Aviation Investigation Final Report

Location:	Pearce, Arizona	**Accident Number:**	LAX06LA141
Date & Time:	April 12, 2006, 15:00 Local	**Registration:**	N732RA
Aircraft:	Velocity XL-RG	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Flight test		

Analysis

The airplane departed controlled cruise flight, completed two descending 360-degree turns, and collided with desert terrain. The purpose of the accident flight was for the pilot to execute a 3-hour flight test mission following a predetermined test plan that he had created. The plan prescribed that he would perform a series of maneuvers (including stalls) all of which were to be conducted above 2,000 feet above ground level (agl). Witnesses heard the engine sputter and observed smoke emitting from the airplane. The airplane began to spiral and completed two 360-degree turns while descending. Prior to ground impact, the airplane assumed a wings level configuration and descended nearly vertically toward flat desert terrain. The airplane impacted with little horizontal velocity. A United States Air Force squadron commander who was operating a jet in the accident area the day of the accident stated that he had previously coordinated simultaneous operations with the accident pilot. The commander did not hear or receive a radio call from the accident pilot nor did he make visual contact with the airplane, as he had anticipated. The accident pilot was in communication with Air Route Traffic Control Center (ARTCC) personnel and receiving traffic advisories. The pilot's last known communication occurred about 8 minutes prior to the accident. The radar data revealed that the airplane was in cruise flight heading southwest between 4,300 and 4,600 feet agl. The last radar return was recorded approximately 0.58 nautical miles (nm) northeast of the accident location. The accident airplane, an experimental amateur-built that was purchased by the operator for a classified research program, was typical of other Velocity models in its assembly and design configuration. The airplane was loaded with an aft center of gravity (CG) that was 0.4 inches aft of the kit manufacturer's recommended CG envelope; however, the kit manufacturer said the airplane would have been controllable without adverse handling characteristics. The pilot's actions and the airplane's flight characteristics were recorded during the flight by data acquisition units and any deviation from the test card would have been seen by the operator upon the return of the flight. Witnesses in the area observed clear skies at the time of the accident. The airplane and all the equipment onboard were thermally destroyed. During the post accident examinations of the wreckage, no anomalies were found

with the airframe or engine.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a departure from controlled flight for undetermined reasons, resulting in a collision with terrain.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
2. TERRAIN CONDITION - GROUND

Factual Information

1.1 HISTORY OF FLIGHT

On April 12, 2006, about 1500 mountain standard time, a Velocity XL-RG, N732RA, descended into desert terrain near Pearce, Arizona. Raytheon Missile Systems (RMS) was operating the airplane under the provisions of 14 CFR Part 91. The airline transport pilot, the sole occupant, sustained fatal injuries; the airplane was destroyed. The local test flight departed from Tucson International Airport, Tucson, Arizona, at 1438. Visual meteorological conditions prevailed and a flight plan had not been filed.

The operator reported that the purpose of the accident flight was for the pilot to execute a 3-hour mission around the Tombstone Military Operations Area (MOA). RMS employees all stated that the flight test protocol that the pilot was to follow encompassed a series of predetermined maneuvers.

A RMS representative stated that the accident flight was the first test plan out of a series of planned test flights. The purpose of the first test plan flight was to perform an operational check of the data recording equipment on the airplane, which included the video recorders and attitude sensors. A secondary objective of the flight was for ground operations to determine if they could receive a signal from the telemetry equipment onboard the airplane. The flight was not to exceed 3 hours. The second test plan to occur later in the week was the flight in which the telemetry data would be tested.

1.1.1 Witnesses

Several witnesses reported observing the airplane prior to impact. One witness, who was also a pilot, stated that when he initially spotted the airplane it was fairly high. As the airplane approached his location, he began to hear the engine sputter; it would momentarily stop for several seconds and then start again. The engine continued the sputtering pattern and the airplane began a clockwise spiral. As the engine continued to sputter, the airplane completed two full 360-degree revolutions (spirals) while descending. During the third revolution, the airplane maneuvered into a wings level configuration and descended toward terrain. The airplane disappeared from the witness's line of sight but he subsequently observed black smoke; he could no longer hear engine noise.

A National Transportation Safety Board investigator interviewed a Lieutenant Colonel with the United States Air Force who was the commander of the Fairchild-Republic A-10 squadron that was operating in the Tombstone MOA the day of the accident. He stated that the accident pilot contacted the squadron about 2 weeks prior to the accident with regards to coordinating operations in the Tombstone MOA. The accident pilot specifically asked if it was possible for

the RMS airplanes to utilize the MOA if prearranged with the Air Force. Several days later the squadron replied to his request stating that, as the schedule permitted, the accident pilot would be able to coordinate a shared utilization of the airspace.

The Lieutenant Colonel further stated that on the day of the accident, the accident pilot had requested to share the Tombstone airspace. The accident pilot had arranged that he would maneuver at 9,000 feet mean sea level (msl) and below, and the A-10 pilots would operate at 10,000 feet msl and above. The Lieutenant Colonel, call sign Atlas-1, arrived with a wing commander (flying another A-10) in the Tombstone airspace and both were expecting to hear a radio call from the accident pilot. As part of his normal procedures, the Lieutenant Colonel was simultaneously monitoring the tactical UHF (ultra high frequency) and the AM VHF (very high frequency). During the flight, he neither heard nor made visual contact with the accident pilot or airplane. He did, however, observe black smoke in the distance during his flight, that he believed to be from a burning farm field.

The Lieutenant Colonel reported that the accident pilot was an experienced A-10 pilot and would know all of the radio frequencies in the area; he additionally possessed an in-flight guide of the area. The Lieutenant Colonel expected the accident pilot to make a radio call about 5 to 10 miles before reaching the boundary of the Tombstone MOA airspace in an effort to make a deconflicting entry. He also believed that the accident pilot would have known to contact him on the AM VHF when entering the MOA.

1.1.2 Radar and Communications

Air Traffic Control (ATC) communication audiotapes from the Tucson Air Traffic Control Tower (ATCT), Tucson Terminal Radar Control Facility (TRACON), and the Albuquerque Air Route Traffic Control Center (ABQ ARTCC) were provided to the Safety Board investigator for review. The initial transmission made by the accident pilot occurred at 1423, when he contacted clearance delivery at Tucson International Airport. The pilot was given a discrete beacon code of 0411 and subsequently transferred to ground control followed by the local control frequency. At 1430, an ATC controller cleared the pilot for takeoff. The pilot contacted Tucson TRACON about 1436 while transitioning from 4,700 feet msl to 9,500 feet msl. The pilot stated that his intended destination was the Tombstone MOA. Tucson TRACON terminated radar service at 1446, and the pilot was instructed to change his beacon code to reflect the common visual flight rule (VFR) squawk (1200) and contact ABQ ARTCC.

The pilot contacted ABQ ARTCC at 1447, indicating he was located 40 miles east of Tucson. The controller issued the pilot a discrete beacon code of 0702 for flight following services. A minute later, the pilot confirmed with the controller that he would remain on ABQ ARTCC frequency rather than share the military frequency. The pilot additionally requested traffic advisories regarding the military operated A-10 airplanes within the MOA. He assured the controller that traffic coordination had already been made with the "Atlas 1" (A-10) airplane in the vicinity. At 1452, the controller issued a traffic warning of an A-10 airplane in his vicinity operating at 12,500 feet msl. The pilot stated that he had a previous agreement with the A-10

airplanes in the area where they would occupy the airspace at or above 10,000 feet msl, and he would remain below 10,000 feet msl. At 1459, the controller stated that radar contact had been lost due to the aircraft being below radar coverage.

Recorded radar data covering the area of the accident was supplied by the Federal Aviation Administration (FAA) in the form of a National Track Analysis Program (NTAP) printout from the ABQ ARTCC. The radar data was examined for the time frame, and both 0411 and 0702 beacon codes were observed that matched the anticipated flight track of the airplane en route from Tucson to the Tombstone MOA. ABQ ARTCC radar data consisted of equidistant radar returns from 1445:02 to 1449:48, and from 1454:10 to 1458:56. The data indicated that the airplane was flying in a southeasterly direction towards the Tombstone MOA.

The radar target was first identified at 1445:02 on a Mode C reported altitude of 9,800 feet msl. During the proceeding 7 minutes, radar returns disclosed a gradual descent to 9,000 feet msl. Radar returns revealed a slight increase in altitude at 1456:21 to 9,300 feet msl before radar contact was lost at 1458:56. The radar plot stretched over a distance of approximately 13.52 nautical miles (nm) in 11 minutes 19 seconds, equating to a radar-derived ground speed of about 72 knots. The last radar return was recorded southwest of the accident location, approximately 0.58 nm from the accident location on a true course of 106 degrees.

1.2 PERSONNEL INFORMATION

According to FAA Airman and Medical Certification records, the pilot held an airline transport pilot certificate with airplane ratings for single and multiengine land; he held a type rating for the Boeing 737. His certificate also was endorsed for commercial privileges for airplane single engine land. The pilot's most recent first-class medical certificate was issued without limitations in November 2004.

The pilot was a former United States Air Force fighter pilot with 22 years experience in various capacities. During his time as an Air Force Officer, the pilot accrued over 4,500 hours of flight time. The pilot's most recent personal logbook covering the period from March 15, 2006, to the date of the accident, indicated that he had amassed a total of 5.4 hours of flight time during three flights in the Velocity. The last recorded flight in the logbook was 2.3 hours and occurred on March 29, 2006; the remark section of the logbook indicated that it was an airplane familiarization and company checkout flight. On March 15, 2006, an instructor signed the logbook stating that the accident pilot had completed 3.0 hours of Velocity flight transition training ground school.

According to a RMS employee, the accident pilot had flown one prior flight with RMS where he and another test pilot flew a different Velocity as an airplane familiarization flight. He stated that the accident pilot was the chief pilot and head of flight operations for the program the accident airplane was involved in. In that capacity, the accident pilot had developed the test plans and sequence in which the program was to operate. The accident pilot developed the accident flight test plan.

A Safety Board investigator interviewed two certificated flight instructors (CFI) that were employed by Velocity, Inc. They stated that four pilots from RMS enrolled in a transition training course in mid March 2006. One CFI conducted the initial flight portion of the training with the accident pilot encompassing 2.3 hours in a Velocity 173 FG. He recalled that, although the pilot had limited experience with piston engine airplanes, he was a "very good pilot" and classified him as "better than average." The CFI also reported that once airborne, the accident pilot had conveyed his interest of seeing the limitations and capabilities of the airplane in-flight.

The other CFI provided ground school for the accident pilot and additionally conducted a training flight. The flight, totaling 0.8 hours in the Velocity XL-RG, was given on the same day as the pervious flight and provided to train the pilots on the model they were going to be flying. The CFI stated that the accident pilot had a good attention to detail. The pilot told him that he wanted to practice lazy-eight and chandelle maneuvers in an effort to feel the airplane's flight characteristics. They performed several such maneuvers and did a 2-g recovery pull-up.

1.3 AIRCRAFT INFORMATION

Velocity, Inc., sold the canard airplane as a kit, which was mostly composed of structure glass, electrical glass, and carbon fiber. The original builder of the Velocity, Inc., XL-RG airplane, serial number 3RX085, purchased the kit on April 17, 2000, and thereafter, constructed the airplane at the Velocity, Inc., facilities in Florida. The airplane was subsequently issued an experimental airworthiness certificate on August 05, 2000, by a Designated Airworthiness Representative (DAR). The operation limitations set forth by the DAR required that the amateur-built airplane complete 40 hours of flight to show that the airplane was safe for flight, before the experimental airworthiness certificate would be issued.

The airplane was equipped with a 260-horsepower Textron Lycoming reciprocating IO-540-D engine, serial number L-247-48. Attached to the engine was a MT CS wood three-blade propeller.

The most recent annual inspection, airframe and engine, was recorded as accomplished on March 01, 2006, at a Hobbs time of 454.1 hours (about 17 flight hours prior to the accident). At that time, the engine had accumulated about 4651.4 hours, and 454.1 since the last major overhaul. Review of the operator's aircraft status sheet and maintenance department records disclosed that there were no unresolved discrepancies at the time the pilot flew the airplane.

A Safety board investigator interviewed the pervious owner of the accident airplane, who was additionally the builder. He stated that he flew the airplane regularly from the time of conception to when he sold it to RMS in the latter part of March 2005.

1.3.1 Configuration

A Safety Board investigator both interviewed and gathered written statements from several RMS engineers that had knowledge of the accident airplane and the systems installed in it. Most helped with the installation and implementation of the equipment in the accident airplane.

The employees stated that, for the purposes of classified research, the airplane was modified. The aft left seat was removed and equipment, primarily a laptop computer, was installed in its place. An additional pitot-static tube was installed on the nose of the airplane. There was a block camera mounted in the front of the airplane in lieu of the removed landing light; the camera was powered by the same wiring that was previously used for the light. Inside the cockpit, a video camcorder was installed on the top of the cabin, positioned to obtain, footage of the instrument panel from the pilot's perspective and an outside view.

For data collection purposes, the airplane was equipped with a Piccolo II autopilot, which was connected to the newly installed pitot-static tube. The Piccolo unit was to serve only as a data recording device for the accident flight. The unit, which had telemetry capabilities, contained sensors that would transmit information on the position, orientation, and status of the airplane over a UHF of 900 megahertz. The telemetry data could only be received about 8 to 10 miles line-of-sight from the ground station.

A laptop computer was powered via an A/C power inverter to the cigarette lighter in the airplane. The laptop was recording the image data from the block camera, as well as recording the information from the hard wired Piccolo unit. The systems were powered from the airplane's 12-volt battery in the front nose baggage area. Both systems were routed to a circuit breaker that was previously used for a stereo and DVD system, which had been removed.

The pilot was to turn the overhead camcorder "on" when beginning the test card maneuvers in an effort to use the 60 minutes of video time appropriately; this was to be the only equipment the pilot would have interacted with during the accident flight.

1.3.2 Center of Gravity (CG)

The operator provided a Safety Board investigator with the accident airplane's weight and balance information. A RMS representative reported that an evaluation of the ranges of weight and balance were performed when the airplane was received in April 2006. Prior to departure on the accident flight, the airplane was weighed, with the pilot on board, via a three-scale weighing system (i.e. one scale positioned beneath each landing gear). Subsequent to the initially weighing, the airplane was fueled to maximum capacity and the final weight and balance was equated to:

-Total Gross Weight: 2,328 pounds
-CG: 134.4 inches

The accident pilot was presented the calculated weight and balance data, which he approved as being acceptable for the flight test.

The Velocity Owner's Flight Manual, "Limitations" section provides the following CG limits: FORWARD: 127.0 inches and AFT: 134.0 inches. Velocity, Inc., developed a CG box to establish these numbers by utilizing flight testing and aerodynamic calculations. The manual states that ideally, the CG should allow for the airplane to maintain a 2:1 loading on the canard wing versus the main wing. With the canard wing situated at a greater angle of attack than the main wing, a stall will first be induced from the canard wing.

In written correspondence with a Safety Board investigator, the Vice President of Velocity, Inc., reported that the accident airplane was typical of other Velocity XL-RG models in its assembly and design configuration. Aside from variations in the accident airplane's operating weight and balance, it would be expected to exhibit similar flight handling and stall characteristics to other Velocity XL models.

Velocity, Inc., recommends 2,700 pounds as the maximum gross takeoff weight. Using the nose of the airplane as the datum point, the company recommends a CG range of 127 inches to 134 inches. The Vice President described that at the rear most 134-inch CG limit, the aircraft exhibits a stall speed approximately 5 knots lower than normal, which would be approximately 60 to 64 knots. In addition, the airplane will have a sensitive pitch response and decreased pitch stability. At 0.75 inches aft of the aft limit, it would be consistent with neutral pitch stability. He further stated that for low-time pilots and pilots with a heavy control hand, this configuration would probably lead to pilot induced pitch oscillations. At 1.5 inches aft of the CG limit the airplane would display negative pitch stability. He added that pilots who know what to expect and who have experience with aircraft that necessitate light control force would have no problem flying the airplane at 134.4 inches aft of datum. However, for most pilots, the ride would be uncomfortable due to the "pitchiness" of the airplane in turbulent air conditions.

1.3.3 Stalls

The Velocity Owner's Flight Manual contains a section titled, "Stall and Low Speed Handling Characteristics." It states that the low speed range (below 65 knots) is "characterized by a doubling of the force required to hold the stick aft, tending to keep the inattentive pilot at a more normal flying speed." The manual further states, "aft of the aft cg limit, the Velocity may be susceptible to aft wing stall, which, while recovered with forward stick, can result in a stall break with a high sink rate."

The Flight Manual additionally provides a recommended entry speed for stalls as a "slow deceleration" and the accelerated stall at 110 knots. It states that intentional spins are not permitted. Pertinent excerpts of the manual are contained in the public docket for this accident.

According to industry publications, in a canard-type airplane it is preferable for the canard wing

to stall prior to the main wing. This will result in the nose lowering and thus slightly accelerating the airplane and maintaining normal controlled flight.

The predecessor of the accident Velocity XL-RG airplane was introduced in 1985. The first models built and flown revealed a tendency to enter a deep stall while at high angles of attack. Although the early Velocity models could be flown at normal attitudes without mishap, a deep stall could be purposely induced from which experienced test pilots could not recover.

There are two documented incidences where deep stalls were encountered. Both of the experienced test pilots indicated that the airplanes stalled at an angle of attack of about 40 to 60 degrees, and "locked" in a non-rotating descent with an almost flat angle to the horizon. Despite efforts to push the nose down by the control stick, rocking the wings and even manually attempting to manipulate the center of gravity forward by shifting their body weight forward, neither pilot was able to recover from the stall. As both airplanes collided with terrain, both pilots remained unharmed due to the slow 1,000 foot per minute descent rate. In both cases, the airplane was within its normal weight and balance envelope.

The unusual descent characteristics of the deep stall have been explained as a result of trapped vortices above the main wing of the Velocity. Following the incidents, the Velocity wing design was changed to an extended trailing edge, which, according to the original designer, prohibits the airplane from entering a deep stall.

1.4 METEOROLOGICAL INFORMATION

The closest weather observation station to the accident site was in Pearce, located about 5 nm to the southwest. The weather reporting unit, KAZCOCHI1, stated the following at the time of the accident: winds 5 miles per hour from the east southeast; temperature 26 degrees Celsius; altimeter 29.80 inches of mercury; humidity 10 percent. Witnesses in the area all reported clear skies at the time of the accident.

1.5 WRECKAGE AND IMPACT

The airplane came to rest situated on level desert terrain, comprised of dirt and brush. The accident site was several nautical miles north of the Tombstone MOA and about 54 nautical miles east of Tucson. The global positioning satellite (GPS) coordinates for the crash site were 31 degrees 52.659 minutes north latitude and 109 degrees 52.952 minutes west longitude, at an elevation of 4,715 feet.

The airplane wreckage was located in the Sulphur Springs Valley, which was nestled between the Chiricahua Mountains to the east, Dragoon Mountains to the west, and the Pinaleno Mountains to the north. The valley floor stretches about 25 nm from east to west, and is comprised of relatively flat desert terrain at an average of 4,300 feet msl. The wreckage was about 5 nm east of Mount Glen, the highest peak in the Dragoon mountain range towering at 7,250 feet.

The airplane control surfaces and components were all contained within the immediate vicinity of the accident site; only shards and fragments of propeller blades were surrounding the wreckage. Located about 10 feet northwest of the airplane was a ravine that was oriented along a northeast to southwest direction. A row of brush measuring about 5 feet in height was between the ravine and the wreckage; the brush was burnt.

An impact ground scar was found about 60 feet from the wreckage on a magnetic bearing of 040 degrees. It was comprised of an oval depression in the hard dirt consistent in shape and size with the width of the fuselage. Adjacent to the ground scar was a bush that appeared freshly severed and crushed downward. Pieces of the propeller blades were found in between the ground scar and the wreckage.

The fuselage was found right side up in a flat dirt area with the nose oriented at 315 degrees. The canard and main aft wings remained associated with the fuselage in the normal position. The entire airplane was thermally destroyed with the exception of numerous fragments of the composite propeller, which were found in the immediate vicinity of the wreckage. The ashen remains of the vertical stabilizers remained associated with their respective outboard aft main wing sections.

Cockpit contents and debris associated with the cabin were found inside the burnt fuselage and consisted of molten plastics and ash. The instruments were thermally consumed and appeared devoid of discernable markings. The electrical system was completely consumed. The firewall, originally constructed of a laminated plywood and stainless steel, sustained crush deformation.

Examination of the thermally destroyed wreckage disclosed that the landing gear struts and tire cords were in their respective wheel wells. According to the Raytheon representative, the landing gear was intact and its position was consistent with being retracted.

Within the ashen remains of the fuselage were steel control cables, which remained in the approximate geometry of their cable runs from the remains of the fuselage to the flight control surfaces. Flight control continuity could not be established due to the extent of the fire damage.

The thermally destroyed remains of what appeared to be electrical equipment were found in the aft portion of the fuselage.

1.6 MEDICAL AND PATHOLOGICAL INFORMATION

The Cochise County Office of the Medical Examiner, Tucson, Arizona, completed an autopsy on the pilot. The FAA Toxicology and Accident Research Laboratory performed toxicological testing on liver and muscle specimens of the pilot. The test results were negative for ethanol and other tested drugs.

1.7 TESTS AND RESEARCH

Following recovery, the airplane was examined under the supervision of a Safety Board investigator and an inspector from the FAA at the storage facility of Air Transport, Phoenix, Arizona. Also present for the investigation were representatives from Raytheon Aircraft Corporation and Textron Lycoming engines.

Investigators separated the engine from its respective mounts. The entire casing and all engine accessories sustained thermal damage. External examination revealed that the magnetos, accessory housing, oil pan, and fuel servo were destroyed by fire. Cylinder number 5 and the adjacent section of the crankcase were partially melted, exposing the crankshaft. Investigators were not able to rotate the crankshaft due to the thermal damage of the engine.

Investigators visually established continuity of the crankshaft, camshaft, valve train, pistons, and accessory gearing. The oil pump housing was melted, revealing the internal gears, which were intact and showed no abnormal wear signatures.

Investigators removed the top spark plugs; the electrodes were gray and circular with similar gaps. According to the Lycoming representative, they revealed signatures consistent with normal operation. Investigators utilized a lighted borescope to examine each cylinder; no mechanical deformation or anomalies were observed.

1.8 ADDITIONAL INFORMATION

1.8.1 Test Card

The test card for the accident flight was provided to a Safety Board investigator and is contained in the public docket for this accident. The flight, Terminal Maneuver Assessment Test 1, had a written objective to "Gain understanding of the Velocity's ability to meet the customer's requirements for terminal maneuvers." These maneuvers encompassed the following seven objectives:

1. Handling characteristics
2. Complete stall series
3. 90-degree roll-ins to selective dive angles (note- increase dive angles by 10 to a maximum of approximately 50-degrees)
4. Bunts to selected dive angles
5. Straight ahead pops - vary climb and dive angles
6. Repeat series at 10,000, 5,000, and 500 feet above ground level (agl) (low altitude pops to level flight)
7. Low altitude (500 feet) handling characteristics.

There were pen markings that crossed out the 500 feet parameter in objective 6 and another

strike through the entire objective 7. A hand-written note was made next to those objectives that stated the hard deck was to be at 2,000 feet agl.

1.8.2 Wildlife

The Director of Bird Conservation at the Audubon of Arizona stated that the accident occurred in an area known as the Sulphur Springs Valley. She reported that the area has a heavily concentrated bird population, with it serving as a breeding ground in the winter. As spring approaches, the birds stage an exit and migrate north. It is common for birds in the area to catch the thermals along the range of the hills.

The director further stated that the most common bird population in that area is the red-tailed hawks that have an average wingspan of 49 inches and weigh about 2.5 pounds. Another typical inhabitant of the area is the Golden Eagle, which has a wingspan of about 79 inches and weighs around 10 pounds. She added that around the time of the accident the Sandhill Cranes were beginning their migration departing from the valley to migrate; they have a wingspan of 73 to 77 inches and weigh between 7 to 10 pounds.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	February 1, 2004
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	4500 hours (Total, all aircraft), 6 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Velocity	**Registration:**	N732RA
Model/Series:	XL-RG	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	3RX085
Landing Gear Type:	Retractable - Tricycle	**Seats:**	1
Date/Type of Last Inspection:	March 1, 2006 Annual	**Certified Max Gross Wt.:**	2700 lbs
Time Since Last Inspection:	17.3 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	471.4 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-D
Registered Owner:	Raytheon Missle Systems	**Rated Power:**	260 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TUS,2643 ft msl	**Distance from Accident Site:**	54 Nautical Miles
Observation Time:	14:55 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	14 knots / 14 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	260°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	32°C / -9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tucson, AZ (TUS)	**Type of Flight Plan Filed:**	None
Destination:	(TUS)	**Type of Clearance:**	VFR flight following
Departure Time:	14:38 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	31.884721,-109.893058

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe
Additional Participating Persons:	Craig Roberts; Federal Aviation Administration; Scottsdale, AZ Mike Gibbons; Raytheon Aircraft Company; Wichita, KS Troy Helgeson; Textron Lycoming; Williamsport, PA
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