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# National Transportation Safety Board - Aircraft Accident/Incident Database

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|------------------------------------|---------------------|---------------|-----------------------|------------------------------------|
| Accident Rpt# ERA12CA042           | 10/18/2011 1730 EDT | Regis# N103ST | Massey, MD            | Apt: Massey Aerodrome MD1          |
| Acft Mk/Mdl MOYES BAILEY DRAGONFLY |                     | Acft SN 16    | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk Prob Caus: Pending |
| Eng Mk/Mdl ROTAX 582UL DCDI        |                     |               | Fatal 0 Ser Inj 0     | Flt Conducted Under: FAR 091       |
| Opr Name: RALPH S. DE GROODT       |                     | Opr dba:      |                       | Aircraft Fire: NONE                |
|                                    |                     |               |                       | AW Cert: SPX                       |

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## Narrative

The pilot stated that this was his first time flying the light sport airplane and just completed the first landing. He was getting familiarized with the airplane's flight and landing characteristics. On the second landing, he permitted the airspeed low and the airplane stalled just prior to touchdown. A witness observed the airplane as it was approaching to land, its right wing dropped, impacting the ground. It then spun towards the right before the nose section impacted the ground; incurring substantial damage. The pilot stated there were no mechanical failures or malfunctions of the airplane or any of its systems prior to the accident.

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| Accident Rpt# CEN12CA119       | 12/18/2011 1400 CST | Regis# N61202        | Loreauville, LA       |                     |                              |
| Acft Mk/Mdl QUICKSILVER MXL II |                     | Acft SN MXL II SPORT | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk     | Prob Caus: Pending           |
| Eng Mk/Mdl ROTAX 582           |                     | Acft TT 157          | Fatal 0               | Ser Inj 2           | Flt Conducted Under: FAR 091 |
| Opr Name: HEATH PRADOS         |                     | Opr dba:             |                       | Aircraft Fire: NONE |                              |
|                                |                     |                      |                       | AW Cert: SPX        |                              |

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## Narrative

The student pilot reported he was "pretty slow" and flying about 200 feet above ground level when he entered a sudden steep left turn. The student pilot did not add power as he entered the turn and said he probably used too much aileron. During the turn the airplane suddenly entered a spin and impacted the ground in a steep nose down attitude. The impact caused substantial damage to all structural components of the airplane. The student pilot said he had about five hours of experience in the accident airplane and had not received any flight instruction in that type. In addition the student pilot stated he thought the cause of the accident was pilot error and that he should have kept a higher airspeed and been at a higher altitude.

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| Accident Rpt# WPR11LA461     | 09/22/2011 830 PDT | Regis# N49S | Wells, NV             |                 |                              |  |
| Acft Mk/Mdl BUNKER RLV-1     |                    | Acft SN 2   | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk | Prob Caus: Pending           |  |
| Eng Mk/Mdl LYCOMING O-320    |                    | Acft TT 817 | Fatal 0               | Ser Inj 1       | Flt Conducted Under: FAR 091 |  |
| Opr Name: MICHAEL D. ERIKSON |                    | Opr dba:    | Aircraft Fire: NONE   |                 |                              |  |

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## Narrative

On September 22, 2011, about 0830 Pacific daylight time, a Bunker RLV-1 experimental amateur built airplane, N49S, was substantially damaged following an impact with terrain while maneuvering about five miles southwest of the Wells Municipal Airport (LWL), Wells, Nevada. The certified private pilot sustained serious injuries and the passenger received minor injuries. Visual meteorological conditions prevailed for the local area flight, which was conducted in accordance with 14 Code of Federal Regulations Part 91, and a flight plan was not filed. The flight departed LWL about 0800.

In a report submitted to the National Transportation Safety Board investigator-in-charge (IIC), the pilot reported that his passenger wanted to take pictures of some nearby mountains, which were located about 5 miles southwest of LWL. The pilot stated that as the airplane approached the rolling hills near the higher mountains he made a right turn into a draw, but the airplane was then unable to climb above the rising terrain, which consisted of rolling hills populated with cedar trees. The pilot added that at this point he was unable to turn around due to higher terrain on both sides of the airplane. The pilot revealed that the airplane subsequently impacted a cedar tree about 15 feet high, and as the airplane descended to the ground it impacted at least two more trees before coming to rest upright substantially damaging the wings and fuselage. The pilot stated that the accident could have been prevented had he gained altitude prior to entering the area of rising terrain. The pilot reported that there were no anomalies with the airplane prior to or during the flight.

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| Accident Rpt# CEN11LA530               | 07/28/2011 1650 CDT | Regis# N114DC | Fort Worth, TX        | Apt: Fort Worth Spinks Airport FWS |
| Acft Mk/Mdl CHRISTIANSEN DON E DO RV-4 |                     | Acft SN 057   | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk Prob Caus: Pending |
| Eng Mk/Mdl LYCOMING 0-320 SERIES       |                     |               | Fatal 0 Ser Inj 1     | Flt Conducted Under: FAR 091       |
| Opr Name: HALEY JACK M                 |                     | Opr dba:      |                       | Aircraft Fire: NONE                |

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## Narrative

On July 28, 2011, at 1650 central daylight time, N114DC, a Vans RV-4, sustained substantial damage during a forced landing near the Fort Worth Spinks Airport (FWS), Fort Worth, Texas. The airline transport pilot was seriously injured and the passenger was not injured. The airplane was registered to and operated by the pilot. A visual flight rules flight plan was filed for the flight that originated in Houston, Texas, about 1445. Visual meteorological conditions prevailed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

In a written statement, the pilot said that he initiated a descent from 8,500 feet to 4,000 feet to clear the Class B airspace around Dallas/Fort Worth International Airport. Upon reaching 4,000 feet, the engine began to run rough and rolled back to idle power. The pilot declared an emergency, established a best glide speed and headed toward Spinks Airport, which was 8.8 miles away. The pilot then tried to trouble shoot the power loss, but was unsuccessful. The airplane was not equipped with carburetor heat. When the airplane reached an altitude of 1,000 feet, the engine lost total power and the pilot landed short of the runway in a corn field. The airplane's left main wheel struck vegetation, which caused the airplane to tip on to its nose striking the spinner.

Postaccident examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed the firewall was bent. The inspector removed the spark plugs, established engine continuity, and confirmed the fuel tanks were half-full of fuel. The carburetor was removed and inspected by an FAA approved maintenance facility. No anomalies were noted with the unit and it was placed back on the engine. The engine was then test-run and produced rated horsepower. No mechanical deficiencies were noted that would have precluded the engine from operating normally at the time of the power loss.

Weather at FWS at 1640 was reported as wind from 130 degrees at 6 knots, visibility 10 miles, clouds scattered at 9,000 feet, temperature 40 degrees Celsius, dewpoint 15 degrees Celsius, and a barometric pressure setting of 29.78 inches of Mercury.

According to the Department of Transportation/FAA Carburetor Icing Probability Chart, the weather conditions at the time of the power loss were conducive to carburetor icing at glide and cruise power.

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|-------------------------------------|---------------------|---------------|-----------------------|------------------------------------|
| Accident Rpt# ERA12FA021            | 10/23/2011 1100 EDT | Regis# N795DB | Lexington, NC         | Apt: Davidson County EXX           |
| Acft Mk/Mdl ELKIND BRUCE COZY MK IV |                     | Acft SN 165   | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk Prob Caus: Pending |
| Eng Mk/Mdl LYCON I0360 SER A&C      |                     |               | Fatal 1 Ser Inj 1     | Flt Conducted Under: FAR 091       |
| Opr Name: BREMER ROLAND AUGUSTUS    |                     | Opr dba:      |                       | Aircraft Fire: NONE                |

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## Narrative

### HISTORY OF FLIGHT

On October 23, 2011, at about 1100 eastern daylight time, an experimental, amateur-built Elkind Cozy MK IV, N795DB, collided with a tree, in a soy bean field, while performing a forced landing following loss of engine power near Lexington, North Carolina. The airplane was registered to a private owner, and was operating as a 14 Code of Federal Regulations Part 91 personal flight. The airplane sustained substantial damage to the airframe. Visual meteorological conditions prevailed and an instrument flight rules (IFR), flight plan was filed. The certificated private pilot was killed and the certificated airline transport pilot passenger received serious injuries. The flight departed from Craig Municipal Airport (CRG), Jacksonville, Florida, at 0846 en-route to Davidson County Airport (EXX) Lexington, North Carolina.

The passenger stated they departed CRG on an IFR flight plan. They canceled their IFR flight plan about 60 miles south of EXX and proceeded VFR to the airport. About 20 minutes from EXX, the pilot informed the passenger they had 7 gallons of fuel remaining in right fuel tank. The passenger encouraged the pilot to switch fuel tanks, but he declined. Upon approach to EXX, the passenger asked the pilot if he was going to land straight ahead to runway 6. The pilot stated he would enter the traffic pattern on a left downwind leg for runway 24. The pilot lowered the nose wheel and was about to turn onto base leg when the engine began sputtering. The pilot initiated a steep descending turn towards the runway and did not attempt to change the fuel tank. The airplane subsequently collided with a tree about 1/8 mile from the runway 24 threshold.

A lineman at EXX stated he observed the airplane in a steep descending turn east of the airport, before the airplane descended from view behind a tree line. Two other witnesses, who lived in the vicinity of EXX, stated they heard the engine sputtering, follow by an impact sound similar an object hitting a tree.

### PERSONNEL INFORMATION

The certificated private pilot, age 69, held a private pilot certificate with a rating for airplane single-engine land, issued on July 29, 2009. The pilot' logbook was not recovered. According to the pilot's wife, his logbook was kept in a flight bag located in the airplane. The pilot held a third-class medical certificate, issued on November 18, 2010, with the restriction "must wear corrective lenses." The pilot indicated on his application for the third-class medical that he had 725 total flight hours, and he had flown 25 hours in the last 6 months. The pilot's last flight review was conducted on July 2, 2011.

The certified flight instructor (CFI), who administered the flight review, stated the pilot purchased the airplane about 1 year before he started flying with the pilot in April 2011. The pilot informed him that he had around 1200 to 1300 flight hours. The CFI gave the pilot 13 hours of instruction in the Cozy MK IV before he signed-off his flight review.

### AIRCRAFT INFORMATION

The Cozy MK IV is a four-place composite canard airplane, with a fixed main landing gear, and a retractable nose landing gear. The airplane, serial number 165, was manufactured in 1996. An experimental Lycon IO-360, 220-horsepower, horizontally-opposed four-cylinder engine powered the airplane. The last condition inspection was conducted on February 9, 2011 at a recorded tachometer time of 387 hours. The tachometer at the crash site was destroyed and the total airframe time and engine time could not be determined. The airplane was last refueled at Palatka, Florida, on October 16, 2011, with 37.62 gallons of 100 low lead fuel.

### METEOROLOGICAL INFORMATION

The 1115 EXX surface weather observation was: wind calm, visibility 10 miles, sky clear, temperature 14 degrees Celsius, dew point temperature 6 degrees Celsius, and altimeter 30.16 inches of mercury. The flight crew received a weather briefing and filed their flight plan with Miami Contracted Flight Service at 0756 on October 23, 2011.

### WRECKAGE INFORMATION

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The wreckage was located 1/8 mile east of runway 24 at EXX, in a soy bean field. Examination of the crash site revealed the airplane's right wing collided with a tree 32 feet above the base of the tree, inboard of the right winglet in a left descending turn, on a heading of 291 degrees magnetic. Fiberglass from the leading edge of the right wing was embedded in the tree. The right wing, right elevator, and right canard were located adjacent to the tree. The airplane continued down the crash debris line (CDL) and impacted the ground 91 feet down the CDL. The canopy separated and was located 105 feet down the CDL. The left wing separated and was located 139 feet down the CDL. The main fuselage came to rest inverted, 140 feet down the CDL on a heading of 261 degrees magnetic. The CDL was 140 feet long.

The right side of the canard and right elevator were damaged and separated at the fuselage. The elevator control rod separated in overload at the fuselage.

The nose cone and cockpit were fragmented and separated from the fuselage forward of the leading edge of the left and right strakes. The nose wheel was separated from the nose strut and the nose wheel strut was extended. The canopy and hinges separated from the fuselage. The canopy lock remained attached to the fuselage, and the canopy lock actuator rod was separated. The locking bolts on the canopy were distorted. The left side forward and rear canopy hinges were separated from the fuselage canopy rails. The forward canopy windscreen and left canopy side window were broken. The right canopy side window was not damaged. The main landing gear separated from the fuselage at its attachment points. The landing brake was not damaged and was in the retracted position.

The instrument panel was fragmented and separated from the fuselage. The throttle was at mid-range and the throttle friction was loose. The mixture lever was full rich. The fuel selector valve was positioned between the left main fuel tank and off positions.

The left and right cockpit molded seat bottoms were destroyed and the seat backs were damaged. The seatbelt mounts were separated from the fuselage. The roll over structure separated from the fuselage and the seat backs. The left and right shoulder harnesses remained attached to the roll over structure. The combined left rear seat bottom and sump tank separated from the cabin floor. The left sump tank was not ruptured. The fuel lines to the left sump tank were ruptured. The left sump tank had about 1 gallon of fuel present. The left seat back remained attached to the cabin floor. The rear seatbelt and shoulder harness were fastened and not damaged. The combined right rear seat bottom and right sump tank remained attached to the cabin floor. The right sump tank was not ruptured and no fuel was present. The right seat back separated from the cabin floor. The right rear seatbelt and shoulder harness were fastened and not damaged.

The pilot's control stick and control linkage were intact extending rearward to the passenger backseat area, where the left aileron torque tube failed consistent with overload. The pilot's canard linkage also failed consistent with overload. The passenger's control stick and linkage were intact and damaged. The passenger's canard linkage was also intact and damaged. The left aileron push rod bell crank separated from the inboard end of the wing, consistent with overload. The right aileron rod end also failed consistent with overload.

The right wing and a section of the center spar separated from the fuselage. The right wing remained bolted to the center spar. The right strake (fuel tank) separated at the wing root. The right main fuel tank was ruptured. No fuel or browning of vegetation was present. The right main fuel cap was secure with a tight seal. No fuel staining was present on the strake, or surface of the right wing. The leading edge of the wing was damaged 9 feet outboard of the outboard edge of the right strake. The inboard and outboard vortilions remained attached to the wing. The middle vortilon was bent rearward. The upper wing fiberglass layers were buckled. The right winglet remained attached to the wing and the leading edge was damaged. The right rudder remained attached to the winglet at all hinge points. The rudder was not damaged. The rudder cable was separated from the Army-Navy cable fork, consistent with overload. The right aileron remained attached at all hinge points. The right aileron linkage was intact up to the right aileron control rod end at the junction of the right wing. The rod there was separated in overload.

The aft pusher engine compartment remained attached to the fuselage and the firewall was not damaged. The lower and upper engine cowlings were fractured and remained attached to the fuselage. The engine assembly remained attached to all engine mounts. The composite propeller remained attached to the propeller crankshaft flange. The propeller blades were not damaged, and the composite spinner was fractured.

The center section of the canard remained attached to its mounts on the fuselage. The left side of the canard and the left elevator were fragmented.

The inboard portion of the left wing remained bolted to the fuselage. The remainder of the left wing separated outboard of the left strake. The leading edge of the wing was damaged from the wing root extending outboard to the left winglet. The inboard, middle, and outboard vortilions remained attached to the wing. The left winglet separated from the wing at the winglet wing intersection. The rudder was damaged and remained attached at all hinge points. The rudder control cable remained attached to the rudder. The rudder cable failed within the wing structure consistent with overload. The aileron was damaged and remained attached at all hinge points. The aileron torque tube failed at the inboard aileron universal joint. The left main fuel tank was ruptured. No fuel or browning of vegetation was

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present. The left main fuel cap was secure with a tight seal. No fuel staining was present on the strake, or surface of the left wing.

Examination of the engine assembly revealed the left and right engine exhaust pipes were not damaged. All induction tubes were attached to their respective attached points. The oil sump was intact and the oil dip stick remained in place. The oil suction screen was removed and no anomalies were noted. An unmeasured amount of oil was present in the oil sump. The National Automotive Parts Association oil filter was removed and opened. The filter media was free of contaminants. The front oil cooler was damaged and the rear oil cooler was not damaged.

The alternator and drive pulley remained attached to the engine assembly and was not damaged. The alternator cooling fan was not damaged. The starter remained attached to the engine and the drive pinion was retracted. The left magneto remained attached to its mount. The magneto produce spark at all ignition leads when the propeller was rotated by hand. The right magneto mounting location was blocked off with a cover plate. A Light Speed Engineering plasma capacitive discharge (CD) ignition system was installed in lieu of a right magneto with an ignition box installed behind the firewall. Two ignition coil packs were installed on top of the engine with automotive style ignition leads. The leads were routed to automotive style spark plugs in the top spark plug holes. The CD ignition was not tested because the airplane battery had been removed by first responders. The top and bottom ignition harnesses were not damaged. The vacuum pump remained attached to the engine. The vacuum pump was removed and disassembled. The composite drive unit was intact and the vacuum pump produced air at the vacuum pump outlet port when the drive was rotated by hand.

The aircraft fuel strainer bowl was removed and contained about 1 teaspoon of blue liquid that smelled like aviation gasoline. The fuel screen was removed and was free of contaminants. The fuel lines leading to engine driven fuel pump and the fuel injector servo were removed and contained fuel. The engine driven fuel pump was removed and contained fuel. The engine driven fuel pump produced pressure at the outlet port when it was actuated by hand. The throttle cable remained attached to the throttle control arm on the fuel injector servo and was at mid-range. The mixture control remained attached to the mixture control arm and was in the full rich position. The fuel injector servo was removed and contained fuel. The fuel injector servo fuel inlet screen was removed and free of contaminants. The fuel injector servo regulator section was disassembled and no anomalies were noted. The fuel flow divider was removed, disassembled and no anomalies were noted. The fuel injector nozzles were removed from all cylinders and no anomalies were noted. All spark plugs were removed. The upper spark plugs displayed dark gray combustion deposits and worn normal condition. The bottom spark plugs exhibited dark brown combustion deposits and worn normal condition.

The engine was partially disassembled. The engine was rotated by hand using the propeller. Suction and compression was obtained on all cylinders. Valve train continuity was observed through all cylinder rocker arms. The accessory drive gears were observed rotating. Crankshaft and valve train continuity was verified. All cylinders were examined using a lighted bore scope and no anomalies were noted.

## MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the Chief Medical Examiner, Chapel Hill, North Carolina, conducted an autopsy on the pilot on October 24, 2011. The cause of death was blunt force trauma. The Bioaeronautical Research Science Laboratory, FAA, Oklahoma City, Oklahoma performed a postmortem toxicology of specimens from the pilot. The specimens were negative for carbon monoxide and ethanol in the blood. No ethanol was detected in the vitreous and no drugs were detected in the urine.

## ADDITIONAL INFORMATION

Notations on the pilot's printed flight plan, on October 23, 2011, indicated the left main fuel tank had 15 gallons of fuel and the right main fuel tank had 24 gallons of fuel. The airplane has 2 gallons of un-usable fuel. The passenger stated the left main fuel tank had 20 gallons of fuel and the right main tank had 17 gallons of fuel. He also stated that 4 gallons of fuel would be utilized for engine start, run-up, and climb to cruise altitude. The total flight time from takeoff to the accident time was 2 hours and 14 minutes.

Estimated fuel consumption data for the Ly-Con experimental engine was provided by a representative of Ly-Con Engines and Accessories. Review of the fuel consumption data provided indicates a fuel burn rate of 10.33 gallons per hour at 65 percent rated horsepower. At 75 percent the fuel burn rate would be 13.75 gallons per hour. At 85 percent the fuel burn rate would be 14.66 gallons per hour. The calculated total fuel burn for a flight time of 2 hours and 14 minutes at 65 percent power would be 23.04 gallons. At 75 percent power the calculated fuel burn would be 30.66 gallons. At 85 percent power the calculated fuel burn would be 32.69 gallons. These figures do not take into account additional fuel required for start, taxi and climb to cruise altitude.

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|----------------------------------|--------------------|---------------|-----------------------|------------------------------------|
| Accident Rpt# CEN12CA026         | 10/16/2011 730 CDT | Regis# N331EJ | Terrell, TX           | Apt: Rockwall 1F7                  |
| Acft Mk/Mdl JANTZEN EVANS VP     |                    | Acft SN P15   | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk Prob Caus: Pending |
| Eng Mk/Mdl VOLKSWAGEN CONVERSION |                    | Acft TT 50    | Fatal 0 Ser Inj 1     | Flt Conducted Under: FAR 091       |
| Opr Name: KING GRADY W           |                    | Opr dba:      |                       | Aircraft Fire: NONE                |
|                                  |                    |               |                       | AW Cert: SPE                       |

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## Narrative

The pilot reported that after a preflight and normal run up he taxied to the runway for takeoff. The airplane lifted off the runway about midfield, but was not climbing as the pilot expected. He stated that the engine was operating normally. As the airplane climbed through about 100 feet, the pilot felt that the airplane was losing lift or stalling, so he lowered the nose and simultaneously had to bank to the right to avoid the tops of a stand of trees near the departure end of the runway. During the turn, the airplane stalled and hit the ground, and that is the last thing that the pilot recalled about the event. The airplane sustained substantial damage to the fuselage and wings. The pilot reported that the airplane was at or above its maximum gross takeoff weight at the time of the accident, which could have explained the less than expected climb performance. He also stated that if he did not have to maneuver away from trees just beyond the departure end of the runway, he may have effected a landing without incident.

After the accident, the pilot offered a safety recommendation in his NTSB Form 6120 Pilot/Operator Report. He stated that pilots who fly airplanes with low horsepower should avoid operating at airports with obstacles in close proximity to the runway, as there is not much margin for error.

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|-------------------------------|---------------------|--------------|-----------------------|------------------------------------|
| Accident Rpt# WPR09FA234      | 05/09/2009 1435 PDT | Regis# N86YP | Ramona, CA            | Apt: Ramona RNM                    |
| Acft Mk/Mdl UPTON BAKENG DUCE |                     | Acft SN 572  | Acft Dmg: SUBSTANTIAL | Rpt Status: Unk Prob Caus: Pending |
| Eng Mk/Mdl LYCOMING O-290D    |                     | Acft TT 480  | Fatal 2 Ser Inj 0     | Flt Conducted Under: FAR 091       |
| Opr Name:                     |                     | Opr dba:     |                       | Aircraft Fire: NONE                |
|                               |                     |              |                       | AW Cert: SPE                       |

## Narrative

### HISTORY OF FLIGHT

On May 9, 2009, about 1435, an Upton, Bakeng Duce, N86YP, experienced an in-flight breakup while maneuvering, followed by an uncontrolled descent into an open field, about 6.4 miles east-southeast of Ramona, California. The private pilot, who borrowed the airplane from its owner, occupied the rear seat of the experimental, single engine, airplane. The pilot, who occupied the front seat, held a commercial pilot certificate. The airplane sustained substantial damage to the structure, which was extensively fragmented. There was no fire. Both pilots were killed during the personal flight. Visual meteorological conditions prevailed, and no flight plan had been filed. The flight was performed under the provisions of 14 Code of Federal Regulations Part 91, and it originated from the Ramona airport about 1424.

Federal Aviation Administration (FAA) and National Transportation Safety Board personnel interviewed a total of nine persons who reported observing and/or hearing the accident. One of these witnesses reported to the Safety Board investigator that, from her vantage point on elevated terrain in a hilly area, she had observed two airplanes flying in close proximity to each other for at least several minutes prior to their colliding.

According to this witness, one of the airplanes was flying slower than the other airplane. The faster moving airplane was predominantly white in color, and the slower moving airplane was predominantly colored red. (The accident airplane's fuselage was red; its wings were white.) The witness further reported to the Safety Board investigator that she observed the airplanes maneuvering "dangerously" close to each other. The witness stated that during the time she observed these airplanes, the red airplane appeared to make relatively shallow bank turns as compared with the maneuvers that the white airplane performed. The airplanes appeared to have collided while the red airplane was flying in an easterly direction, and the unidentified airplane was climbing in a northerly direction. The witness reported that an instant following what appeared to have been the midair collision she yelled out "The white airplane hit the red airplane." The witness additionally reported that, immediately following the collision, the red airplane rolled into a 90-degree bank, a span of wing appeared to break off, and the airplane spiraled downward until impacting the ground. Following the impact, she did not recall seeing the faster airplane again.

Eight other witnesses made statements indicating that they heard a sputtering engine and looked upward. One of the witnesses stated that he observed the accident airplane spiral downward until it made a dull thud upon impacting the ground. He also reported observing a wing, which was separated from the main body of the airplane. Another of the witnesses stated he observed a large piece of the airplane that looked like a parallelogram fluttering as it fell. None of these witnesses reported observing a second airplane flying in the vicinity at the time of the crash.

### Radar Track Examination

Safety Board and FAA air traffic control personnel examined recorded radar from all of the pertinent radar site locations that had coverage in the hilly terrain that surrounds the crash site and in the neighboring vicinity. Radar coverage of primary (non-transponder) equipped aircraft in the accident site area was problematic at elevations below 1,000 feet above ground level.

Primary radar targets were found for an aircraft that departed the Ramona Airport area about 1425 and then tracked southeast toward the accident location. The last target was detected about 1435, approximately 1/4 mile from the crash site. The aircraft appears to have begun executing various course changes in the area of the accident site commencing about 1432.

According to the Safety Board's air traffic control investigator, the radar data appears to show only one aircraft in the vicinity. No altitude information was available for the aircraft. The witness statement regarding the presence of a second aircraft and a possible midair collision could not be substantiated by radar observations.

### PERSONNEL INFORMATION

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The 60-year-old pilot who occupied the airplane's rear seat held a private pilot certificate with a single engine land airplane rating. He also held an airframe and powerplant mechanic certificate. In January, 2008, the pilot reported having 1,450 hours of flight time when he was issued a second-class aviation medical certificate with the limitation that he wear corrective lenses.

The 50-year-old pilot who occupied the airplane's front seat held a commercial pilot certificate with ratings for glider, single engine land airplane and instrument airplane. He also held a certified flight instructor certificate for single engine land airplanes that expired in 1990. The pilot also held a control tower operator certificate. In December 2008, the pilot reported having 1,050 hours of flight time when he was issued a second-class aviation medical certificate with the limitation that he wear corrective lenses.

## AIRPLANE INFORMATION

In 1986, the FAA issued the airplane's builder operating limitations for the airplane and an airworthiness certificate. In part, the limitations stated that operators of the airplane were prohibited from aerobatic flight, which is an intentional maneuver involving an abrupt change in attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight.

FAA records indicate that the experimental, amateur built, single-engine airplane was manufactured by Samuel L. Upton. The airplane model was called a Bakeng Duce, and it bore serial number 572. The airplane was equipped with a 140-horsepower, Lycoming O-290D engine that was installed in the airplane's wood frame structure.

The airplane was equipped with two seats, in a tandem configuration, and dual flight controls. The airplane could be flown from either seat.

According to the airplane's owner, the pilot in the rear seat was the FAA certificated mechanic who performed a conditional (annual) inspection on the airplane on May 2, 2009, at a total airframe time of 480 hours. Although the airplane is equipped with dual flight controls, the rear seat's instrument panel contains more instruments, including circuit breakers, than the front seat's panel.

## METEOROLOGICAL INFORMATION

Witnesses located within less than 1 mile from the accident site reported that the sky condition was clear, and the wind was light and variable. The visibility was not restricted.

Ramona Airport is located about 8 miles west of the accident site. At 1453, it reported having a clear sky with 10 miles visibility.

## WRECKAGE AND IMPACT INFORMATION

The main wreckage was located in an open, near level, field at the following global positioning system coordinates: 32 degrees 59.319 minutes north latitude by 116 degrees 46.969 minutes west longitude. The field elevation was about 1,840 feet mean sea level (msl).

FAA and airplane recovery personnel reported finding fragmented airplane parts in the field, between 0.1 and 0.3 miles east-northeast of the main wreckage. The airplane's owner reported that his Bakeng Duce was destroyed upon impacting the ground and fragmenting into numerous pieces.

Photographs provided by the FAA indicated that the airplane came to rest on its right side. The entire empennage was attached to the fuselage. The cockpit was crushed and fragmented. The metal propeller and engine assembly were found together, adjacent to the firewall and main wreckage. Both wings were crushed, with multiple breaks observed in the forward and aft spars. The wings were broken from both their fuselage attachment points, and from their lift struts, which were bent. No evidence of fire or oil residue was observed on the empennage.

Safety Board personnel examined the airplane wreckage following its recovery. The flight control continuity to the rudder and elevator assembly was confirmed from the aft fuselage to the respective control surfaces.

The entire left wing spar was located, although it was broken in several locations. The left wing's aileron was found attached to the wing. The control cable continuity to the left wing's aileron was confirmed from the aileron to the fuselage.

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# National Transportation Safety Board - Aircraft Accident/Incident Database

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The right wing spar was found fragmented in numerous locations, mostly outboard of the location where the wing lift strut attaches to the wing. The right wing's aileron was found separated from the wing. Reportedly, it had been located about 0.1 mile east of the main wreckage, in the vicinity of numerous wood fragments.

An examination of the white colored left and right wing skin did not disclose any visible evidence of a colored paint transfer onto the skin. The painted skin exhibited numerous scratch marks and tears oriented in various directions. Not all pieces of skin were located.

## MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed on the pilots by the County of San Diego, California, Office of the Medical Examiner. The reports indicate that the cause of death for both pilots was multiple blunt force injuries.

The Medical Examiner and the FAA's Civil Aerospace Medical Institute, Oklahoma City, Oklahoma, performed forensic toxicology on specimens from the pilots. No evidence of ethanol or drugs of abuse were detected.

## TESTS AND RESEARCH

### Wood Spar Construction and Laboratory Examination

Several of the fractured and separated right wing spar segments (outboard of the lift strut-to-wing attachment point) were submitted to the Safety Board for analysis by the Office of Research and Engineering, Materials Laboratory, Washington, D.C. In pertinent part, the laboratory's examination of fractured right wing spar components revealed that the fractures at the inboard and outboard ends of one fragmented forward spar piece occurred primarily as splits along the grain of the wood. The splitting fracture indicated that the grain of the wood was not aligned with the longitudinal axis of the spar. An examination of one sample indicated that the average angle of deviation between the wood grain and the spar axis was approximately 12 degrees. A 12-degree angle of deviation would correspond to a slope of more than 1 in 5.

Laboratory personnel additionally noted that the misaligned wood grain was not apparent by viewing either the front or back surfaces of the spar. Wood strips had been attached to the top and bottom edges of sections of the spar, which precluded one's ability to observe the misalignment.

The effect of the misaligned grain orientation on the spar's strength was evaluated. According to a United States Department of Agriculture, Forest Products Laboratory General Technical Report, a grain offset angle of 12 degrees predicts that the bending strength decreases to a value between 30 and 70 percent of the strength for a structure with grain aligned with its axis. The FAA's publication (AC 43.13-1B) entitled "Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair," states that the maximum permissible grain deviation (slope of grain) is 1 in 15, or 3.8 degrees. The relative strength and stiffness of an airplane's wood wing spar is reduced when the grain structure within the spar is not oriented in a longitudinal direction, relative to the longitudinal axis of the spar.