

Aviation Investigation Factual Report

Location:	Seale, Alabama	Accident Number:	NYC08FA157
Date & Time:	April 7, 2008, 12:26 Local	Registration:	N210HM
Aircraft:	CARTWRIGHT H JR/COTTRELL M RV-10	Aircraft Damage:	Destroyed
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Factual Information

HISTORY OF FLIGHT

On April 7, 2008, at 1226 eastern daylight time, an amateur-built RV-10, N210HM, was destroyed when it impacted trees and terrain in Seale, Alabama, following a missed approach to Columbus Metropolitan Airport (CSG), Columbus, Georgia. The certificated private pilot, and the pilot rated passenger/builder were killed. The flight originated from Lebanon Municipal Airport, Lebanon, Tennessee. Instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

According to relatives of the pilot, the reason for the flight was to visit the Sun 'n Fun Fly-In located in Lakeland, Florida.

A handheld global positioning system (GPS), Garmin GPSMAP 196, was recovered from the airplane. The GPS unit was sent to the National Transportation Safety Board Office of Research and Engineering for data extraction. The GPS data, along with voice communication data provided by the Federal Aviation Administration (FAA), revealed that the pilot established communications with Atlanta Approach at 1148, while flying the airplane at an altitude 9,300 feet, and requested a very high frequency omnidirectional radio range (VOR) runway 18 approach to Weedon Field Airport (EUF), Eufaula, Alabama. The flight continued on a track of 173 degrees for approximately 13 minutes until it was cleared to descend to 4,000 feet by the controller. The controller then cleared the airplane for the approach about 20 miles north of the airport. The pilot then explained to the controller, "We may, I think we are going to fly the whole approach here, I think we'll let you know when[unreadable]." The airplane then began a descending right turn to a track of 090 degrees and the pilot further stated, "We're going to have to come up with an alternate plan here."

The pilot then requested, and was provided, vectors to Auburn-Opelika Airport (AUO), Auburn, Alabama. While en-route to AUO, he amended his request and asked for vectors to CSG, stating that he required an airport with an instrument landing system (ILS) approach. The controller subsequently provided vectors, followed by an ILS approach clearance to runway 6 at CSG. Shortly after receiving the clearance, the airplane flew past the ILS localizer path. The controller then received a low altitude alert and relayed this to the pilot. The pilot responded, 'We're correcting altitude here, and we flew through the ILS.' The controller then cancelled the approach clearance and requested that he climb to 3,000 feet, and turn right to 270 degrees. The pilot then stated, "Do you have any location that the weather is 2,000 feet or better?" The controller responded that the pilot could consider checking the weather at AUO, to which the pilot responded, "Okay we'll do that." Over the next 17 seconds the airplane began a descending right turn from an altitude of 2,694 feet to 1,330 feet. The airplane then began a

climbing right turn, and within 15 seconds reached an altitude of 2,770 feet. The last recorded GPS track occurred at 1226:41 and was observed at an altitude of 2,148 feet. The wreckage was located at an elevation of 270 feet, about 400 feet east of the location where the final GPS track was recorded.

The airplane deviated approximately 400 feet above its assigned altitude, and 1,200 feet below, on multiple occasions throughout the last 14 minutes of the flight. The controller twice relayed low altitude alert warnings to the pilot, and on five occasions alerted him that he was not maintaining the assigned heading. The pilot did not declare an emergency to the controller at any point during their communications.

PERSONNEL INFORMATION

Investigators were unable to determine the seating location of the pilots in the airplane.

Pilot

The pilot, age 63, held a private pilot certificate with a rating for airplane single-engine land and instrument airplane. The pilot's most recent FAA second-class medical certificate was issued September, 2006, with the limitation that he wear lenses for near and distant vision. Review of his pilot logbooks revealed that as of March 22, 2008 he had accumulated about 1770 total hours of flight experience, which included about 358 hours in actual instrument conditions.

According to the logbook, the pilot accumulated 6.4 hours of total flight experience in instrument conditions for the 6 months preceding the accident. During that time he performed three instrument approaches in instrument meteorological conditions, and one practice instrument approach in visual meteorological conditions. The logbook entry did not display a notation stating that the practice approach was performed under the supervision of a safety pilot. The pilot's logbook records further indicated that since June 2000, he had logged about 130 flight hours in his personal airplane, N19419 in simulated and instrument flight conditions. This airplane was a 1976 Cessna 177B, equipped with conventional cockpit instruments.

Passenger/Builder

The pilot rated passenger/builder, age 64, held a private pilot certificate with a rating for airplane single-engine land, and the limitation of night flying prohibited. He did not possess an instrument rating. His most recent FAA third-class medical certificate was issued January 3, 2008, with the limitation that the certificate was only valid for 12 months, and that he wear lenses for near vision. Review of his pilot logbooks revealed that he had accumulated about 526 total hours of flight experience, 68 hours of which were in the accident airplane. In the 90 days prior to the accident, the logbook indicated 5.2 hours of total flight time, all of which was flown in the accident airplane. A flight review was conducted in the accident airplane on February 9, 2007, and included 0.3 hours of simulated instrument training.

AIRCRAFT INFORMATION

The four-seat, low-wing, fixed-gear amateur built airplane, was issued a special airworthiness certificate in January 2007. A review of the airplane's flight and maintenance logbooks revealed it had accrued a total time in service of 75 hours prior to the accident flight. The last conditional inspection occurred on February 1, 2008, at a total flight time of 71 hours. The Lycoming IO-540-C4B5 engine had accumulated a total time in service of 2,287 hours. The engine had accrued 75 flight hours since the most recent major overhaul which was completed in 2007. Pitot static, altimeter, and transponder inspections were accomplished on February 26, 2007, and a VOR check was completed on the day prior to the accident.

The airplane was equipped with a liquid crystal display avionics suite, in a configuration commonly referred to as a, 'glass cockpit.' The equipment included a Dynon Avionics Electronic Flight Information System (EFIS) E10-A, two Grand Rapids Technologies Incorporated (GRT) EFIS Horizon Series 1 Multifunction Displays, and a GRT Engine Information System. Navigation and communication functions were supported with a single Garmin/Apollo SL30 Transceiver.

The airplane was not equipped with any vacuum operated or analog flight instruments.

A flight logbook located onboard the airplane indicated that prior to departing on the accident flight, the airplane was serviced with 13.6 gallons of fuel, bringing the total fuel on board to 61 gallons.

METEOROLOGICAL INFORMATION

The closest official weather observation station was Lawson Army Airfield (LSF), Fort Benning, Georgia, located 9.5 miles southeast of the accident site. The elevation of the weather observation station was 232 feet msl. An aviation routine weather report (METAR) for LSF was issued at 1227. It stated: winds variable at 3 knots; visibility 9 miles; skies 1,000 feet overcast; temperature 18 degrees Celsius; dew point 17 degrees Celsius; altimeter 30.05 inches of mercury.

A METAR for CSG, which was located 16 miles northeast of the accident site, was issued at 1251. It stated: winds from 100 degrees at 9 knots; visibility 8 miles; skies 1,000 feet overcast; temperature 18 degrees Celsius; dew point 14 degrees Celsius; altimeter 30.05 inches of mercury. The weather observation station was located at an elevation of 397 feet msl.

An aviation routine weather report for AUO, which was located 23 miles northwest of the accident site, was issued at 1235. It stated: winds from 090 degrees at 9 knots; visibility 10 miles; skies 1,200 feet overcast; temperature 18 degrees Celsius; dew point 14 degrees Celsius; altimeter 30.03 inches of mercury. The weather observation station was located at an elevation of 777 feet msl.

The Geostationary Operations Environmental Satellite number 12 (GOES-12) data was obtained from the National Oceanic and Atmospheric Administration (NOAA). The GOES-12 visible satellite imagery depicted an area of low stratiform and stratocumulus clouds extending over the region. The radiative cloud top temperature over the accident site was 283.80 degrees Kelvin (K) or 10.64 degrees Celsius (C), which corresponded to cloud tops near 4,500 feet msl.

The NOAA surface analysis chart issued at 1237, depicted a stationary front covering southern Georgia and the eastern region of Alabama.

WRECKAGE AND IMPACT INFORMATION

The airplane was examined at the accident site on April 8, 2008. There was a strong odor of fuel, and all airplane components were accounted for at the scene. The wreckage path was approximately 440 feet long, and oriented about 150 degrees magnetic. The first identified point of contact (FIPC) was in treetops about 80 feet above the flat, wooded terrain. Several pieces of angularly cut wood were scattered along the wreckage path.

The airplane was fragmented along the entire wreckage path. Control continuity was established from the rudder to the foot pedals. Control continuity of the remaining components could not be confirmed due to extensive push rod fracturing. The cockpit and cabin area came to rest about 175 feet beyond the FIPC.

The propeller was separated from the engine aft of the crankshaft flange, and located 340 feet down the wreckage path. The propeller flange was still attached to the hub, and the crankshaft fracture surface was on a 45-degree plane around its circumference. Both propeller blades displayed similar twisting, bending, and tip curl. One propeller blade tip was separated and located in the wreckage path; the other blade displayed a 2-inch leading edge tear 16 inches from the tip.

The engine was the last component located along the wreckage path, 433 feet beyond the FIPC. The engine was stripped of all external accessories with the exception of the right magneto and the propeller governor.

The engine case displayed extensive cracking, and the engine crankshaft could not be rotated. The top spark plugs were removed from all six cylinders and all of the electrodes were observed intact, and were light tan and gray in color which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart. Rotation of both magneto input shafts produced sparks at their respective terminal leads. Both the fuel injection servo, and engine driven fuel pump contained blue-colored fuel, and were absent of debris. The exhaust manifolds exhibited ductile compression deformation.

The pilot and passenger doors were fragmented throughout the wreckage path. A partial reconstruction and examination of the doors revealed no anomalies in the locking mechanism

of either door.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were conducted by the Alabama Department of Forensic Sciences, and the cause of death for both occupants was reported as blunt force injuries. Toxicological tests on specimens from the pilot were performed by the FAA Civil Aeromedical Institute, the results were negative for all screened drug substances and ingested alcohol.

TEST AND RESEARCH

The cockpit area sustained heavy crush damage and fragmentation, and as such the operation of the avionics suite could not be confirmed.

A representative from GRT stated that the EFIS Horizon units were capable of recording flight parameters to an externally attached Universal Serial Bus (USB) memory device. He further stated that the recording feature must be manually enabled by the pilot for each flight, and that the default power-up setting is to not record data. Three USB memory devices were located in the wreckage; data from the units were extracted by the Safety Board Investigator, but no flight parameter information was present. The GRT representative further stated that the Horizon EFIS units were capable of displaying terrain information, and that the terrain data was stored on a compact flash memory card. The Safety Board Investigator removed the compact flash cards from each unit. The data from one of the cards was extracted and contained a single terrain file dated February 14, 2008. The remaining compact flash card sustained crush damage, and the data could not be recovered.

ADDITIONAL INFORMATION

FAA Advisory Circular 60-4A states in part, "The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight, supported by other senses, allows the pilot to maintain orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of orientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is 'up.'...Surface references and the natural horizon may at times become obscured, although visibility may be above flight rule minimums. Lack of natural horizon or such reference is common on over water flights, at night, and especially at night in extremely sparsely populated areas, or in low visibility conditions.... The disoriented pilot may place the aircraft in a dangerous attitude... Therefore, the use of flight instruments is essential to maintain proper attitude when encountering any of the elements which may result in spatial disorientation."

Pilot Information

Certificate:	Private	Age:	63,Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Unknown
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	September 1, 2006
Occupational Pilot:	No	Last Flight Review or Equivalent:	July 15, 2006
Flight Time:	1770 hours (Total, all aircraft), 1650 hours (Pilot In Command, all aircraft), 13 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft)		

Pilot Information

Certificate:	Private	Age:	64,Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Unknown
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	January 1, 2008
Occupational Pilot:	No	Last Flight Review or Equivalent:	February 9, 2007
Flight Time:	526 hours (Total, all aircraft), 74 hours (Total, this make and model), 477 hours (Pilot In Command, all aircraft), 52 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CARTWRIGHT H JR/COTTRELL M	Registration:	N210HM
Model/Series:	RV-10	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	40238
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	February 1, 2008 Condition	Certified Max Gross Wt.:	2900 lbs
Time Since Last Inspection:	4 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	75 Hrs at time of accident	Engine Manufacturer:	LYCOMING
ELT:	Installed, not activated	Engine Model/Series:	IO-540-C4B5
Registered Owner:	On file	Rated Power:	250 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:	CSG,232 ft msl	Distance from Accident Site:	95 Nautical Miles
Observation Time:	12:51 Local	Direction from Accident Site:	100°
Lowest Cloud Condition:		Visibility	9 miles
Lowest Ceiling:	Overcast / 1000 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.04 inches Hg	Temperature/Dew Point:	18°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lebanon, TN (M54)	Type of Flight Plan Filed:	IFR
Destination:	Columbus, GA (CSG)	Type of Clearance:	IFR
Departure Time:	09:33 Local	Type of Airspace:	Unknown

Airport Information

Airport:	Columbus Metropolitan Airport CSG	Runway Surface Type:	Asphalt
Airport Elevation:	397 ft msl	Runway Surface Condition:	Unknown
Runway Used:	06	IFR Approach:	ILS
Runway Length/Width:	6997 ft / 150 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	32.36639,-85.149444

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Joseph Arvay; FAA/FSDO; Birmingham, AL
Report Date:	January 23, 2009
Last Revision Date:	
Investigation Class:	<u>Class</u>
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=67769

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available <u>here</u>.