2 nautical mile from the lateral limits of the Class Bravo shelf, the airplane began a 90ø right turn. The airplane deviated from the course to the destination and did not level off at 400 ft, as requested. The airplane continued on a southeasterly heading and descended to 200 ft before radar contact was lost. There were no radio communications or other indications of distress from the airplane before the loss of radar contact.

A witness reported seeing the airplane descending at a 45ø angle into the water. A pilot involved with the search and recovery of the airplane classified the conditions as "pitch black." Examination of the airframe and engine revealed no evidence of mechanical malfunctions or abnormalities that would have precluded normal operation.

The pilot was neither qualified nor proficient to conduct the flight by reference to instruments, and had likely used lights on the shoreline as a ground reference in the dark light conditions. However, when he turned away from the shoreline to continue his descent, likely to avoid entering the Class Bravo airspace, the pilot did not have adequate external visual cues by which to maintain attitude and altitude; he likely became spatially disoriented, and lost control of the airplane. Although toxicological testing was positive for hydroxyzine, an antihistamine, the drug was detected in muscle tissue and not in blood indicating that it likely had no impairing effect.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The noninstrument-rated pilot's spatial disorientation and subsequent loss of airplane control while maneuvering at low altitude, over water with no visible horizon, in dark night conditions, which resulted in a collision with the water.

Events

1. Maneuvering - Loss of visual reference
2. Maneuvering - Loss of control in flight
3. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Psychological-Perception/orientation/illusion-Spatial disorientation-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
4. Environmental issues-Conditions/weather/phenomena-Light condition-Dark-Effect on operation - C
5. Personnel issues-Experience/knowledge-Experience/qualifications-Total instrument experience-Pilot - C

Narrative

HISTORY OF FLIGHT

On November 4, 2015, at 1933 eastern standard time, a Flight Design GMBH CTLS light sport airplane, N622BT, was substantially damaged after it impacted the Atlantic Ocean near Queens, New York. The private pilot was fatally injured. The airplane was owned and operated by the private pilot under the provisions of 14 Code of Federal Regulations Part 91 personal cross-country flight. Night visual meteorological conditions prevailed, and no flight plan was filed. The flight originated from Northeast Philadelphia Airport (PNE), Philadelphia, Pennsylvania, about 1900, with an intended destination of Portsmouth International Airport, Pease (PSM), Portsmouth, New Hampshire.

According to personnel at the departure airport, the airplane was "topped off" with fuel before departure. A fuel receipt indicated 17 gallons of 100 low-lead (LL) aviation fuel was added to the airplane about 1840 on the evening of the accident.

Federal Aviation Administration (FAA) Air Traffic Control radar and voice communication information revealed that the airplane departed PNE and leveled off at

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1,400 ft mean sea level (msl). At 1916, the pilot requested to remain at 1,500 ft then descend to 400 ft under the John F. Kennedy Airport (JFK) Class Bravo airspace along the south shore of Long Island. The controller acknowledged the request, and the pilot continued toward his destination. At 1931, the pilot contacted JFK tower, and the tower controller cleared the pilot to fly along the shoreline at or below 500 ft. The pilot acknowledged the clearance at 1932:30. About 1 minute later, while at 700 ft msl and 0.2 nautical mile (nm) from the lateral limits of the Class Bravo airspace 500-ft shelf that he was cleared to fly underneath, the airplane began a 90ø right turn, off his previously-established course, and descended through 500 ft msl. The airplane continued on a southeasterly heading and descended to 200 ft msl before radar contact was lost at 1933:32 about 0.6 nm to the southeast of the coast of Breezy Point, Queens, New York. There were no radio transmissions or other indications of distress from the airplane.

Several witnesses saw the airplane descend into the ocean. One witness described the descent angle as about 45ø. The witness stated that he heard an "explosion" a short time later. A helicopter pilot who assisted in the search for the wreckage noted that it was "pitch black" over the water.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with a rating for airplane single-engine land. His most recent third-class FAA medical certificate was issued on August 5, 2014. According to the pilot's logbook, he had accumulated about 280 total hours of flight time, of which about 270 hours were in the accident airplane make and model. The logbook showed 4 hours of night experience, which was all accumulated in September 2014 while the pilot was receiving primary flight instruction. The logbook showed 3.5 hours of simulated instrument time under the hood, with the most recent occurring on October 8, 2014, for 0.3 hour; in the remarks section of the logbook it listed that flight as "private pilot practical exam."

AIRPLANE INFORMATION

According to FAA records, the light sport airplane was manufactured in 2011 and was powered by a 100-horsepower Rotax 912ULS reciprocating engine. The airplane's most recent condition inspection was completed on November 2, 2015, at a total time in service of 321.4 hours.

METEOROLOGICAL INFORMATION

A recorded weather observation about the time of the accident at JFK, about 9 nm from the accident site, included wind from 100ø at 3 knots, visibility 10 statute miles, clear skies below 12,000 ft above ground level, temperature 14øC, dew point 11øC, and an altimeter setting of 30.35 inches of mercury.

According to the Astronomical Applications Department at the United States Naval Observatory, sunset was at 1648, the end of civil twilight was at 1717, and moonrise was at 0040 of November 5, 2015. The phase of the moon on the day of the accident was waning crescent, with 39% of the moon's visible disk illuminated.

According to a representative from Lockheed Martin Flight Services (LMFS), the pilot had no contact with LMFS or DUATS on the date of the accident.

WRECKAGE AND IMPACT INFORMATION

The wreckage was recovered from the water and examined. Flight control continuity was confirmed from all flight control surfaces to the cockpit flight controls. The engine controls remained attached to the cockpit. The throttle was in the full-forward position and the mixture was in the mid-range position. The flap indicator, ignition switch, ELT position switch, circuit breaker panel, and radio volume control remained attached to the instrument panel and no other instruments were recovered. The two seats were separated from the seat tracks.

The wing spar was separated from the fuselage. The forward section of the left wing was separated from the remainder of the wing and fragmented. The wingtip was impact-separated. The left aileron remained attached to the wing at its inboard attach point. The flap remained attached to the left wing.

The empennage was separated from the fuselage. The left stabilator remained attached to the empennage, and the right stabilator was partially separated. The rudder remained attached to the vertical stabilizer via the control cables.

The right wing remained attached to the carry-through spar. The outboard forward section of the right wing was impact-separated and fragmented, and the right wingtip was impact-separated. The right aileron remained attached to the wing at the inboard attach point, and the right flap remained attached at all attach

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points.

The left main landing gear remained attached to the fuselage; however, that section of the fuselage was separated from the cabin area. The left tire was impact-separated from the left main landing gear. The right main landing gear was impact-separated and the right tire remained attached. The nose landing gear remained attached to the engine mounts.

The propeller remained attached to the engine. All three blades were fractured about midspan from the propeller hub. The propeller was rotated by hand, and thumb compression was confirmed on all cylinders. The Nos. 1 and 3 top spark plugs and the Nos. 2 and 4 bottom spark plugs were removed; they were wet, light grey in color, and exhibited normal wear. The rocker box covers were removed, and crankshaft and valve train continuity was confirmed throughout the engine.

The right carburetor was impact-separated and not recovered. The left carburetor was disassembled and no anomalies were noted. The butterfly valve operated without anomaly. An odor similar to 100LL aviation fuel was noted in the carburetor. The carburetor gasket displayed no anomalies.

The engine ignition harness remained attached to the engine. All of the engine harness leads were present; however, some of the harness leads were impact-separated from their associated spark plugs.

The ballistic recovery system parachute was recovered. The parachute was separated from the airplane and was partially deployed, and the rocket motor was discharged. The ballistic recovery system handle was not recovered from the water.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office the Chief Medical Examiner for the City of New York, Queens, New York, performed the autopsy on the pilot. The autopsy report indicated that the pilot died as a result of multiple blunt injuries.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing of the pilot. Fluid and tissue specimens from the pilot tested negative for carbon monoxide and carbon dioxide. Hydroxyzine, an antihistamine, was detected in liver; however, it was not detected in blood.

ADDITIONAL INFORMATION

Spatial Disorientation

The FAA's Pilot's Handbook of Aeronautical Knowledge contained guidance that stated that, "Under normal flight conditions, when there is a visual reference to the horizon and ground, the sensory system in the inner ear helps to identify the pitch, roll, and yaw movements of the airplane. When visual contact with the horizon is lost, the vestibular system becomes unreliable. Without visual references outside the airplane, there are many situations where combinations of normal motions and forces can create convincing illusions that are difficult to overcome."

The Handbook also advised, "unless a pilot has many hours of training in instrument flight, flight in reduced visibility or at night when the horizon is not visible should be avoided."

FAA Publication "Spatial Disorientation Visual Illusions" (OK-11-1550) , stated, in part, that "false visual reference illusions may cause you to orient your aircraft in relation to a false horizon; these illusions are caused by flying over a banked cloud, night flying over featureless terrain with ground lights that are indistinguishable from a dark sky with stars, or night flying over a featureless terrain with a clearly defined pattern of ground lights and a dark starless sky." The publication provided guidance on the prevention of spatial disorientation. One of the preventive measures was "When flying at night or in reduced visibility, use and rely on your flight instruments."

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Accident Rpt# WPR16LA017 10/24/2015 1510 MST	**Regis# N25100**	**Prescott, AZ**	**Apt: Ernest A Love Field Airport KPRC**
Acft Mk/Mdl LUSCOMBE 8A-A	**Acft SN 1024**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL C85-12F		**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: LAWLER, DAN C.	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: LTSP

Summary

The commercial pilot of the tailwheel-equipped airplane stated that, upon touching down in a three-point attitude, the airplane veered left. The pilot attempted to correct with rudder, but the airplane continued left and ground looped. Examination revealed that the tailwheel had rotated 180ø, leaving its control chains crossed over one another. Under this condition, the tailwheel direction of movement would be opposite that commanded by the pilot. Further examination revealed that the tailwheel steering arms were bent upward, allowing the wheel to rotate past its travel stops and into the reversed condition. It is likely that, as the pilot initially lost control and the airplane began to ground loop, the wheel passed beyond its travel limits, causing the controls to become reversed, which made recovery unlikely.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain directional control during landing, and his inability to recover due to a malfunction of the tailwheel.

Events

1. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Nose/tail landing gear-Malfunction - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

Narrative

On October 24, 2015, about 1510 mountain standard time, a Luscombe 8A, N25100, experienced a loss of directional control during the landing roll, and ground looped at the Ernest A. Love Field Airport, Prescott, Arizona. The pilot, who owned the airplane, was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. The certified flight instructor and his passenger were not injured; the airplane sustained substantial damage. The personal cross-country flight departed from Gallup Municipal Airport, Gallup, New Mexico, about 1245 with a planned destination of Prescott. Visual meteorological conditions prevailed and a company flight plan had been filed.

In a written report, the pilot stated that as he entered the vicinity of the destination airport, he maneuvered the airplane for a straight-in approach to runway 21L. The approach was slightly higher than his normal glide slope, and the pilot configured the airplane into a left slip in an effort to lose altitude. After becoming established, he maintained a left crab angle to compensate for an approximate 7 kt left crosswind. He configured the airplane for a three-point landing and touched down on the centerline. The airplane continued the landing roll until decelerating to about 15 mph at which point it began to veer to the left. The pilot input full rudder control to try to counteract the veer, but despite his attempts, the airplane ground looped.

During the accident sequence, the airplane incurred substantial damage to the wing. The pilot opined that the loss of control was precipitated by a tail wheel malfunction. According to Federal Aviation Administration (FAA) records, the pilot purchased the airplane on the day of the accident; he reported having amassed about 200 hours of flight time in the same make and model.

The Luscombe 8A was equipped with a Scott 3-24B tailwheel (now Scott 2000), with a steerable six-inch rubber tire with full-swivel capability. The rudder control horns were connected via chains to the assembly, which uses spring pressure to hold a set of steering arms into machined flats on the wheel fork. As the wheel pivots to its travel limit, it comes into contact with a stop on the fork bracket, which releases the assembly, allowing the wheel to castor freely. According to the Scott 3-24B Handbook, "The tail wheel assemblies provide directional control throughout full rudder travel of the aircraft while the tailwheel is in contact with the ground. The assemblies will automatically full-swivel only well after the maximum point of air rudder control is reached in either direction.The tailwheel steering and release mechanism is so designed that 65-degrees of tailwheel turn (or travel) is provided either right or left from neutral steering position before the mechanism begins to release."

The airplane came to rest on the edge of the runway with the right landing gear collapsed and folded under the fuselage. The tailwheel steering chains remained affixed to their respective rudder horns as well as their respective steering arms mounted on the tailwheel body. However, the tailwheel had rotated over 180-degrees and was canted to the left leaving the chains crossed over one another. Additionally, the steering arms appeared bent upwards. A complete report with accompanying photographs are attached to the public docket for this accident.

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An FAA certified airframe and powerplant mechanic examined the tailwheel. He stated the examination revealed that the tailwheel was turned around 180-degrees from its normal configuration. The right steering arm was bent upwards, and he observed that it was able to clear over the stop, allowing the steering head to continue to the reversed position, rather than unlock to caster freely. Under this condition, the tailwheel direction of movement would be opposite that commanded by the pilot, rather than free-castering as designed. He additionally noted that the leaf spring assembly was loose, allowing a possible shudder to develop. Following the examination, he repaired the assembly, and the steering arms were reconfigured to their correct straight position, enabling them to contact the stops and release the wheel to freely caster with the steering chains remaining on their respective side.

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Accident Rpt# GAA17CA250 04/30/2017 800 PDT	**Regis# N366DN**	**Boulder City, NV**	**Apt: N/a**	
Acft Mk/Mdl NORTH WING UUM INC SPORT X2-N-NO	**Acft SN LS7003**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ROTAX 582 UL	**Acft TT 652**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: SALLY E. LARIMORE	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: LTSP	

Events

2. Landing - Loss of control in flight

Narrative

The student pilot of the weight-shift-control aircraft reported that while practicing touch-and-go landings on a dried lake bed, the flight instructor was controlling the throttle inputs and she "controlled the wing". She added that just before the accident, she observed three dust devils to the east and during a final pass near the north end of the lake bed, they came upon "strong localized turbulence". The aircraft impacted the ground and rolled to the left.

The flight instructor reported that during the turbulence encounter "about 4-6 ft" above the ground, the "wing stalled" which resulted in a "hard nose wheel landing".

The weight-shift-control aircraft sustained substantial damage to both wings.

The flight instructor reported that there were no preaccident mechanical failures or malfunctions with the weigh-shift-control aircraft that would have precluded normal operation.

The flight instructor reported the wind was light and variable, and the temperature was 70øF at the accident location. A review of recorded data from the automated weather observation station located about 6 miles northeast of the accident site reported that about the time of the accident the wind was calm and the temperature was 64øF.

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Accident Rpt# CEN15FA277	**06/18/2015 738 MDT**	**Regis# N51311**	**Taos, NM**	**Apt: Taos Regional Airport SKX**
Acft Mk/Mdl NORTHWING DESIGN APACHE SPORT-NO		**Acft SN 41746**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ROTAX 582			**Fatal 1**	**Ser Inj 0**	**Flt Conducted Under: FAR 103**
Opr Name: WATERHOUSE BUZZ		**Opr dba:**			**Aircraft Fire: NONE**
					AW Cert: SPX

Events

1. Initial climb - Loss of control in flight

Narrative

HISTORY OF FLIGHT

On June 18, 2015, about 0738 mountain standard time, a North Wing Apache Sport powered-lift aircraft, N51311, impacted terrain following a loss of control during initial climb after takeoff from Taos Regional Airport (SKX), Taos, New Mexico. The sport pilot sustained fatal injuries, and the aircraft sustained substantial damage. The aircraft was registered to the pilot/owner and was being operated as a 14 Code of Regulations (CFR) Part 103 personal flight. Day visual meteorological conditions existed at the time of the accident near the accident site, and a flight plan had not been filed for the local flight, which departed about 0736.

Several witnesses who were working on the departure end of runway 22 reported seeing the aircraft take off from the runway, climb to about 500 ft, and then enter a right turn. The witnesses stated that the aircraft seemed to "fall out of the sky" and stall before it collided with terrain adjacent to and right of the departure end of the runway. One witness stated that he heard the engine revving before impact. See figure 1 for an overhead image of SKX and the accident location.

PERSONNEL INFORMATION

The 69-year old pilot held a sport pilot certificate for powered-lift aircraft. A review of the pilot's logbook revealed that he had 540 total flight hours, all of which were in powered-lift aircraft and 300 hours of which were in the accident aircraft. According to logbook entries, the last time that the pilot had flown the accident aircraft was August 9, 2014. The most recent entry in the pilot's logbook was dated September 8, 2014, in which he flew another aircraft of the same make and model. Interviews with a family member and a friend of the pilot confirmed that this was pilot's last flight before the accident flight. The family member stated that the pilot kept meticulous records. According to an entry on the last page of his logbook, the pilot had successfully completed a flight review in accordance with 14 CFR Section 61.56(a) on November 22, 2014. The entry was signed by a flight instructor, but the number of flight hours for that flight were not recorded.

AIRCRAFT INFORMATION

The two-seat, powered-lift aircraft, serial number 4608087, was manufactured and owned by the pilot since 2003. The aircraft had a special airworthiness certificate classifying its operation in the experimental light sport aircraft category.

The aircraft was powered by a rear-mounted engine, Rotax model 582 UL. According to a friend of the pilot, the aircraft was in good condition, was well maintained by the pilot, and had been stored in an airport hangar since it was new.

AIRPORT INFORMATION

SKX is a public airport located about 8 miles northwest of Taos at an elevation of 7,094 ft mean sea level. SKX's principal runway is 4/22, which is 4,083 ft long and 75 ft wide and surfaced with asphalt. A postaccident examination of the runway revealed no abnormalities, and no aircraft parts were found along the takeoff path.

METEOROLOGICAL INFORMATION

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At 0713, the routine aviation weather report for SKX was calm wind, no ceiling, clear skies, visibility 10 statute miles, temperature 18øC, dew point 8øC, and an altimeter setting of 30.35 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

On-site examination of the aircraft, including the flight controls, structure and engine, revealed no evidence of any mechanical anomalies. Grounds scars and the orientation of the wreckage were consistent with the aircraft impacting the ground in a nose-low attitude. No manufacturing anomalies were noted with the aircraft. The wooden propeller assembly was shattered and exhibited signatures consistent with the engine producing power at the time of impact. See figure 2 for a photograph of the accident site and wreckage.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsy

The University of New Mexico Health Sciences Center, Office of the Medical Investigator, performed an autopsy on the pilot. The cause of death was reported to be "multiple blunt force injuries," and the manner of death was reported to be "accident."

The autopsy identified significant coronary artery disease with 80% stenosis of the proximal left anterior descending coronary artery, as well as increased interstitial fibrosis (scarring) of the wall of the heart. The thickness of the right ventricular wall was significantly increased at 0.7 cm (average thickness is 0.3 cm). In addition, there was evidence of arteriosclerosis in the kidneys and extensive emphysema in the lungs.

Toxicology

The Federal Aviation Administration's (FAA) Bioaeronautical Research Laboratory performed toxicology testing of specimens from the pilot. The testing detected sildenafil, its metabolite desmethylsildenafil, and zolpidem in the urine and blood (0.003 ug/ml of zolpidem in blood). In addition, 0.0036 ug/ml of tetrahydrocannabinol (THC) and 0.0105 ug/ml tetrahydrocannabinol carboxylic acid (THC-COOH) were identified in the cavity blood. THC-COOH was also identified in the liver (0.0219 ug/ml) and brain (0.0012 ug/ml).

Sildenafil is a prostaglandin inhibitor used to treat erectile dysfunction or pulmonary hypertension and is not impairing. Zolpidem is a short-acting prescription sleep aid and is a Schedule IV controlled substance that carries the warning, "May impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)." Therapeutic levels of zolpidem are typically between 0.0250 and 0.3000 ug/ml.

THC is the psychoactive compound found in marijuana, and THC-COOH is its inactive metabolite. THC concentrations typically peak while smoking, whereas THC-COOH concentrations typically peak about 9 to 23 minutes after the start of smoking. Significant performance impairments are usually observed for at least 1 to 2 hours after using marijuana, and residual effects have been reported up to 24 hours.

Medical History

Attempts were made to locate the pilot's primary physician and obtain his personal medical records, but according to the pilot's wife, the physician had recently retired and left town. Therefore, no personal medical records were made available for review. The pilot's wife reported that he had shortness of breath and often used an inhaler to treat it.

ADDITIONAL INFORMATION

The wreckage was released to the owner's representative.

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Accident Rpt# ERA16LA263	**07/19/2016 1233 EDT**	**Regis# N615BS**	**Warrenton, VA**	**Apt: Warrenton-fauquier HWY**
Acft Mk/Mdl TECNAM P2008		**Acft SN 105**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 912S		**Acft TT 38**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: BERTHOLD SCHMUTZHART		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: LTSP

Summary

The sport pilot reported that he was on the ramp ready for departure and that he was aware of helicopter traffic in the airport traffic pattern. He turned right onto the runway and saw a helicopter hovering over the runway ahead of him. He initiated the takeoff roll but then chose to reject the takeoff to avoid a possible collision. He stated that he pushed too hard on the left toe brake and that the airplane then departed the left side of the runway. The airplane then nosed down in the grass, which resulted in structural damage to the right wing.

The pilot did not report any mechanical malfunctions or failures with the airplane that would have precluded normal operation. The pilot reported that he had recently transitioned to the airplane with toe brakes from his previous airplane, which was equipped with a hand brake. He had only logged about 7 hours of flight time in the accident airplane make and model. It is likely that the pilot's lack of experience using a toe brake led to his failure to use it properly.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's decision to begin the takeoff roll with helicopter traffic on the runway, which led to a rejected takeoff. Contributing to the accident was the pilot's improper use of the toe brakes, which he had limited experience using and resulted in a runway excursion.

Events

1. Takeoff-rejected takeoff - Runway excursion
2. Takeoff-rejected takeoff - Nose over/nose down

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Brake-Incorrect use/operation - C
2. Personnel issues-Experience/knowledge-Experience/qualifications-Total experience w/ equipment-Pilot - F
3. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C

Narrative

On July 19, 2016, at 1233 eastern daylight time, a Costruzioni Aeronautiche Tecnam P2008, N615BS, was substantially damaged following a rejected takeoff and runway excursion at Warrenton-Fauquier Airport (HWY), Warrenton, Virginia. The private pilot was not injured. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day, visual meteorological conditions prevailed at the time, and no flight plan was filed. The local flight was originating at the time of the accident.

The pilot reported that he was on the ramp and ready for departure when he heard via the airplane's radio a helicopter calling "downwind, base, final, and departure." He made a right turn onto the runway and observed a helicopter hovering over the runway, ahead of his position. After initiating the takeoff roll, he elected to reject the takeoff to avoid a possible collision. He had recently transitioned to a new airplane with toe brakes, and his previous airplane was equipped with a hand brake. He pushed hard on the brakes, "very likely too much on the left side" and the airplane departed the left side of the runway. The airplane departed the runway surface and nosed down in the grass. The pilot did not report any mechanical malfunctions or failures with the airplane that would have precluded normal operation.

The pilot, age 87, held a private pilot certificate with a rating for airplane single engine land and glider. He also held a FAA experimental aircraft builder certificate. The pilot held a FAA third class medical certificate and reported 1,295 total hours of flying experience on his most recent medical certificate application that was dated October 28, 2013. He reported 7 hours of flying time in the accident airplane make and model.

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Accident Rpt# CEN17LA188 01/24/2017 845 CST	**Regis# N6040Y**	**Fort Worth, TX**	**Apt: Bell Training Facility 3XS7**	
Acft Mk/Mdl BELL 407	**Acft SN 53371**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
Eng Mk/Mdl ROLLS-ROYCE 250-C47B	**Acft TT 8530**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: BELL HELICOPTER TEXTRON INC.	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: STN	

Events

1. Autorotation - Hard landing

Narrative

On January 24, 2017, about 0845 central standard time, a Bell 407 helicopter, N6040Y, was substantially damaged during a hard landing at the Bell Training Facility Heliport (3XS7), Fort Worth, Texas. The flight instructor and pilot receiving instruction were not injured. The helicopter was registered to and operated by Bell Helicopter Textron as a 14 Code of Federal Regulations Part 141 instructional flight. Visual meteorological conditions prevailed at the time of the accident. The flight was not operated on a flight plan. The flight originated from the Bell Helicopter Hurst Heliport about 0820.

The flight instructor stated that he was demonstrating the emergency procedure for a failure of the Full Authority Digital Engine Control (FADEC) from auto to manual mode. The helicopter was in a stable 5-foot hover at the time. To begin the demonstration, the FADEC was intentionally switched into manual mode. After approximately 10 seconds, the engine speed began to increase, which resulted in a corresponding increase in the main rotor speed. The instructor increased the collective control input in an attempt to control the engine and rotor speed. The helicopter subsequently climbed to about 25 feet above ground level (agl) and began to shake violently. The flight instructor maintained control and initiated a descent for landing. However, the helicopter contacted the ground with a sufficient descent rate to spread the skids. The helicopter was subsequently shut down and the pilots exited without injury.

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Accident Rpt# CEN16LA273	**07/18/2016 1915 CDT**	**Regis# N393SX**	**Lodi, WI**	**Apt: Lodi Lakeland 9WN5**
Acft Mk/Mdl BRANDT SONEX		**Acft SN 393**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl AEROVEE		**Acft TT 25**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: PILOT		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Summary

During a local flight, the pilot of an experimental amateur-built airplane had a partial engine power loss. He said that the engine sounded different but remained running. He turned the airplane back to the airport and noted he was high and fast. He indicated that he bled off airspeed, as he wanted to avoid buildings before landing. He subsequently reduced power and performed a landing with calm wind present. The airplane's nose and left main landing gear collapsed after touchdown, the airplane skidded to the north side of the runway, and exited the runway into a ditch where it sustained the substantial damage. The airplane was powered by an engine that the pilot/builder assembled from a kit. The airplane accumulated 25 hours of flight time at the time of the accident. The kit manufacturer engine assembly and installation manual had specific rocker shaft instructions that included procedures on how to adjust and install rocker arms. An examination revealed that the threaded shaft of a rocker arm swivel pad had separated at a point on the shaft where there was a cross drilled hole. The remaining rocker arms did not exhibit the appearance of arm adjustment in accordance with the kit manufacturer's assembly manual. Detailed examination of the failed valve adjuster showed it separated into two portions approximately mid length in the shank area between the two threaded areas. This location was coincident with a hole drilled crosswise through the shank of the valve adjuster. The fracture surfaces exhibited crack arrest patterns consistent with a fatigue fracture. The origin of the fatigue fracture appears to be coincident with the edge of the cross-drilled hole. Examination of the exemplar valve adjuster and specifically the cross-drilled hole revealed a roughly finished surface with a pronounced burr around the circumference of the hole. A professional materials engineering publication, in part, stated, "The fatigue strength of components can be reduced merely by the presence of a drilled hole; it is further reduced by failure to remove burrs (incurred during drilling) from the hole edges. Fractures originating at drilled holes are common in complex parts containing internal, intersecting machined passages because of the difficulty and expense of providing adequate break-edge radii at such locations. It could not be determined if the failure of the rocker arm was due to the misassembly of the rocker arm assembly and/or the toolmarks left by the manufacturing process.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The separated rocker arm assembly for undetermined reasons, which resulted in the partial loss of engine power and led to the landing gear collapsing during the subsequent forced landing.

Events

1. Prior to flight - Aircraft maintenance event
2. Enroute - Powerplant sys/comp malf/fail
3. Enroute - Loss of engine power (partial)
4. Emergency descent - Off-field or emergency landing
5. Landing - Collision during takeoff/land

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine (reciprocating)-Recip eng cyl section-Failure - C
2. Personnel issues-Task performance-Maintenance-Installation-Owner/builder
3. Personnel issues-Task performance-Maintenance-Fabrication-Other/unknown

Narrative

On July 18, 2016, about 1915 central daylight time, a Brandt Sonex experimental amateur-built airplane, N393SX, impacted a ditch when it exited runway 9 (1,875 feet by 105 feet, turf) at the Lodi Lakeland Airport (9WN5), near Lodi, Wisconsin, during a forced landing following a partial loss of engine power. The sport pilot was uninjured. The airplane fuselage was substantially damaged during the impact with the ditch. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day visual meteorological conditions prevailed for the flight, which operated without a flight plan. The local flight originated from 9WN5 at time unknown.

The pilot reported a partial loss of engine power, which occurred northwest of 9WN5. He said that the engine sounded different but remained running. He turned the airplane back to the airport and noted he was high and fast. He indicated that he bled off airspeed, as he wanted to avoid buildings before landing. He subsequently reduced power and performed a landing. The airplane's nose and left main landing gear collapsed after touchdown, the airplane skidded to the north side of the runway, and exited the runway into a ditch where it sustained the substantial damage.

The pilot, age 71, held a Federal Aviation Administration (FAA) sport pilot certificate and he reported that he accumulated 180 hours of total flight time.

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N393SX was a low-wing, fixed tricycle gear, 2-seat, experimental amateur-built airplane with serial number 393. It was powered by a 70-horsepower AeroVee engine driving a fixed pitch Sensenich propeller. The pilot reported that the airplane had a condition inspection completed on December 4, 2015, and that the airplane accumulated 25 hours of flight time at the time of the accident.

The airplane and engine were sold as kits that the owner assembled. The kit manufacturer engine assembly and installation manual had specific rocker shaft instructions that included procedures on how to adjust and install rocker arms.

At 1953, the recorded weather at the Dane County Regional Airport-Truax Field, near Madison, Wisconsin, was: Wind calm; visibility 10 statute miles; sky condition few clouds at 5,500 feet; temperature 27 degrees C; dew point 17 degrees C; altimeter 30.15 inches of mercury.

An FAA inspector examined the wreckage and observed that the threaded shaft of a rocker arm swivel pad on the rocker arm assembly had separated at a point on the shaft where there was a cross drilled hole. The accident engine's remaining rocker arm assemblies did not exhibit the appearance of arm assembly adjustment in accordance with the adjustment directions in the kit manufacturer's assembly manual. The separated rocker arm swivel pad and an exemplar pad from the accident engine were shipped to the National Transportation Safety Board (NTSB) Materials Laboratory for detailed examination.

An NTSB Materials Laboratory Engineer examined the items and produced Materials Laboratory Factual Report No. 16-101, which is appended to the docket material associated with this investigation. The report, in part, indicated the failed valve adjuster separated into two portions approximately mid length in the shank area between the two threaded areas. This location was coincident with a hole drilled crosswise through the shank of the valve adjuster. The fracture surfaces exhibited crack arrest patterns consistent with a fatigue fracture. The origin of the fatigue fracture appears to be coincident with the edge of the cross-drilled hole. The ball bearing on the end of the valve adjuster had seized in place and could not be rotated. A measurement of the hardness on a section of the fractured valve adjuster revealed a hardness of 20.2 on the Rockwell C scale.

Examination of the exemplar valve adjuster and specifically the cross-drilled hole revealed a roughly finished surface with a pronounced burr around the circumference of the hole.

ASM International Handbook, Volume 11, Failure Analysis and Prevention, in part, stated:

> The fatigue strength of components can be reduced merely by the presence of a drilled hole; it is further reduced by failure to remove burrs (incurred during drilling) from the hole edges. Fractures originating at drilled holes are common in complex parts containing internal, intersecting machined passages because of the difficulty and expense of providing adequate break-edge radii at such locations.

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Accident Rpt# WPR15LA179 05/29/2015 1542 MST	**Regis# N44508**	**Glendale, AZ**	**Apt: Glendale Municipal Airport GEU**	
Acft Mk/Mdl BURR EXPRESS 2000 RG-NO S	**Acft SN 0101RG**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl P & W CANADA PT6A-20	**Acft TT 48**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: BURR JOHN	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: SPE	

Summary

The private pilot reported that, following a normal landing in the experimental amateur-built airplane, he applied beta thrust to decelerate the airplane and lightly applied the brakes. Suddenly, the left main landing gear collapsed, and the airplane swerved to the left. The airplane departed the runway surface and the left wing impacted a runway sign. Postaccident examination revealed that the left main landing gear actuator heim rod failed where the threads met the rod end; however, the rod was not made available for further examination, and the reason for the landing gear collapse could not be determined.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A collapse of the left main landing gear for reasons that could not be determined based on the available information.

Events

1. Landing-landing roll - Landing gear collapse
2. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On May 29, 2015, about 1542 mountain standard time, a Burr Express 2000 RG, N44508, experienced a landing gear collapse during the landing roll at Glendale Municipal Airport (GEU) in Glendale, Arizona. The private pilot and one passenger were uninjured, and the airplane sustained substantial damage to the rudder and elevators. The airplane was registered to, and operated by, the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed and no flight plan was filed. The flight departed from GEU at about 1500.

The pilot reported that he landed the airplane onto the runway normally. He applied beta thrust to decelerate the airplane and started to brake lightly. Suddenly, the left main landing gear collapsed and the airplane swerved to the left. The airplane departed the runway surface and the left wing impacted a runway sign. It traversed along the dirt when the right landing gear collapsed and the tail impacted the ground before sliding to a rest.

During a postaccident examination by a Federal Aviation Administration Inspector it was revealed that the left main landing gear actuator heim rod failed where the threads meet the rod end. Given the location of the heim rod, the inspector was unable to view the fracture surface while the component was installed on the airplane. In addition, the inspector noted that the hydraulic line to the gear actuator was ripped.

The National Transportation Safety Board Investigator-in-charge attempted to obtain the heim rod for further examination, however, the pilot had already repaired the airplane and the part was no longer available.

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Accident Rpt# WPR17LA104 05/15/2017 1630 PDT	**Regis# N846PM**	**Firebaugh, CA**	**Apt: Firebaugh F34**	
Acft Mk/Mdl EVOLUTION AIR LLC LANCAIR	**Acft SN EVO-0065**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
Eng Mk/Mdl PRATT AND WHITNEY PT6A125-A	**Acft TT 200**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: EVOLUTION AIR LLC	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: SPE	

Events

1. Enroute-cruise - Miscellaneous/other

Narrative

On May 15, 2017, about 1630 Pacific daylight time, an Evolution Aircraft, Lancair Evolution, N846PM, was substantially damaged during a forced landing attempt at Firebaugh Airport (F34), Firebaugh, California. The private pilot and one rear seat passenger did not sustain any injuries. A front seat passenger and two rear seat passengers received minor injuries. The airplane was owned and operated by a private individual and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the cross-country flight that departed Livermore Municipal Airport (LVK), Livermore, California at approximately 1400. The personal flight was destined for Marana Regional Airport (AVQ), Marana, Arizona.

The pilot reported that he and 4 family members were en route to their home airport following a recent stay in Northern California. The departure, climbout, and most of the cruise flight was smooth and uneventful; however, further into the flight, at an altitude of 25,000 feet, the windshield "exploded" instantaneously without any pre-indication. The airplane instantly lost cabin pressure and the pilot's headset departed the airplane, so he activated the ancillary oxygen and donned his oxygen mask. During his subsequent steep descent, the pilot found a nearby airport with the requisite landing distance. He entered the airport's identifier into the onboard global positioning system and followed the course line. At 12,000 feet, the pilot leveled off and made visual contact with the airport. He was unable to locate the airport's windsock during the descent, but chose to land on runway 12. While on the downwind leg, the pilot deployed one notch of flaps and attempted to maintain a target airspeed of 110 knots. After he turned to the final leg of the airport traffic pattern, the pilot deployed the landing gear, but the left main landing gear did not show a green indication. The pilot recycled the landing gear, but received the same indication. He then decided to land with the landing gear in the UP position, as his available flight time was decreasing. According to his recount, although the airplane made contact with the runway at a high rate of speed, the touchdown was smooth and level. The airplane then overran the runway, impacted a fence, and traversed a road before it came to rest in a field.

Postaccident examination by a Federal Aviation Administration inspector revealed substantial damage to both wings.

The wreckage was retained for further examination.

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Accident Rpt# CEN16FA278	**07/21/2016 1840 CDT**	**Regis# N511GS**	**Fairmont, OK**	**Apt: N/a**
Acft Mk/Mdl HARRIS-RUNYAN SKYBOLT 300		**Acft SN HR30091001**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO 540-K1G5D		**Acft TT 2183**	**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: HARRIS RANDALL L		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Summary

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.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's delay in recovering from an aerobatic maneuver resulting in collision with terrain.

Events

1. Maneuvering-aerobatics - Loss of control in flight
2. Maneuvering-aerobatics - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Altitude-Not attained/maintained - C
2. Personnel issues-Action/decision-Action-Delayed action-Pilot - C
3. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

Narrative

HISTORY OF FLIGHT

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.

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A witness located « 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.

PERSONNEL INFORMATION

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 INFORMATION

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

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 170ø at 10 knots gusting to 20 knots, visibility 10 miles, sky condition few clouds at 8,000 ft, temperature 38ø Celsius (C), dew point temperature 18ø 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

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 295ø.

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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 90ø 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.

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Accident Rpt# ERA17CA030	**10/28/2016 1400 EST**	**Regis# UNREG**	**West Middlesex, PA**	**Apt: West Middlesex PA21**
Acft Mk/Mdl KOLB FIRE FLY		**Acft SN 042A021**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 503			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: GARY FOBES		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: NON

Events

1. Maneuvering-low-alt flying - Loss of control in flight

Narrative

According to the non-certificated pilot of the unregistered airplane, he was flying at a low altitude when he encountered a gust of wind. He then lost control of the airplane, and it subsequently impacted trees, resulting in substantial damage to the airframe. The pilot reported that there were no pre-impact mechanical failures or malfunctions of the airframe or engine that would have precluded normal operation.

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Accident Rpt# CEN17LA065	**12/23/2016 1013 MST**	**Regis# N320RJ**	**Cody, WY**	**Apt: Yellowstone Regional Airport COD**
Acft Mk/Mdl LUECK KITFOX 7		**Acft SN S70507084**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim Prob Caus: Pending**
Eng Mk/Mdl ROTAX 914UL		**Acft TT 39**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name:		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Events

5. Landing-landing roll - Collision during takeoff/land

Narrative

On December 23, 2016, at 1013 mountain standard time, a Kitfox 7, N320RJ, impacted terrain near the Yellowstone Regional Airport (COD), Cody, Wyoming. The commercial pilot was uninjured. The airplane received substantial damage. The airplane was registered to and operated by an individual under 14 Code of Federal Regulations Part 91 as a maintenance test flight. Visual meteorological conditions prevailed for the local flight that was not operating on a flight plan. The flight originated from COD about 1000 and was to remain in the airport traffic pattern.

The airplane experienced a loss of engine power during a visual approach from the airport traffic pattern. The pilot performed a forced landing to a field where the airplane nosed-over and impacted terrain.

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Accident Rpt# CEN15FA422	**09/24/2015 1908 CDT**	**Regis# N929DS**	**Granbury, TX**	**Apt: Granbury Rgnl GDJ**
Acft Mk/Mdl PIERCE, HENRY BUSHBY MUSTANG II		**Acft SN 1242**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360-D1A		**Acft TT 436**	**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: CASEY J BUSSETT		**Opr dba:**		**Aircraft Fire: GRD**
				AW Cert: SPE

Summary

Witnesses observed the airplane takeoff, and level off as it flew down the runway at a low altitude. It then entered a steep nose-up climb, followed by a sudden roll to the right and a steep nose-down descent. Video images from a security camera, showed the airplane descended at about 20ø to 30ø nose-down attitude until it impacted the terrain. Examination of the wreckage did not find any anomalies that would have contributed to the accident. Signatures on the propeller were consistent with the propeller being driven during the impact sequence. A review of the pilot's video camera found recordings of similar maneuvers that had a right rolling tendency during the airplane's recovery to level flight. The circumstances of the accident were consistent with the pilot's exceedance of the airplane's critical angle of attack during a steep climb resulting in an aerodynamic stall and collision with terrain.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's exceedance of the airplane's critical angle of attack resulting in an aerodynamic stall and collision with terrain.

Events

1. Takeoff - Abrupt maneuver
2. Initial climb - Aerodynamic stall/spin
3. Initial climb - Loss of control in flight
4. Uncontrolled descent - Collision with terr/obj (non-CFIT)
5. Post-impact - Part(s) separation from AC
6. Post-impact - Explosion (post-impact)
7. Post-impact - Fire/smoke (post-impact)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Capability exceeded - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

Narrative

HISTORY OF FLIGHT

On September 24, 2015, at 1908 central daylight time, a kit-built Mustang II airplane, N929DS, impacted terrain during initial climb at Granbury Regional Airport (GDJ), Granbury, Texas. The pilot and the passenger were fatally injured, and the airplane was destroyed. The airplane was registered to and operated by a private individual, as a 14 Code of Federal Regulations Part 91 personal flight. Day visual meteorological conditions prevailed and a flight plan had not been filed. At the time of the accident the airplane was departing GDJ for a local flight.

Witnesses at the north end of the runway, reported that after the airplane took off to the south, it briefly leveled off and flew down the runway at low altitude. It then entered a steep nose-up climb, followed by a sudden roll to the right, and a steep nose-down descent. Video images from a security camera, about 700 feet away, showed the airplane descended in a 20ø to 30ø nose-down attitude. The airplane impacted the terrain and a postimpact fire ensued.

PERSONNEL INFORMATION

The pilot was employed as a helicopter pilot for an air ambulance company. He normally operated Bell 206L3 and 407 helicopters. He purchased, N929DS, a completed Mustang II on August 18, 2015. The pilot had accumulated 33.5 hours in the accident airplane. The pilot's last biannual flight review was conducted on June 3, 2014, in a Bell 206L3. The pilot's last biannual flight review in a fixed-wing aircraft was not located during the investigation. It could not be determined when the pilot last practiced stall recoveries.

AIRCRAFT INFORMATION

N929DS, was an amateur built, low wing, single engine airplane. On May 19, 2015, the airplane was inspected in accordance with Federal Aviation Rule 43 Appendix D and found to be in a condition for safe operation. At the time of that inspection, the airplane and engine had accumulated 402.88 hours. Using data

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obtained from the pilot's log book, at the time of the accident, the airplane had accrued no less than 436.3 hours.

METEOROLOGICAL INFORMATION

AIRPORT INFORMATION

WRECKAGE AND IMPACT INFORMATION

The wreckage came to rest in a grass field near the departure end of runway 14. Impact signatures were consistent with a nose low collision with terrain. The airplane's propeller, spinner, and hub fractured from the engine at the propeller flange and was partially embedded in the ground. The main wreckage was several yards away from the propeller and consisted of the remainder of the airplane. A postimpact fire consumed much of the wreckage. Flight control continuity was established. Examination of the propeller found deep pitting and gouging on the leading edges of both blades. In addition, both blades exhibited deep chord wise scratches. One blade was fractured near its mid-span with grainy, gravelly fracture surfaces. No anomalies were detected with the airframe.

The engine was examined. Engine continuity and compression was verified to each cylinder. The carburetor and magentos were heat damaged and could not be tested. There were no preimpact defects noted with the engine.

Several cockpit electronic devices which had the potential for retaining data via non-volatile memory were sent to the NTSB laboratory for examination and data download. Fire damage precluded the download of data from any of the devices. A GoPro Hero 2 camera found in the wreckage was also sent to the lab for download.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by Tarrant County Medical Examiner as authorized by the Justice of the Peace of Hood County. The cause of death was "multiple blunt force injuries due to [an] aircraft crash with [a] post-crash fire." The manner of death was ruled an accident.

The FAA Civil Aerospace Medical Institute performed forensic toxicology on specimens from the pilot. Testing was negative for all tested substances.

TESTS AND RESEARCH

GoPro Camera

An exterior examination revealed the camera unit had not sustained any damage and image recording information was extracted from the associated SD card. The card contained 26 aviation related video files. Of the 26 video files, 18 were determined to have been recorded in the accident airplane. None of the 18 video files recorded in the accident airplane contained a recording of the accident flight.

Of the 18 video files, eight recordings contained a maneuver similar to the maneuver described by witnesses. In the eight recordings, the aircraft began a takeoff roll, became airborne, and remained at a low altitude as it traveled down the runway. Near the departure end of the runway, the aircraft climbed quickly and subsequently was brought to a level attitude. In most recordings where this maneuver was conducted, the aircraft exhibited a varying degree of right roll, either at the same time the aircraft was brought to a level attitude or within moments thereafter. During the 8 recordings when this maneuver was conducted, the aircraft's airspeed indicator never displayed a value of less than 80 mph. During one recording in which this maneuver was conducted, an electronic tone was heard on the audio track. The electronic tone was consistent with the stall warning tone heard on the aircraft's previous landings. The indicated airspeed at the time of this tone was approximately 105 mph and the aircraft's attitude was about 10ø in pitch and 45ø in roll to the right. At this time, the pilot was exiting the climb maneuver and leveling the airplane. Though the stall warning horn did briefly sound, there were no other indications the aircraft was approaching a stalled condition.

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Accident Rpt# ERA17CA177	**05/10/2017 1540 EDT**	**Regis# N532SE**	**Reedsville, PA**	**Apt: Mifflin County Airport RVL**
Acft Mk/Mdl REUPERT MARK AVID FLYER-NO SERIES		**Acft SN 231**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 582		**Acft TT 900**	**Fatal 0 Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: MCCAA ROBERT T		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Events

2. Takeoff - Loss of control in flight

Narrative

The sport pilot, was also the owner of the experimental, amateur-built, tailwheel airplane stated that he was demonstrating maneuvers for the purpose of developing his brother's familiarity with the make and model airplane. The sport pilot's brother was a pilot-rated passenger, seated in the right seat and had not previously flown the make and model airplane. After completing about 1 hour of maneuvers, the sport pilot's brother attempted a takeoff in calm wind. During the takeoff roll, as the tail became airborne, the airplane began to swerve. The sport pilot's brother overcorrected for the swerve and the airplane departed the right side of the runway. The sport pilot attempted to regain control and climb over obstacles, but the airplane stalled and impacted a field. Examination of the wreckage by a Federal Aviation Administration inspector revealed damage to both wings and the fuselage. The inspector did not observe any preimpact mechanical malfunctions, nor did the pilots report any.

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Accident Rpt# GAA17CA308	**05/27/2017 1300 CDT**	**Regis# N721E**	**Lakeside, TX**	**Apt: N/a**
Acft Mk/Mdl ROBERT HAMBLIN AUTOGYRO GMBH		**Acft SN V00255**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 0 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: ROBERT HAMBLIN		**Opr dba:**		**Aircraft Fire: NONE**

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Accident Rpt# GAA17CA220	**04/07/2017 1000 EDT**	**Regis# N3839Y**	**Bessimer, AL**	**Apt: Bessemer EKY**
Acft Mk/Mdl SHILT JERRY C F-1 ROCKET-NO SERIES		**Acft SN 073**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-540-D4A5		**Acft TT 154**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: JERRY C. SHILT		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Events

1. Landing - Loss of control on ground

Narrative

The pilot reported that during the landing roll as the tailwheel was almost in contact with the ground, the airplane started to veer to the right. He attempted to correct to the left, but lost directional control, and the airplane ground looped to the left.

During the ground loop, the airplane sustained substantial damage to its right wing and firewall.

The pilot reported that there were no pre-accident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system on the airport, about the time of the accident, reported the wind at 340ø at 10 knots, gusting to 17 knots. The pilot landed on runway 23.

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Accident Rpt# GAA17CA246 04/24/2017 1531 CDT	**Regis# N614WB**	**Chesterfield, MO**	**Apt: Spirit Of St Louis SUS**
Acft Mk/Mdl THOMAS B MCGRATH JA30	**Acft SN JA422-11-14**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX BULLYHAWK 914	**Acft TT 80**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: THOMAS B. MCGRATH	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Events

1. Landing - Loss of control on ground

Narrative

The pilot of the tailwheel-equipped airplane reported that after several attempts to land, the wind had changed to a more favorable direction and "[he] was confident in [landing] the plane". He added that the approach was uneventful, but during the landing roll "a cross wind started pushing the aircraft and tail left". Subsequently, the airplane ground looped to the right.

The airplane sustained substantial damage to the left wing, left wing aileron and right wing rear spar.

The pilot reported that there were no pre-accident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system on the airport, about the time of the accident, reported the wind at 180ø at 10 knots. The pilot landed on runway 8L.

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Accident Rpt# WPR16LA088 03/10/2016 1533 MST	**Regis# N44AZ**	**Prescott, AZ**	**Apt: Ernest A. Love Field PRC**
Acft Mk/Mdl THOMAS D. PARKES LANCAIR ES	**Acft SN ES-089-FB**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl MAZDA/ATKINS 20B	**Acft TT 245**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: THOMAS D. PARKES	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Summary

The airline transport pilot was departing in the experimental, amateur-built airplane. During the initial climb, the engineÿexperienced a partial loss ofÿpower. The pilot performed a precautionary landing on a taxiway, during which the airplane departed the paved surface and the nose landing gear collapsed. Postaccident examination of the engine turbocharger revealed reddish-white discoloration of the turbine wheel, which suggested excessive engine exhaust gas temperature. Likewise, discoloration observed on the turbine end shaft journal was consistent with high temperature. The combination of high exhaust temperature and the rotational speed of the turbine wheel likely caused the blade material to creep and the wheel diameter to increase until the blade tips rubbed against the turbine housing. This eventually caused blade tip failures, which resulted in a rotating imbalance. It is likely that the combination of wheel rubbing and imbalance and caused the turbocharger to slow or stop, which in turn resulted in the loss of engine power. The reason for the excessive engine temperature could not be determined during the investigation based on the available information.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A partial loss of engine power due to an over-temperature event, which thermally damaged the blade tips of the turbocharger wheel and resulted in a slowing or stoppage in the rotation of the turbocharger.

Events

1. Initial climb - Loss of engine power (partial)
2. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Turbocharging (recip only)-Turbocharger-Damaged/degraded - C

Narrative

On March 10, 2016, about 1533 mountain standard time, a Thomas Parkes Lancair ES, N44AZ, was substantially damaged following a forced landing due to a reported partial loss of engine power at Ernest A. Love Field (PRC), Prescott, Arizona. The airline transport pilot, the sole occupant and owner of the airplane, was not injured. Visual meteorological conditions prevailed for the proposed local flight, which was being operated in accordance with 14 Code of Federal Regulations Part 91, and a flight plan was not filed. The flight was originating at the time of the accident.

In a report submitted to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the pilot reported that as he advanced the throttle for takeoff he checked the initial engine acceleration, which appeared to be normal and smooth; manifold pressure (MAP) was set at 31 inches, with normal turbocharger spool-up noted as the secondary injectors cut in during acceleration. The pilot opined that this was a normal turbo-normalized installation with a manual waste-gate spring loaded to 5 psi. The turbo relief valve was set for a maximum MAP of 3.2 psi to provide sea-level power at PRC's elevation of 5,000 ft.

The pilot reported that he lifted off about 75 to 80 knots (kts) with the engine running smoothly, but acceleration seemed to taper off as the airplane approached 100 feet above ground level. The pilot stated that the MAP was still reading 31 inches, but he needed to reduce his pitch attitude slightly to maintain 80 kts. The pilot further stated that previous experience had led him to expect a vigorous rate of climb with a manual reduction in propeller rpm, but at this point he realized that the engine had a power issue, at which time he pushed the throttle full forward. The pilot reported that he had sufficient runway to land the airplane, but without sufficient runway to stop before contacting a berm at runway's end. Additionally, he realized that there was a self-serve fueling station in his path, which prompted him to make a slight left turn in order to line up for a precautionary landing on taxiway Charlie. However, as the taxiway began slowly rising in the windscreen, he quickly altered the turn, lowered the flaps, and landed on the edge of taxiway Bravo adjacent to the ramp, missing all aircraft that were tied down in that area. The airplane quickly ran out of ramp area and impacted the rough terrain approaching taxiway Foxtrot. The pilot stated that the airplane bounced a few times before the nose gear collapsed and skidded across runway 12, coming to rest upright in the grass just beyond the runway. According to the pilot, the nose landing gear, propeller, cowling, and firewall were damaged as a result of impact with a newly installed Precision Approach Path Indicator's four vertical pipes, control boxes, and lights.

A Federal Aviation Administration (FAA) aviation safety inspector's postaccident examination of the airplane revealed a compromised engine mount and damage to the firewall. On April 26, 2016, the NTSB IIC met with the pilot/owner at his hangar at PRC to discuss the accident, as well as to perform a cursory

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inspection of the engine. During the inspection, the IIC observed that the engine's crankshaft rotated freely, with no binding noted. No indications of a catastrophic engine event was observed. The pilot stated that he did not feel that there was a problem with the engine itself, however, that the issue centered around the turbocharger (serial number CCN00246, OEM part number LW-12689, part number 406610-9020).

An external examination of the turbocharger revealed hard scraping on the hot side, two blades were observed chipped, two additional blades were cracked, and the impeller was tight. The pilot reported that he initially purchased the engine in 1999 from Atkins Rotary, located in Eatonville, Washington, and that there were no historical records available for the engine. The pilot subsequently installed the turbocharger to the engine, with its first flight being in 2003. The NTSB IIC had the turbocharger removed from the engine, retained custody of the component, and on May 5, 2016, shipped the component to the facilities of Hartzell Engine Technologies, Piqua, Ohio, where a detailed examination and analysis would be performed.

On May 20, 2016, under the supervision of a FAA aviation safety inspector assigned to the FAA's Cincinnati Flight Standards District Office, Cincinnati, Ohio, a Hartzell Engine Technologies technician performed an examination of the subject turbocharger. The technician's findings revealed that the turbine wheel and blades had indications of being overtemped (EGTs greater than approximately 1,650 degrees F) and possible overspeed. The technician revealed that the reddish-white discoloration of the turbine wheel suggested excessive exhaust gas temperature, and that the discoloration of the turbine end shaft journal was consistent with excessive temperature. The technician reported that a combination of high exhaust temperature and wheel speed caused the blade material to creep (high temperature plastic deformation), and wheel diameter to increase until the blade tips rubbed against the turbine housing. The technician also reported that blade tip rub and creep eventually caused blade tip failures, which resulted in a rotating imbalance that damaged the compressor-bearing bore, compressor wheel rub, and introduced debris/particles into the oil bearings. The technician concluded that a combination of imbalance and wheel rub likely resulted in the turbocharger rotation to slow or stop, and thus the resultant loss of boost and engine power. (Refer to the Hartzell Engine Technologies Turbocharger Examination Findings report, which is appended to the docket for this accident.)

During the investigation, the pilot revealed that the airplane was equipped with an EGT gauge that would alert him when the temperature exceeded 1,600 degrees F. However, during the accident sequence he did not observe an overtemperature warning light, nor did he know when the temperature probe was last calibrated. Additionally, the pilot reported that since the accident occurred, he had sent the engine to a repair facility, which to date has not been able to determine what precipitated the overtemperature condition.

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Accident Rpt# GAA17CA299	**05/22/2017 1300 AKD**	**Regis# N484WT**	**Talkeetna, AK**	**Apt: Talkeetna TKA**
Acft Mk/Mdl THOMAS E HUDZINSKI BACKCOUNTRY		**Acft SN BC31411007**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 0 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: THOMAS E. HUDZINSKI		**Opr dba:**		**Aircraft Fire: NONE**

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Accident Rpt# ERA16LA086 01/09/2016 1600 EST	**Regis# N72MT**	**Minneola, FL**	**Apt: Florida Flying Gators 3FD4**
Acft Mk/Mdl WAYLAND JOHN H AVID MARK	**Acft SN 1431D**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 582	**Acft TT 350**	**Fatal 0 Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: ROBERT E SALZMANN	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Summary

The sport pilot of the experimental, amateur-built, light sport airplane performed a takeoff and initiated a steep, left, crosswind turn to avoid horses off the end of the runway. About 300 ft above the ground, he smelled "burning wires" and thought he saw a "wisp of smoke." The engine "sputtered then died." The left wing stalled, the airplane rolled inverted, and entered a downward spiral. The airplane collided with trees and terrain before coming to rest, inverted, in a grassy field. Examination of the airframe and engine found no evidence of a mechanical failure or malfunction that would have prevented normal operation. The pilot received his sport pilot certificate about 4 months before the accident and had accumulated about 120 hours of total flight time at the time of the accident. It is likely that, following the total loss of engine power, the pilot failed to reduce the airplane's angle of attack either sufficiently or quickly enough to prevent an aerodynamic stall/spin.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power for reasons that could not be determined because postaccident examination revealed no anomalies that would have precluded normal operation. Contributing to the accident was the pilot's exceedance of the airplane's critical angle of attack during the crosswind turn, which resulted in an aerodynamic stall/spin.

Events

1. Initial climb - Loss of engine power (total)
2. Initial climb - Loss of control in flight
3. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - F
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Not attained/maintained - F

Narrative

On January 9, 2016, about 1600 eastern standard time, an experimental amateur-built Avid Mark IV, N72MT, was substantially damaged following a forced landing after takeoff from Florida Flying Gators Ultralight Flightpark (3FD4), Minneola, Florida. The sport pilot was seriously injured. The airplane was privately owned and operated under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day, visual meteorological conditions prevailed, and no flight plan was filed. The local flight was originating at the time of the accident.

The pilot reported that, after takeoff, he turned onto the crosswind leg of the traffic pattern. He performed a steep turn after takeoff to avoid horses off the end of the runway. He then noticed the smell of "burning wires" and "may have seen a wisp of smoke." At 300 feet above the ground, and while still climbing, the engine "sputtered, then died." He made a radio call that he was returning to the runway. The left wing then stalled and the airplane rolled inverted and entered a downward spiral. The airplane collided with two trees during the descent before colliding with the terrain. The airplane came to rest in a grassy area, inverted.

Inspectors with the Federal Aviation Administration (FAA) responded to the accident site and examined the wreckage. They observed structural damage to fuselage, empennage, and both wings. An FAA airworthiness inspector examined the engine and found no evidence of a mechanical failure or malfunction. There were no arcing or burn signatures on the engine's electrical wiring or connectors. A postaccident test run of the engine could not be performed due to impact damage.

The pilot received his sport pilot certificate on September 2, 2015, after taking a two-week training course. He reported 120 hours of total flight time, including 100 hours as pilot-in-command. He also reported 65 hours in the accident airplane make and model, all as pilot-in-command. He stated that, after the accident, he took additional lessons with his original flight instructor to practice emergency procedures, stalls, and stall recovery.

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Accident Rpt# GAA17CA236 04/15/2017 1525 EDT	**Regis# N122BD**	**Oliver Springs, TN**	**Apt: N/a**
Acft Mk/Mdl ZEILER BAKENG DUCE 1976 CZ-	**Acft SN 1776-CZ**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-290	**Acft TT 788**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: TIMOTHY M. STRINGER	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Events

2. Landing - Loss of control in flight

Narrative

The pilot reported that during approach, while flying from the rear seat of the tandem seat, high-wing airplane, he "needed to lose speed and altitude". He placed the airplane in a right-wing low, forward slip, and he added that the airplane had poor forward visibility at slower speeds. He aligned the airplane with the center of the runway and "pulled the nose up slightly to slow [down]," and a "wind gust" came from the right and "pushed" the airplane over the trees. He "saw [the] tree tops coming up fast under [his] left wing", and "out of shear instinct, [he] banked slightly right to avoid going in nose first". The airplane collided with the tree tops.

The airplane sustained substantial damage to both wings and the empennage.

The pilot reported that there were no pre-accident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The automated weather observation system about 3 nautical miles from the accident site, about the time of the accident, reported the wind variable at 3 knots. The pilot landed to the southwest.

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Accident Rpt# WPR16LA164	**08/12/2016 1000 PDT**	**Regis# N619LD**	**Ocean Shores, WA**	**Apt: N/a**
Acft Mk/Mdl ZENITH CH601		**Acft SN 66980**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL O-200		**Acft TT 11**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: LONNY GUNTHER		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Summary

The private pilot was conducting a local personal flight in an experimental, amateur-built airplane. The pilot reported that, during cruise flight, the voltmeter's indications became erratic and that, shortly after, the airplaneÿexperienced a total loss of electrical power. The engine subsequently lost power, and the pilot conducted anÿemergency landing, during which the bottom of the fuselage contacted surrounding vegetation. The right wing then dipped, and the airplane impacted terrain.ÿThe pilot reportedÿthat, following the accident, he checked the battery's charge, and it was 11 volts; however, the electrical system on the airplane required 12 to 13 volts for operation.

The pilot partially disassembled the airplane following the accident, and the engine, most of the flight instruments, the tachometer, and the interior components were not available for examination. Therefore, a thorough evaluation of the airplane's electrical system was not possible. However, the battery examination revealed thatÿit had a 10-volt charge,ÿindicating that either a battery or charging system failure occurred. The fuel delivery system included two electronic fuel pumps connected in series with no mechanical or auxiliary pumps installed. Therefore, the loss of electrical power would have disabled both fuel pumps and resulted in fuel starvation and a loss of engine power. There was no other method to deliver fuel to the engine if the battery power was insufficient to power the fuel pumps.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A reduction in electrical power, which disabled both fuel pumps and resulted in fuel starvation and a loss of engine power.

Events

1. Enroute-cruise - Electrical system malf/failure
2. Enroute-cruise - Loss of engine power (total)
3. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Electrical power system-(general)-Failure - C
2. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C
3. Environmental issues-Physical environment-Object/animal/substance-(general)-Contributed to outcome

Narrative

On August 12, 2016, about 1000 Pacific daylight time, a Zenith CH601, N619LD, sustained substantial damage when it impacted the ground near Ocean Shores, Washington. The private pilot, the sole occupant, sustained minor injuries. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed. The local flight originated from Bowerman Airport (HQM), Hoquiam, Washington at 0900.

The pilot reported that he was in cruise flight when the voltmeter's indications became erratic. Shortly thereafter, the airplane experienced a complete loss of electrical power, followed by a loss of engine power. He immediately executed an emergency landing, and established the best glide speed at 70 mph. Prior to impact, the bottom of the fuselage contacted surrounding vegetation, the right wing dipped, and the airplane impacted the terrain.

The airplane was equipped with an Odyssey Extreme Series PC-680 battery which required a 14.4 charging voltage. In a phone conversation with the National Transportation Safety Board investigator-in-charge, the pilot stated that had checked the battery's state of charge after the flight, and the battery indicated 11 volts. He added that the electrical system on the airplane requires 12-13 volts for operation.

A Federal Aviation Administration (FAA) Inspector examined the airplane's logbook, and the majority of the wreckage. The airplane logbook showed the last condition inspection occurred on September 20, 2015; an Experimental Airworthiness certificate for the purpose of Amateur Built was issued on May 20, 2016. The airplane was in Phase 1 operation test flight, and it was restricted to a 25-mile radius of HQM.

The engine, most of the flight instruments, the tachometer, interior components, and damaged canopy pieces were removed by the owner following the accident, and were not present for the examination.

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The nose gear was bent to the right. The fuselage exhibited compression wrinkles in the top skin between the empennage and the cabin. The right wing was removed, and showed some outboard leading edge damage. The right elevator was significantly damaged. The skin below the horizontal stabilizer was wrinkled. The left aileron and wingtip sustained damage. The main landing gear was partially folded under the fuselage.

The battery showed a 10-volt charge. The airplane was equipped with two Facet 12 volt electronic fuel pumps. Both pumps were connected in series; therefore, fuel to the engine had to pass through both pumps. There were no other mechanical or auxiliary pumps installed. The wire and connectors that remained in the fuselage were automotive type. All circuit breakers were observed in, and no overheated wiring or arcing was found.

The airplane was powered by a Continental O-200-A engine, serial number 72 JACH-A-48, and was installed on the airplane with about 250 hours since major overhaul. Initially, the engine was equipped with an external oil filter and an adapter on the oil cooler pad, but the pilot removed the filter assembly and installed the cooler pad cover on the engine case. The oil screen did not contain any metal particles.

The carburetor was separated from the engine, and it appeared largely intact. Neither the carburetor bowl nor the accelerator pump contained fuel. The complete statement from the FAA inspector detailing the examination is appended to the accident in the public docket.

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Accident Rpt# GAA17CA301	**04/30/2017 1530 PDT**	**Regis# N89SR**	**Napa, CA**	**Apt: N/a**
Acft Mk/Mdl ZWICKER MURRAY R GLASTAR-NO		**Acft SN 5492**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 0 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: KARL B. WHITCOMB		**Opr dba:**		**Aircraft Fire: NONE**

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