Aviation Investigation Final Report

Location:	Whitewater, California	**Accident Number:**	WPR12FA203
Date & Time:	May 12, 2012, 19:15 Local	**Registration:**	N51336
Aircraft:	M SQUARED BREESE	**Aircraft Damage:**	Substantial
Defining Event:	Inflight upset	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The day before to the accident, the pilot flew from his home to a private airstrip about 60 miles away in order to attend a desert gathering of his ultralight association. The ultralight-like aircraft consisted of an aluminum tube framework with a single seat, an open fuselage, and fabric-covered aerodynamic surfaces, and was powered by a 60-horsepower engine and was equipped with a rocket-powered parachute. The next day, the pilot flew about 15 miles to another private airstrip and flew back to the gathering a few hours later. Although the gathering was scheduled to continue one more day, in the late afternoon, the pilot decided to depart for his home airport. Before his departure, he had a brief discussion about the headwind with another association member. When the aircraft was about halfway to its destination, in a region of mountainous terrain, two witnesses observed it flying about 400 feet above the ground. They believed the aircraft to be in trouble because the wings were rocking. The aircraft made a 270-degree turn, pitched up and over to the inverted position, and began a steep, nose-down descent. The pilot deployed the rocket-powered aircraft parachute, but the parachute did not arrest the descent. The aircraft struck the ground in a steep trajectory in a steep nose-down attitude. Examination of the aircraft did not reveal any preimpact mechanical failures or deficiencies that would have prevented continued flight or the deployment and functioning of the parachute system. Although all but one of the parachute system's shroud lines were cut, their as-found location and appearance indicated that they were cut after the accident—most likely to prevent the canopy from inflating and disturbing the wreckage.

About the time of the accident, a meteorological station 2 miles from the accident site recorded 31 mph wind , with gusts to 47 mph. Witnesses also reported that it was very windy, and one ultralight pilot familiar with the area reported that the area was notorious for strong winds and rotors. Although the pilot was not the owner, he was considered to be highly experienced and quite familiar with the aircraft. Although the specific reasons for the failure of the parachute to arrest the descent could not be determined, the high wind, turbulence, initial descent attitude and trajectory, and low deployment altitude likely all contributed to that failure. Additionally, the pilot regularly left the safety pin for the parachute activation handle in during flight, which may have delayed his activation of the system.

Probable Cause and Findings

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

The pilot's decision to fly at low altitude in mountainous terrain in the presence of strong wind and turbulence, which resulted in an aerodynamic upset at too low an altitude for recovery.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Expectation/assumption - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	(general) - Capability exceeded
Aircraft	Parachute - Capability exceeded
Environmental issues	High wind - Contributed to outcome

Factual Information

History of Flight

Enroute-cruise	Turbulence encounter
Enroute-cruise	Inflight upset (Defining event)
Uncontrolled descent	Turbulence encounter
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On May 12, 2012, about 1915 Pacific daylight time, an experimental light sport M-Squared Breese DS, N51336, was substantially damaged when it impacted terrain near Whitewater, California. The pilot received fatal injuries. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no Federal Aviation Administration (FAA) flight plan was filed for the flight.

The pilot was a member of the Ultralight Squadron of America, which was a southern California chapter of the U.S. Ultralight Association. According to other members of the association, the pilot and the aircraft were based in Perris, California. The day before the accident, the pilot flew the aircraft from Perris to a private strip in Joshua Tree, California, and then to Kelly Airport (CA51), a private strip in Lucerne Valley, California, where the association was holding a weekend event. The morning of the accident, he again flew to Joshua Tree and back. He did not fly the aircraft any more that day, until he departed for Perris about 1830.

Although the gathering was scheduled to continue overnight and into the next day, for unknown reasons, the pilot decided to return home that evening. Just prior to leaving CA51, the pilot told a colleague that due to headwinds, he (the pilot) had "better leave now" if he wanted to get home before dark. The pilot did not mention any problems with his aircraft, and the two did not discuss the winds or upcoming flight any further. Several of the members present watched the pilot take off, and followed him visually until he was out of sight to the south. One witness reported that the flight looked "bumpy" as the pilot flew away.

About 1915, two persons in an automobile headed north near Whitewater noticed the aircraft a few hundred yards ahead of them, at an altitude they estimated to be about 400 feet above the ground. The aircraft was headed west, and it appeared to them that the pilot was having difficulty, due to the fact that the wings were "rocking." They then observed the aircraft begin a 270-degree left turn until it was headed approximately north. Just as the aircraft came around to a northerly heading, it "flipped" and began a rapid nose-down descent. They elaborated that the nose rose up and rotated over the tail so that the aircraft became inverted. The aircraft then went into a "nose dive," where the nose was pointed steeply down, and the aircraft trajectory was also steeply down.

The witnesses observed the aircraft launch a "flare," followed by a parachute. The parachute did not appear to fully open or help slow the aircraft's descent; it just started pulling the aircraft south, in the

direction of the wind. The aircraft impacted the ground several seconds later, still in a nose-down attitude, and the parachute then began to pull the aircraft with it. The witnesses stopped their car, attempted to render aid to the pilot, and telephoned 911 for assistance.

The witnesses declined to cite a value in seconds for how long the aircraft was in view; one stated that from the time from chute deployment to ground impact was "real quick."

One witness also estimated that he and the other witness arrived at the wreckage "less than a minute" after the impact.

According to Cal Fire documentation, the incident call was received about 1919, personnel and equipment were dispatched about 1923, and they arrived on scene about 1935.

PERSONNEL INFORMATION

FAA information indicated that the 50-year-old pilot held a sport pilot certificate for single engine land sport airplane. The certificate was issued in October 2010. The pilot had no FAA medical certification records, nor was he required to. Records of the pilot's flight time or experience were not obtained by the investigation.

A friend of the pilot reported that he himself flew near the accident locale on a relatively regular basis. The friend typically flew in that area at an altitude of 5,500 to 6,500 feet to remain at least 2,000 feet above ground level (agl), and that he preferred to "fly high," allowing significant clearance above the terrain, regardless of location. The friend reported that he never saw the pilot fly high, and instead always saw the pilot fly low, which he described as typically 1,000 to 2,000 feet agl. He and the other association pilots considered the pilot accomplished, and "nearly invincible"- in his opinion the pilot had "more than nine lives." The friend also reported that the pilot "wasn't one to check ahead" regarding weather conditions. The friend was uncertain as to how the pilot navigated, but he knew that the pilot was familiar with the route between his origin and destination.

Another friend of the pilot reported that it was the pilot's habit pattern, prior to each flight, to remove the "Remove Before Flight" streamer from the safety locking pin in the parachute activation handle, but leave the pin that it was attached to in place for the flight.

MEDICAL AND PATHOLOGICAL INFORMATION

The Riverside County California Sheriff, Coroner Division, autopsy report indicated that the cause of death was "multiple blunt impact injuries." The FAA Civil Aeromedical Institute conducted forensic toxicology examinations on specimens from the pilot, and reported that no carbon monoxide, cyanide, ethanol, or any screened drugs were detected.

AIRCRAFT INFORMATION

The aircraft was manufactured in 2007, and was equipped with a 60 hp HKS 700E series engine. The owner of the aircraft estimated that it had a total time in service of about 210 hours, and that the pilot had about 9,000 total hours of flight experience.

The specification sheet for the same aircraft powered by a 54 hp Rotax engine cited the following speeds:
Power off stall – 27 mph
Landing approach – 31 mph
Best angle of climb – 36 mph
Design maneuvering – 55 mph
Never exceed – 74 mph

Cruise speed varied as a function of power, and ranged between 38 and 74 mph for 55 to 100 percent power, respectively. However, the specification sheet also cited a "Max Level Speed, Sea Level" value of 68 mph.

In 2009, the owner installed a rocket-powered Ballistic Recovery Systems (BRS) brand aircraft parachute. The installed system was a model BRS-6 800 series. The main bridle was the primary load bearing connection between the parachute and the aircraft, and was affixed to a single attach point on the top of the aircraft. The rocket and parachute were mounted on the bottom of the aircraft. The bridle was routed from the bottom to the top of the aircraft, and stowed using breakaway straps to secure it to the airframe until the rocket and parachute were deployed.

The installation and operating instructions for the parachute system explicitly stated that the engine must be shut down prior to activation of the rocket and parachute. This was intended to prevent capture, cutting, and/or entanglement of the main bridle by the propeller. When properly installed, the parachute system was designed to suspend the aircraft in a wings-level, slightly nose low attitude.

BRS specified a maximum deployment speed of 138 mph. BRS operating guidance stated that there have been successful deployments as low as 100 feet above the ground, but that the number of variables affecting the operation and deployment prevented citation of any minimum deployment altitude.

METEOROLOGICAL INFORMATION

The 1950 automated weather observation at a National Oceanic and Atmospheric Administration station located less than 2 miles northwest of the impact site included winds from the west-northwest at 31 mph, with gusts to 47 mph. One association pilot familiar with flying in the accident locale reported that the area of the accident site was "notorious for rotors" (strong, horizontal vortices) and strong winds.

FAA Advisory Circular AC 00-6A, Aviation Weather, stated that the main causes of turbulence include obstructions to wind flow. Obstructions such as rough terrain disrupt smooth wind flow into a "complex snarl of eddies." An aircraft flying through these eddies experiences turbulence. This turbulence is classified as "mechanical" since it results from mechanical disruption of the ambient wind flow. The degree of mechanical turbulence depends on wind speed and roughness of the obstructions. The higher the speed and/or the rougher the surface, the greater the turbulence.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest inverted, in desert terrain foothills. The inverted fuselage was oriented on a magnetic heading of 338 degrees. The first identified point of contact was an impact crater, which was about 10 feet from the wreckage. The crater had a ground scar on the right side (when facing along

impact direction) that was similar to the dimension of the right wing; this ground scar was oriented about 330°. The main wreckage was at GPS coordinates of 33.9327 N and 116.6419 W.

All major components were present, and all remained attached, or partially attached, to the aircraft. The forward section of the fuselage was crumpled aft, and the right wing sustained significant crush and crumple damage in the inboard and aft directions. The left wing was nearly intact, with the exception of some fractured tubing. The empennage support structure was bent in the up direction.

The flight control surfaces included ailerons, elevator, and rudder, and control continuity was established for all flight controls. All observed damage was consistent with impact damage signatures.

Evidence was consistent with intentional deployment of the rocket and parachute; the activation handle was extended about 3 inches out from its stowed position. The rocket casing components were found about 160 feet west-southwest of the aircraft, and the rocket was found about 320 feet west-southwest of the aircraft.

The main bridle remained attached to the top of the aircraft, and had cleanly separated (per design) from its stowed position on the airframe. The lack of scuff marks or localized crushing in the vicinity of the main bridle attach point was not consistent with the aircraft being suspended by the parachute.

The parachute remained attached to the aircraft, and was located about 30 feet south of the aircraft. The parachute canopy and main bridle were undamaged. However, all shroud lines except one were severed near the parachute end of the main bridle. The cut lines were found in a similar position and orientation as the uncut line. The cuts and the lie of the lines were consistent with the lines being purposefully and neatly cut post-accident, but the investigation was unable to determine when, why, or by whom they were cut.

The engine was displaced from its mounts, but showed no evidence of catastrophic failure. The oil filter was undamaged. The inline fuel filter was clear. The spark plugs were securely affixed in their respective cylinder receptacles, and the ignition harness appeared undamaged.

The engine was equipped with two carburetors and two air filters. The filters appeared similar in color to one another, and were undamaged. The pilot's throttle moved freely from stop to stop, and the throttle controls moved freely from stop to stop on each carburetor. The choke control cable was fracture-separated at its control box attach point. Both choke controls operated freely by hand.

Two of the three propeller blades were essentially undamaged. The third blade was fractured near the two-thirds span position, through about three quarters of the chord. The propeller condition was consistent with lack of propeller rotation at impact. Neither the parachute main bridle nor any shroud lines were tangled in the propeller.

The observed damage was consistent with the witness' reports of a steep nose-down trajectory and attitude to impact. At the time of the accident, the pilot was wearing a helmet, and was buckled into his lap-and shoulder-restraint harness system.

Pilot Information

Certificate:	Sport Pilot	**Age:**	50
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Sport pilot None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	M SQUARED	**Registration:**	N51336
Model/Series:	BREESE DS	**Aircraft Category:**	Airplane
Year of Manufacture:	2007	**Amateur Built:**	
Airworthiness Certificate:	Experimental light sport (Special)	**Serial Number:**	29652
Landing Gear Type:	Tricycle	**Seats:**	1
Date/Type of Last Inspection:	July 9, 2011 Condition	**Certified Max Gross Wt.:**	650 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	210 Hrs at time of accident	**Engine Manufacturer:**	HKS
ELT:	Not installed	**Engine Model/Series:**	700E
Registered Owner:	John Karevoll	**Rated Power:**	60 Horsepower
Operator:	John Karevoll	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	WWAC,2546 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	19:50 Local	**Direction from Accident Site:**	320°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	27 knots / 40 knots	**Turbulence Type Forecast/Actual:**	/ Terrain-Induced
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/ Unknown
Altimeter Setting:		**Temperature/Dew Point:**	24°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lucerne Valley, CA (CA51)	**Type of Flight Plan Filed:**	None
Destination:	Perris, CA	**Type of Clearance:**	None
Departure Time:	18:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	33.932777,-116.641944

Administrative Information

Investigator In Charge (IIC):	Huhn, Michael
Additional Participating Persons:	Nathan Dickinson; FAA FSDO; Riverside, CA Greg Ellsworth; BRS; Minneapolis, MN
Original Publish Date:	September 29, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=83616