



AVIATION



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# Aviation Investigation Final Report

<b>Location:</b>	Rowdy, Kentucky	<b>Accident Number:</b>	ERA15FA220
<b>Date &amp; Time:</b>	May 21, 2015, 18:54 Local	<b>Registration:</b>	N26886
<b>Aircraft:</b>	GULFSTREAM AMERICAN CORP AA-5A	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>	VFR encounter with IMC	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The noninstrument-rated private pilot was nearing the destination airport at the end of a cross-country flight. Instrument meteorological conditions (IMC) were widespread in the vicinity of the destination, and several witnesses stated that the weather conditions were misty, foggy, and rainy at the time of the accident. However, the extent to which the pilot had familiarized himself with the weather conditions along the route of flight before takeoff could not be determined, as there was no record of a weather briefing from an official, access-controlled source. Radar data showed the airplane on a northerly heading at a cruise altitude about 7,000 ft above ground level (agl). The airplane passed west of the airport as it continued north, then entered a descending right turn in the direction of the airport. The airplane conducted a series of descending right and left turns east of the airport until radar contact was lost at an altitude about 5,600 ft agl in the vicinity of the accident site. The pilot did not contact air traffic control at any time during the flight.

The airplane came to rest in heavily wooded, hilly terrain and was highly fragmented. There was no evidence of an in-flight breakup, or of pre- or postimpact fire. Several angularly-cut tree branches along the wreckage path indicated that the engine was producing power at the time of impact. A postaccident examination of the airplane and the engine revealed no evidence of any anomalies that would have precluded normal operation.

It is likely that the pilot was operating in visual meteorological conditions above the clouds until he neared the destination airport, at which time he attempted to descend through IMC in order to land. The fact that the pilot did not hold an instrument rating and had received only minimal training in instrument flight significantly increased his susceptibility to the sensory illusions associated with instrument flight. Given the reduced visibility conditions and the radar flight track of the airplane, it is likely that the pilot experienced spatial disorientation and a subsequent loss of control as he attempted to descend through IMC and locate the airport.

## Probable Cause and Findings

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

The noninstrument-rated pilot's decision to continue visual flight rules flight in instrument meteorological conditions, which resulted in a loss of control due to spatial disorientation.

### Findings

<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Environmental issues</b>	(general) - Decision related to condition
<b>Personnel issues</b>	Spatial disorientation - Pilot
<b>Personnel issues</b>	Aircraft control - Pilot

# Factual Information

## History of Flight

Maneuvering	VFR encounter with IMC (Defining event)
Maneuvering	Loss of visual reference
Maneuvering	Collision with terr/obj (non-CFIT)

On May 21, 2015, about 1854 eastern daylight time, a Gulfstream American Corp AA-5A, N26886, was destroyed when it impacted terrain while maneuvering near Rowdy, Kentucky. The private pilot was fatally injured. Instrument meteorological conditions (IMC) prevailed, and no flight plan was filed for the flight, which departed Aiken Municipal Airport (AIK), Aiken, South Carolina, at an unknown time, and was destined for Wendell H Ford Airport (CPF), Hazard, Kentucky. The personal flight was operated under the provisions of Title 14 Code of Federal Regulations Part 91.

Radar data obtained from the Federal Aviation Administration (FAA) revealed a track of visual flight rules (VFR) targets correlated to be the accident airplane. About 1830, the airplane was established on a track of about 345 degrees towards CPF at an altitude of 8,300 feet mean sea level (msl). The airplane passed west of the airport, then about 1845, about 2 miles northwest of the airport, the airplane began a right, 180-degree turn and descended to about 7,700 feet msl as it tracked south. At 1848, on an approximate right base position in relation to runway 32, the airplane began another right turn and descended to about 7,500 feet. Over the next several minutes, the airplane completed a series of turns about one mile east of CPF, with altitudes varying between 7,500 and 6,800 feet. The last radar target with recorded altitude, at 1853:38, placed the airplane about 700 feet west of the accident site at 6,800 feet. There was no record of the pilot having contacted any air traffic control (ATC) facility during the accident flight. It could not be determined whether the pilot made any radio transmissions on the common traffic advisory frequency for CPF.

The airport manager at CPF stated that he was flying a helicopter in the area on the afternoon of the accident, and described the weather conditions as poor. Cloud ceilings were between 400-800 feet above ground level (agl), and in some locations the clouds were "all the way down to the ridge." He stated that several "bands" of weather had moved through the area that afternoon, at times reducing the visibility to around 2 miles.

Two witnesses stated that the weather conditions at the time of the accident were daylight, with mist and fog. They heard the sound of impact and ran outside to see what had occurred.

Two other witnesses near the accident site reported that they observed the airplane smoking as it impacted the ground. One of these witnesses reported that he saw the airplane come from the direction of the airport.

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	59,Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	July 15, 2014
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	February 13, 2015
<b>Flight Time:</b>	(Estimated) 220 hours (Total, all aircraft), 143 hours (Total, this make and model), 144 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft)		

The pilot held a private pilot certificate with a rating for airplane single-engine land. He did not hold an instrument rating. His most recent FAA third-class medical certificate was issued July 15, 2014. Review of the pilot's personal logbooks revealed that he had accumulated a total flight time of about 220 hours, with about 143 hours in the accident airplane, including about 20 hours in the 90 days before the accident. According to the logbook, the pilot had accumulated 3.6 total hours of simulated instrument flight time.

In an interview conducted by the FAA, the owner of the airplane stated that he was friends with the pilot and had flown with him often. He and the pilot had spoken about the flight earlier on the day of the accident, and had discussed the weather conditions for the flight. The owner also stated that the pilot did not like talking on the radio, and did not normally file visual flight rules (VFR) flight plans or request VFR flight following services from ATC. Additionally, the owner and the pilot had agreed that the pilot would not fly the airplane at night.

The airport manager at CPF stated that the pilot had flown into the airport several times prior to the accident, and that the accident flight was "not the first time" the pilot had flown to CPF under VFR when the weather was IMC.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	GULFSTREAM AMERICAN CORP	<b>Registration:</b>	N26886
<b>Model/Series:</b>	AA-5A	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1979	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal; Utility	<b>Serial Number:</b>	AA5A0788
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	August 1, 2014 Annual	<b>Certified Max Gross Wt.:</b>	2200 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	2136.75 Hrs as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	O-320 SERIES
<b>Registered Owner:</b>	WRIGHT-HANGER AVIATION INC	<b>Rated Power:</b>	150 Horsepower
<b>Operator:</b>	WRIGHT-HANGER AVIATION INC	<b>Operating Certificate(s) Held:</b>	None

The airplane was manufactured in 1979, and was equipped with a Lycoming O-320 series, 150 hp reciprocating engine. The airplane's most recent annual inspection was completed August 1, 2014, at a total aircraft time of 2,136.75 hours.

According to the owner, the airplane was equipped with Garmin 430 and 496 units, and was capable of receiving XM satellite weather information. The airplane was also equipped with an autopilot that "did not work well" and "would put the airplane into a bank." According to the owner, the pilot was aware of the limitations of the autopilot and was likely not using it during the flight.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	CPF, 1256 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	19:05 Local	<b>Direction from Accident Site:</b>	264°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	3 miles
<b>Lowest Ceiling:</b>	Broken / 800 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/ Unknown
<b>Wind Direction:</b>	320°	<b>Turbulence Severity Forecast/Actual:</b>	/ Unknown
<b>Altimeter Setting:</b>	30.07 inches Hg	<b>Temperature/Dew Point:</b>	11°C / 11°C
<b>Precipitation and Obscuration:</b>	N/A - None - Drizzle		
<b>Departure Point:</b>	Aiken, SC (AIK)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Hazard, KY (CPF)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class E

The 1745 weather observation at CPF included wind from 310 degrees at 7 knots, 5 statute miles visibility, a broken cloud layer at 1,000 feet, an overcast ceiling at 1,500 feet, temperature 12 degrees C, and dew point 11 degrees C.

The 1845 weather observation at CPF included wind from 330 degrees at 4 knots, 3 statute miles visibility, light drizzle, scattered clouds at 800 feet, a broken cloud layer at 1,400 feet, and an overcast ceiling at 2,100 feet.

The 1905 weather observation at CPF included wind from 320 degrees at 4 knots, 3 statute miles visibility, drizzle, broken cloud layers at 800 feet and 1,200 feet, an overcast cloud layer at 2,000 feet, temperature 11 degrees C, and dew point 11 degrees C.

The 1848 weather observation at JKL, located about 13 nautical miles (nm) north-northwest of the accident site, included wind variable at 5 knots, 5 statute miles visibility, mist, clouds broken cloud layers at 800 feet and 2,500 feet, and an overcast ceiling at 3,000 feet. The cloud ceilings were reported variable between 400 feet and 1,100 feet.

The 1853 weather observation at JKL included wind from 310 degrees at 5 knots, 5 statute miles, mist, broken cloud layers at 800 feet and 2,700 feet, and an overcast ceiling at 3,500 feet. The cloud ceilings were reported variable between 400 feet and 1,100 feet.

A terminal aerodrome forecast (TAF) for JKL, issued at 1320, forecast conditions at 1800 with visibility better than 6 statute miles and an overcast layer at 1,500 feet.

Airmen's Meteorological Information (AIRMET) Sierra, issued at 1645 and valid at the accident time, was the only AIRMET valid for the accident site at the accident time. AIRMET Sierra forecasted mountains to be obscured by cloud cover.

An area forecast issued at 1445 and valid for the accident time forecast occasional visibility down to 5 statute miles, mist, and an overcast ceiling between 2,000 and 2,500 feet mean sea level (MSL) with cloud tops between 6,000 and 8,000 feet MSL.

An Area Forecast Discussion issued by the Jackson, Kentucky National Weather Service office at 1537, discussed IMC, including low-level cloud cover and areas of drizzle, to continue through the afternoon and evening. Dense fog was forecast to develop as the cloud ceilings lifted overnight and in the pre-dawn hours.

There was no record of the pilot receiving a preflight weather briefing from a Flight Service Station or through the DUAT system.

### Airport Information

<b>Airport:</b>	WENDELL H FORD CPF	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	1256 ft msl	<b>Runway Surface Condition:</b>	Wet
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

Wendell H. Ford Airport (CPF) was located about 1 statute mile southwest of the accident site at an elevation of 1,256 feet msl. The airport was comprised of two asphalt runways, oriented 14/32 and 06/24. Runway 14/32 was 5,499 feet long by 100 feet wide. Runway 06/24 was 3,246 feet long by 60 feet wide. Runways 14 and 32 were equipped with pilot-controlled lighting, which included precision approach path indicator lights for each runway.

### Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	37.389167,-83.243331

The wreckage was located about 1 nm east of CPF in heavily wooded, hilly terrain. The airplane's initial impact point was identified as a tree, passed which the wreckage path extended on a heading of about 084 degrees magnetic. Several angularly-cut tree branches were identified along the wreckage path that exhibited paint transfer consistent with propeller contact. The main wreckage came to rest about 70 feet passed the initial impact point, and was destroyed by impact. All major components of the airplane were accounted for at the scene.

The propeller remained attached to the crankshaft. The spinner was impact separated and only the spinner back plate remained. Both propeller blades exhibited significant s-bending, leading edge gouging, and chordwise scratching. One blade tip was impact separated approximately 22 inches from the hub.

The engine was separated from the airframe and heavily impact-damaged and covered with dirt and vegetation found near the accident site. All engine accessories, with the exception of the base of the engine driven diaphragm fuel pump and a lever arm, were separated on impact. The #1 cylinder head was impact-damaged which revealed the top of the piston, exhaust valve, and intake port. The #2, #3, and #4 cylinders were inspected using a digital video borescope and revealed no anomalies. Due to impact damage, the crankshaft could not be rotated via the prop or with a spline gear tool inserted at the vacuum pump drive. The vacuum pump was intact, and examination revealed no anomalies. Impact damage precluded examination of the flight instruments. There was no evidence of any pre- or post-impact fire.

## **Medical and Pathological Information**

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An autopsy was performed on the pilot's remains by the Office of the Associate Chief Medical Examiner, Frankfort, Kentucky. The cause of death was listed as multiple blunt force injuries. The FAA's Civil Aerospace Medical Institute performed forensic toxicology testing on specimens from the pilot, and no drugs of abuse were detected.

## **Additional Information**

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### **Spatial Disorientation**

The Airplane Flying Handbook (FAA-H-8083-3A) stated, "...the VFR pilot is, in effect, in IMC anytime he or she is inadvertently, or intentionally for an indeterminate period of time, unable to navigate or establish geographical position by visual reference to landmarks on the surface. These situations must be accepted by the pilot involved as a genuine emergency, requiring appropriate action...If the natural horizon were to suddenly disappear, the untrained instrument pilot would be subject to vertigo, spatial disorientation, and inevitable control loss."

The FAA Pilot's Handbook of Aeronautical Knowledge, chapter 16, "Aeromedical Factors," stated, "Under normal flight conditions, when there is a visual reference to the horizon and ground, the sensory system in the inner ear helps to identify the pitch, roll, and yaw movements of the aircraft. When visual contact with the horizon is lost, the vestibular system becomes unreliable. Without visual references

outside the aircraft, there are many situations in which normal motions and forces create convincing illusions that are difficult to overcome...Unless a pilot has many hours of training in instrument flight, flight should be avoided in reduced visibility or at night when the horizon is not visible."

## **Preventing Similar Accidents**

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### **Reduced Visual References Require Vigilance (SA-020)**

#### **The Problem**

About two-thirds of general aviation accidents that occur in reduced visibility weather conditions are fatal. The accidents can involve pilot spatial disorientation or controlled flight into terrain. Even in visual weather conditions, flights at night over areas with limited ground lighting (which provides few visual ground references) can be challenging.

#### **What can you do?**

- Obtain an official preflight weather briefing, and use all appropriate sources of weather information to make timely in-flight decisions. Other weather sources and in-cockpit weather equipment can supplement official information.
- Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself about your skill limitations. Plan ahead with cancellation or diversion alternatives. Brief passengers about the alternatives before the flight.
- Seek training to ensure that you are proficient and fully understand the features and limitations of the equipment in your aircraft, particularly how to use all features of the avionics, autopilot systems, and weather information resources.
- Don't allow a situation to become dangerous before deciding to act. Be honest with air traffic controllers about your situation, and explain it to them if you need help.
- Remember that, when flying at night, even visual weather conditions can be challenging. Remote areas with limited ground lighting provide limited visual references cues for pilots, which can be disorienting or render rising terrain visually imperceptible. When planning a night VFR flight, use topographic references to familiarize yourself with surrounding terrain. Consider following instrument procedures if you are instrument rated or avoiding areas with limited ground lighting (such as remote or mountainous areas) if you are not.

- Manage distractions: Many accidents result when a pilot is distracted momentarily from the primary task of flying.

See <https://www.nts.gov/Advocacy/safety-alerts/Documents/SA-020.pdf> for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Diaz, Allison
<b>Additional Participating Persons:</b>	Karlton White; FAA/FSDO; Louisville, KY Judson Rupert; Lycoming Engines; Williamsport, PA
<b>Original Publish Date:</b>	March 8, 2017
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=91219">https://data.nts.gov/Docket?ProjectID=91219</a>

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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 [here](#).