



National Transportation Safety Board Aviation Accident Final Report

Location:	Gary, IN	Accident Number:	CEN13FA002
Date & Time:	10/03/2012, 1116 CDT	Registration:	N308PJ
Aircraft:	CIRRUS DESIGN CORP SR22	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

The pilot was flying an RNAV/GPS approach when the accident occurred. The air traffic controller did not provide approach clearance to the accident airplane until it was inside the final approach fix (FAF) and 1,000 feet above the FAF crossing altitude. The controller also issued a late turn to intercept the approach course, and he did not issue a descent clearance because his attention was directed to resolving a separation conflict involving two other aircraft. According to data recorded by the airplane's primary flight display, the pilot disconnected the autopilot after receiving the approach clearance, and the airplane then began a rapid descent. About 40 seconds later, the airplane rolled left and tracked left of the approach course. The airplane's ground proximity warning alert activated, and the airplane subsequently rapidly reversed roll and pitch directions consistent with an attempt by the pilot to correct the airplane's hazardous flight path. The airplane continued to roll right and pitch to a nose-high attitude before rapidly transitioning to a nose-down attitude of more than 85 degrees. As the airplane descended below a 900-foot cloud layer, the pilot rolled the airplane to wings level and made a high g-force pullup until ground impact. Given the pilot's high workload due to deficient approach control services and possible distraction while operating in instrument meteorological conditions and the subsequent loss of airplane control, it is likely that the pilot experienced spatial disorientation.

Examination of the airframe and engine did not reveal any preimpact failures or malfunctions that would have precluded normal operation. Toxicology testing indicated the pilot used cocaine, hydrocodone, and marijuana at some point in the recent past. However, the use of the cocaine and hydrocodone likely did not affect the pilot's performance at the time of the accident, and the effect of the marijuana use could not be determined from the available evidence.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control during an instrument approach due to spatial disorientation. Contributing to the accident were deficient approach control services and the pilot's loss of

positional awareness.

Findings

Personnel issues	Spatial disorientation - Pilot (Cause) Aircraft control - Pilot (Cause) Situational awareness - Pilot (Factor) Identification/recognition - ATC personnel (Factor) Recent instrument experience - Pilot
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Factual Information

HISTORY OF FLIGHT

On October 3, 2012, at 1116 central daylight time, a Cirrus SR22, N308PJ, operated by a commercial pilot, collided with terrain while flying an instrument approach at the Gary/Chicago International Airport (GYG), Gary, Indiana. The pilot and passenger were fatally injured and the airplane was destroyed from ground impact and postimpact fire. The flight was being operating under 14 Code of Federal Regulations Part 91. Instrument meteorological conditions prevailed during the instrument approach portion of the flight and an instrument flight rules flight plan was filed. The flight originated from the Smyrna Airport (MQY), Smyrna, Tennessee, at 0925.

According to voice recordings provided by the Federal Aviation Administration (FAA), the pilot first contacted approach control about 35 miles southeast of GYG while in a descent to 4,000 feet mean sea level (msl). After receiving vectors and a further descent to 3,000 feet msl, N308PJ was cleared for the RNAV/GPS Y approach to runway 30 at GYG.

At the point of the first approach clearance by air traffic control (ATC), N308PJ was inside the final approach fix (FAF) and 1000 feet above the recommended FAF altitude. After no response was received from the pilot, ATC repeated the approach clearance to N308PJ. The pilot acknowledged this approach clearance, as well as a frequency change to the tower. No further radio transmissions were recorded on either approach or tower control frequencies.

After the pilot confirmed the approach clearance, radar returns indicated N308PJ in a descent and close to on course laterally. About 40 seconds after starting the descent, radar returns indicated N308PJ initiated a left, descending turn away from course centerline. The last recorded radar return indicated an altitude of 1,700 feet msl, about one mile southeast of runway 30 at GYG, almost overhead of the accident site.

PERSONNEL INFORMATION

The pilot, age 48, held a commercial pilot certificate with airplane single-engine land, single-engine sea, and instrument ratings. On May 18, 2012, the pilot was issued a FAA Class 2 medical certificate, which required corrective lenses be worn. At the time of the medical examination, the pilot reported having 1,100 hours of total flight experience, with 50 hours in the last six months. The pilot reported 650 hours of flight experience in the make and model of the accident airplane on his application for aircraft insurance, dated December 5, 2011.

A certified flight instructor (CFI), who flew training flights with the accident pilot, stated that the pilot often struggled to maintain instrument flying proficiency due to an active lifestyle. He stated that the accident pilot was challenged with accomplishing routine instrument flying tasks, such as changing a radio control frequency while conducting an instrument approach.

AIRCRAFT INFORMATION

The accident airplane, a 2007 Cirrus SR-22, was registered to Gandy Air LLC. A standard airworthiness certificate was issued for the airplane on August 8, 2007. The airplane was equipped with a Continental IO-550-N46B engine. The last annual inspection was performed on the airplane on September 17, 2012, with a total aircraft time of 566.4 hours.

METEOROLOGICAL INFORMATION

The weather observation station at GYY reported the following conditions at 1140: wind variable at 6 knots, visibility 5 miles, ceiling 900 feet overcast, temperature 17 degrees Celsius (C), dew point 13 degrees C, and altimeter 29.97 inches of mercury.

TESTS AND RESEARCH

A circuit card from the airplane's primary flight display (PFD) and an autopilot unit were recovered from the accident airplane and forwarded to the National Transportation Safety Board's Vehicle Recorder Laboratory for evaluation. The autopilot unit was destroyed by fire and flight data was not recovered. Two flash memory devices were removed from the damaged PFD and read using a memory chip reading device.

The following summary utilized data from the PFD: The airplane departed MQY and climbed to a final cruise altitude of 10,000 feet msl. The GPS steering autopilot mode was used for lateral navigation during the cruise portion of the flight. At 1053 the airplane began a descent, leveling briefly at 8,000 feet msl, 4,000 feet msl, and 3000 feet msl. At 4,000 feet msl, the GPS steering mode deactivated and heading hold mode activated. At 1109, the next waypoint parameter switched from "KGYG" to "WASTU", which was the FAF. Autopilot vertical speed mode was used to descend from 4,000 feet msl to 3,000 feet msl.

The autopilot altitude hold mode was used to maintain 3,000 feet msl. At 1114:07, the autopilot switched from heading hold to approach mode. At 1114:32, the next waypoint parameter switched from "WASTU" to "RONOY", an intermediate stepdown fix on final (ATC transmitted the second approach clearance to N308PJ at 1115:09).

At 1115:25, inside the FAF and still at 3,000 feet msl, the autopilot disconnected. During two periods immediately prior to the disengagement of the autopilot a "TRIMMING" indication was sent by the autopilot. This indication is present when the autopilot has run the pitch trim for a period in excess of four seconds, which is consistent with pushing or pulling on the yoke while the autopilot is still connected.

After the autopilot disconnected, the airplane began a descent that reached 5,000 feet per minute. During this descent, the airplane rolled 37 degrees left and pitched down to 14 degrees nose low. At 1115:50, the airplane reversed both roll and pitch directions, commencing a roll to the right and a pitch up.

The altitude and vertical speed profile at which the roll and pitch reversed corresponded to the activation criteria for the enhanced ground proximity warning system (GPWS), which triggers aural voice and visual annunciator warnings. Initially, the voice alert "Sink Rate" is triggered and a yellow caution alert annunciator lamp illuminates. The pilot guide for the enhanced GPWS installed in the accident airplane is located in the NTSB public docket.

After reversing pitch and roll direction, the airplane continued rolling right and pitched up to a 15-degree nose up attitude. The airplane continued rolling right and transitioned to a nose down pitch of more than 85 degrees nose low and 170 degrees of right roll. As the airplane descended below 900 feet above ground level, a rapid roll to wings level and pitch up occurred. Centrifugal forces during the pitch up were recorded in excess of 4.5 Gs. The last data record was 48 degrees nose down, with a descent rate of about 7,000 feet per minute.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in a wooded area about one mile from the approach end centerline of runway 30 at GYY. The wreckage debris was scattered from the initial impact

crater outward on a 164-degree heading. The debris field extended about 100 feet from the impact crater and was about 65 feet wide at its widest point. To the north of the impact crater, trees displayed freshly broken and cut tree limbs. The angle at which the broken and cut tree limbs made with respect to each other and the impact crater was measured as a 52-degree descent.

The airplane was fragmented and mostly consumed by fire. The aileron control cable was fractured on both sides of the console aileron actuation pulley and the right hand aileron actuation pulley. All three turnbuckles were present with safety clips installed. Elevator and rudder control cable continuity was confirmed.

The Cirrus Airframe Parachute System (CAPS) parachute was located about 60 feet from the impact crater. The parachute remained partially packed in the deployment bag (D-bag) and exhibited thermal damage. The rocket motor was hanging in some small trees, still attached to the pickup collar, lanyards, and incremental bridle. The motor was determined to be expended. The incremental bridle remained in the sheath and had not "unzipped."

The D-bag straps were attached to the incremental bridle. The ends of the D-bag straps exhibited thermal damage where they separated from the bag. A portion of the suspension lines were hanging in the tree branches and exhibited thermal damage at both ends. The lines were hanging in a straight line between the parachute and the impact crater. Portions of thermally damaged risers were also present in the trees between the impact crater and the parachute.

The flight station bulkhead was located about 28 feet forward of the impact crater. The launch tube, base, and igniter assembly were present. Approximately two feet of the activation cable extended from the igniter assembly. The activation handle was out of the handle holder and approximately 93 inches of activation cable remained attached to the activation handle. The plastic sheath for the activation cable was not present, consistent with the thermal damage to the surrounding components. The safety pin for the activation handle was not observed.

The aluminum cross beam that bolts across the opening to the CAPS enclosure was bowed forward. The reefing line cutters were not observed. The CAPS enclosure cover was located 55 feet from the impact crater and exhibited impact and fire damage. Evidence at the accident site was consistent CAPS deployment due to ground impact forces.

The engine was examined off the accident site. A borescope inspection was conducted on all six engine cylinders. None of the cylinders, cylinder barrels, pistons, or valves displayed any sign of operational distress. The induction system, exhaust system, magnetos, oil sump, and fuel pump were examined, with no pre-impact anomalies noted. The ignition system was destroyed during the accident sequence and ensuing fire.

Examination of the airframe, engine and propeller did not reveal any anomalies associated with a pre-impact failure or malfunction.

MEDICAL AND PATHOLOGICAL INFORMATION

On October 5, 2012, an autopsy was performed on the pilot by the Lake County Coroner. The cause of death was blunt force injuries. Toxicology testing of vitreous as part of the autopsy indicated past use of cocaine and hydrocodone. The FAA's Civil Aeromedical Institute in Oklahoma City, Oklahoma, performed toxicology tests on the pilot, which was limited by the lack of available blood or urine. No ethanol was detected in the muscle or liver. Trace amounts

of tetrahydrocannabinol (marijuana) was found in lung and its metabolite tetrahydrocannabinol carboxylic acid was detected in the lung and liver.

ADDITIONAL INFORMATION

The air traffic controller stated that while vectoring N308PJ toward the final approach at GYY, he observed two aircraft east of GYY that were "becoming a conflict". A conflict alert (CA) alarm sounded and was displayed on his radar screen, which drew his attention away from N308PJ. After resolving the conflict, the controller stated that he was still a little flustered as he returned to provide approach service to N308PJ. He stated that if not for the loss of separation conflict, he felt he would have given better approach services to N308PJ.

History of Flight

Approach-IFR final approach	Loss of control in flight (Defining event) Collision with terr/obj (non-CFIT)
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Pilot Information

Certificate:	Commercial	Age:	48
Airplane Rating(s):	Single-engine Land; Single-engine Sea	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 2 With Waivers/Limitations	Last Medical Exam:	05/18/2012
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 1100 hours (Total, all aircraft), 650 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	CIRRUS DESIGN CORP	Registration:	N308PJ
Model/Series:	SR22	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	2628
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	09/21/2012, Annual	Certified Max Gross Wt.:	3400 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	566 Hours	Engine Manufacturer:	CONT MOTOR
ELT:	Installed, not activated	Engine Model/Series:	IO-550-N
Registered Owner:	GANDY AIR LLC	Rated Power:	310 hp
Operator:	GANDY AIR LLC	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	KGYG, 591 ft msl	Observation Time:	1140 CDT
Distance from Accident Site:	1 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	325°	Conditions at Accident Site:	Instrument Conditions
Lowest Cloud Condition:		Temperature/Dew Point:	17°C / 13°C
Lowest Ceiling:	Overcast / 900 ft agl	Visibility	5 Miles
Wind Speed/Gusts, Direction:	6 knots, Variable	Visibility (RVR):	
Altimeter Setting:	29.97 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Smyrna, TN (KMQY)	Type of Flight Plan Filed:	IFR
Destination:	Gary, IN (KGYG)	Type of Clearance:	IFR
Departure Time:	0925 CDT	Type of Airspace:	Class D

Airport Information

Airport:	Gary/Chicago Int'l Arp (KGYG)	Runway Surface Type:	
Airport Elevation:	591 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	Global Positioning System; RNAV
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	Unknown
Total Injuries:	2 Fatal		

Administrative Information

Investigator In Charge (IIC): Michael J Folkerts **Adopted Date:** 07/16/2014

Additional Participating Persons: Robert Helbing; Federal Aviation Administration; South Bend, IN
Daniel Sedberry; Federal Aviation Administration; South Bend, IN
Brad Miller; Cirrus Aircraft; Duluth, MN
Nicole Charnon; Continental Motors; Mobile, AL
Brian Soper; National Transportation Safety Board; Washington, DC

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Investigation Docket: <http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=85230>

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