Aviation Investigation Final Report

Location:	Belvidere, Kansas	**Accident Number:**	CHI04FA215
Date & Time:	August 7, 2004, 10:21 Local	**Registration:**	N190J
Aircraft:	Jorgensen Velocity XL-RG	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The amateur-built airplane was destroyed by a post-accident fire following an in-flight breakup and subsequent explosion during cruise flight. The non-instrument rated pilot called for a weather briefing and was told that an instrument flight rules advisory was issued for the one-western third of Kansas and that the departure airport was currently reporting marginal visual flight rules weather conditions. The pilot did not file a flight plan during the weather briefing. At the time of departure, the airport's weather observation system reported an overcast ceiling of 900 feet and a surface visibility of 5 statute miles with mist. Combining aircraft radar track data with several weather products indicated that the accident airplane was operating within an overcast cloud layer prior to the accident. Just prior to the accident, aircraft radar track data showed the airplane in a climbing left turn, followed by a descending left turn that continued until the last radar return at 5,700 feet msl. The calculated average descent rate was 2,000 feet/min between the last two radar returns. The last radar return was 0.64 nm northeast of the accident site. A witness to the accident reported hearing an airplane overhead, which was followed by an increase in engine noise. The witness stated he "looked up and saw the plane fall out of the clouds in [an] inverted flat spin, the wing broke off, then the plane burst into flames [and] fell straight to the ground." No anomalies consistent with a preexisting condition were observed during the post-accident examination of the airframe and engine.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The non-instrument rated pilot's VFR flight into known instrument meteorological conditions

and his failure to maintain aircraft control which resulted in an inverted flat spin, in-flight breakup, and explosion.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: CRUISE

Findings
1. (C) VFR FLIGHT INTO IMC - INTENTIONAL - PILOT IN COMMAND
2. (F) WEATHER CONDITION - CLOUDS

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
3. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
4. STALL/SPIN - INADVERTENT - PILOT IN COMMAND

Occurrence #3: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. WING - FAILURE,TOTAL

Occurrence #4: FIRE/EXPLOSION
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On August 7, 2004, at 1021 central daylight time, an amateur-built Jorgensen Velocity XL-RG, N190J, built and piloted by a private pilot, was destroyed by a post-accident fire following an in-flight breakup and subsequent explosion near Belvidere, Kansas. Instrument meteorological conditions prevailed along the route of flight. The personal flight was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 91 without a flight plan. The pilot was fatally injured. The cross-country flight departed Dodge City Regional Airport (DDC) at 1000 and was en route to Melbourne International Airport (MLB), Melbourne, Florida.

At 0923:29 (hhmm:ss), the non-instrument rated pilot contacted Wichita Automated Flight Service Station (AFSS) to obtain a visual flight rules (VFR) weather briefing for a flight from DDC to MLB. The pilot stated that his proposed departure time was 1000. The briefer told the pilot that an instrument flight rules (IFR) advisory was issued for the western one-third of Kansas and that DDC was currently reporting marginal VFR weather conditions. The pilot asked for and was provided the current weather conditions for Tulsa, Oklahoma. The pilot then asked about the marginal VFR conditions at DDC and was told that the conditions would continue until 1200. The pilot asked for and was provided the forecasted winds aloft for 6,000 and 9,000 feet mean sea level (msl). The briefing concluded with a discussion concerning the temporary flight restrictions (TFR) along the proposed route of flight. The pilot did not file a flight plan during the briefing. The weather briefing concluded at 0926:48.

Aircraft radar track data was collected from the Kansas City Air Route Traffic Control Center (ARTCC). The data showed an airplane transmitting a VFR transponder code (1200) departing DDC at 1000:20. The radar facility's lower altitude limitation over DDC was about 3,000 feet msl. The airplane departed the DDC area to the southeast, between 3,500 and 3,600 feet msl. At 1002:15, radar contact was lost with the airplane approximately 6.2 nautical miles (nm) southeast of DDC.

At 1016:57, the radar facility began tracking an aircraft transmitting a VFR transponder code approximately 42.2 nm east-southeast of DDC and 6.5 nm west-northwest of the accident site. The airplane continued to the east-southeast, between 3,900 and 4,100 feet msl, until 1017:45 when radar contact was lost approximately 4.3 nm west-northwest of the accident site.

At 1020:21, the radar facility began tracking an airplane transmitting a VFR transponder code 0.8 nm south of the accident site. The airplane was at 5,600 feet msl established in a left climbing turn reaching 6,100 feet msl. The radar data then showed the airplane in a descending left turn until the last radar return at 1020:57. The calculated average descent rate

was 2,000 feet/min between the last two radar returns. The last radar return was 0.64 nm northeast of the accident site at 5,700 feet msl. The radar facility's lower altitude limitation over the accident site was about 5,500 feet msl. The accident site elevation was approximately 1,894 feet msl.

A witness to the accident reported hearing an airplane overhead, which was followed by an increase in engine noise. The witness stated he "looked up and saw the plane fall out of the clouds in [an] inverted flat spin, the wing broke off, then the plane burst into flames [and] fell straight to the ground."

DAMAGE TO AIRCRAFT

The airplane was destroyed during the in-flight breakup, explosion, and subsequent ground fire.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with an airplane single-engine land rating. The pilot was not instrument rated. FAA records show the pilot's last medical examination was completed on October 1, 2002, when he was issued a third-class medical certificate with the limitation "must wear corrective lenses & possess glasses for near & intermediate vision."

The pilot's flight logbook was reviewed and total flight times were calculated as of the accident flight. The pilot had a total flight experience of 614.0 hours, all of which were in single-engine airplanes. He had logged 520.0 hours as pilot-in-command (PIC). The pilot had no experience in actual instrument conditions and 3.2 hours in simulated instrument conditions. He had logged 25.1 hours of night flight experience.

The pilot had flown 88.1 hours during the past year, 36.7 hours during the prior 90 days and 10.8 hours during the previous 30 days. The accident flight was 0.3 hours in duration and was the only flight time accumulated on the day of the accident.

The pilot's first flight in a Velocity XL-RG model was logged on March, 13, 2000, and as of the accident flight, he had accumulated about 220 hours in the aircraft type. The pilot's last endorsement for a flight review, as required by regulation 14 CFR Part 61.56, was completed on May 13, 2003.

AIRCRAFT INFORMATION

The accident airplane was an amateur-built Jorgensen Velocity XL-RG, serial number 1. The Velocity XL-RG is a composite, canard-style airplane that incorporates a retractable landing gear and a constant speed propeller. The airplane has a swept wing plan form with large winglets that include rudder surfaces. The engine is mounted aft of the main cabin, between the left and right wings. The main cabin is configured to seat four occupants and has a

suggested maximum takeoff weight of 2,800 lbs.

The airplane was issued an experimental airworthiness certificate on March 25, 2000. The airplane was built, owned and operated by the pilot. The aircraft had a total service time of about 210 hours at the time of the accident, according to the pilot's flight logbook.

The airplane was equipped with a 300 horsepower Lycoming IO-540-C4B5 engine, serial number L-16352-48A. The IO-540-C4B5 is a six-cylinder, 540 cubic inch displacement, fuel injected, horizontally opposed, reciprocating engine.

The propeller was a wooden, three-bladed MT Propellers MTV-9-B/LD178-102, hub serial number 99078.

The maintenance logbooks were not recovered during the investigation. As a result, the maintenance history for the airframe, engine, and propeller are unknown.

The airplane was serviced with 29.4 gallons of 100 low-lead aviation fuel on August 7, 2004, at the departure airport. The accident occurred during the first flight after being refueled.

METEOROLOGICAL INFORMATION

The departure airport (DDC) was located 49 nm west-northwest of the accident site. The airport was equipped with an Automated Surface Observing System (ASOS) that reported the following weather conditions seven minutes prior to the accident airplane's departure:

At 0953: Wind 170 degrees true at 12 knots, visibility 5 sm with mist, overcast ceiling at 900 feet above ground level (agl), temperature 19 degrees Celsius, dew point 17 degrees Celsius, altimeter setting 30.05 inches-of-mercury.

The closest weather reporting location to the accident site was located at the Pratt Industry Airport (PTT), Pratt, Kansas, about 24 nm northeast of the accident site. The following weather conditions were reported by the PTT ASOS about ten minutes prior to the accident:

At 1010: Wind 160 degrees true at 7 knots, visibility 10 sm, overcast ceiling at 3,400 feet agl, temperature 18 degrees Celsius, dew point 14 degrees Celsius, altimeter setting 30.05 inches-of-mercury.

Infrared and visible satellite imagery indicated a broken to overcast layer of clouds extending over Kansas and Oklahoma, with several areas of vertical development associated with rain showers. The closest defined area of rain showers associated to a cumulonimbus formation was about 50 nm south of the accident site. The radiative cloud top temperatures over the accident site were 8.54 degrees Celsius, which corresponded with cloud tops near 9,000 feet msl with higher cloud tops to the west and northeast of the accident site.

Weather radar for the accident area indicated several areas of reflectivity ranging from 35 to 40 dBZ, corresponding to a level 2 to 3 (moderate to strong) rain shower. Combining the aircraft radar track data with the weather radar data showed the accident airplane had traveled through an area of level 2 to 3 rain showers prior to the accident.

The Area Forecast current for the western one-third of Kansas indicated an overcast ceiling of 1,000 feet agl with cloud tops of 7,000 feet msl, and visibilities of 3 to 5 miles with mist. Central Kansas was forecast to have scattered to broken clouds at 5,000 feet agl, and broken clouds at 10,000 feet msl, without any surface visibility restrictions.

There was an active AIRMET advisory current for the departure area that indicated localized instrument flight rules (IFR) conditions due to low ceilings and visibility in precipitation, mist, and fog. The IFR conditions were expected to end between 1000 and 1200. The accident site was located about 15 nm east of the advisory boundary.

There were no other Convective SIGMETs, SIGMETs, Severe Weather Forecast Alerts, or Center Weather Advisories current over Kansas at the time of the accident.

There were two pilot reports available around the time of the accident. Both of these aircraft were operating on IFR flight plans and had flown through an overcast cloud layer. At 1005, an aircraft over Garden City, Kansas, reported an overcast cloud layer beginning at 3,200 feet msl with tops at 5,500 feet msl. At 1125, an aircraft departing out of Dodge City, Kansas, reported the cloud tops were 6,800 feet msl. Neither pilot report indicated that any turbulence or low-level wind shear had been encountered.

The accident pilot contacted Wichita AFSS to obtain a VFR weather briefing for a flight from DDC to MLB. The pilot did not file a flight plan during the briefing, nor did the briefer solicit the pilot for a flight plan. The route briefing did not include any report of the general synoptic conditions prevailing over the route of flight, a summary of the radar or satellite imagery, and did not include cloud tops.

WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board's on-scene investigation began on August 9, 2004.

A global positioning system (GPS) receiver was used to identify the position of the main wreckage as 37-degrees 23-minutes 15.3-seconds north latitude, 99-degrees 03-minutes 33.8-seconds west longitude. The wreckage was in a remote pasture area located about 49 nm east-southeast of the departure airport. The GPS elevation of the main wreckage was 1,894 feet msl.

The main wreckage consisted of the fuselage, cockpit, canard, and engine. The fuselage, cockpit, and canard were destroyed by fire. The remaining wreckage was found dispersed over a wide area, with large structural components located along a 315 magnetic heading from

the main wreckage. The left wing was located 315 feet from the main wreckage, a piece of elevator was found 812 feet from the main wreckage, the right wing was found 1,297 feet from the main wreckage, and the upper and lower engine cowls were found about 1,500 feet from the main wreckage. The furthest debris was found over 1.0 nm from the main wreckage and consisted mainly of structural foam core material and paperwork.

The wreckage was recovered and a layout determined that all primary airframe structural components, flight control systems, engine, and propeller were present. Both wings separated at their respective wing roots, and both fractures were consistent with overload. The left wing exhibited heat blistering and was covered by gray soot on all external surfaces, consistent with being enveloped in a fire. The soot was homogeneously deposited along the wing's entire span and no soot streaking was noted. The right wing did not exhibit any heat damage and was not covered by any soot. Flight control continuity for both ailerons and winglet-mounted rudders was confirmed from the individual surfaces to the respective wing roots. The canard was destroyed by fire. The recovered elevator piece was not fire damaged and the fracture features were consistent with overload. The upper and lower engine cowls did not exhibit any soot or heat damage on either the inner or outer surfaces. The inner surfaces of both engine cowls did not exhibit any fuel or oil staining.

The engine exhibited fire damage. The engine fuel and ignition systems were fire damaged, which prevented further examination. The engine oil sump was consumed by fire. The engine could not be rotated due to impact and fire damage. The propeller hub and its fractured blade stubs remained attached to the engine.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was not able to be performed. No toxicology testing was performed due to the lack of samples.

ADDITIONAL INFORMATION

The wreckage was released to a representative of the Kiowa County Sheriff's Office on August 10, 2004.

Parties to the investigation included the FAA, Lycoming, and Velocity, Inc.

Pilot Information

Certificate:	Private	**Age:**	66,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	October 1, 2002
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 1, 2003
Flight Time:	614 hours (Total, all aircraft), 220 hours (Total, this make and model), 520 hours (Pilot In Command, all aircraft), 37 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Jorgensen	**Registration:**	N190J
Model/Series:	Velocity XL-RG	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	1
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	Continuous airworthiness	**Certified Max Gross Wt.:**	2800 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	210 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-C4B5
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PTT,1952 ft msl	**Distance from Accident Site:**	24 Nautical Miles
Observation Time:	10:10 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 3400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.04 inches Hg	**Temperature/Dew Point:**	18°C / 14°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Dodge City, KS (DDC)	**Type of Flight Plan Filed:**	None
Destination:	Melbourne, FL (MLB)	**Type of Clearance:**	None
Departure Time:	10:00 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	Both in-flight and on-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	In-flight
Total Injuries:	1 Fatal	**Latitude, Longitude:**	37.390277,-99.059448

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	James Lamb; Federal Aviation Administration - Wichita FSDO; Wichita, KS Gregory Erikson; Lycoming; Wayne, IL Duane Swing; Velocity Aircraft; Sebastian, FL
Original Publish Date:	December 28, 2006
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=59844