



# Aviation Investigation Final Report

<b>Location:</b>	Dover, Delaware	<b>Accident Number:</b>	ERA13LA111
<b>Date &amp; Time:</b>	January 13, 2013, 18:45 Local	<b>Registration:</b>	N4975S
<b>Aircraft:</b>	Piper PA-28R-200	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Fuel exhaustion	<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The pilot had planned a night instrument cross-country flight of 3 hours 45 minutes, with 5 hours 30 minutes of fuel onboard. About 3 hours 20 minutes into the flight, when the airplane was approximately 15 miles from the intended destination airport, the pilot diverted as the airplane ahead of him had to perform a missed approach due to a low cloud ceiling. The pilot diverted to a nearby airport with calm wind and an instrument landing system (ILS) approach; however, he attempted two GPS approaches to the opposite end of the 6,400-foot-long runway. He performed a missed approach on both GPS approaches before reaching the decision altitude of 306 feet above ground level (agl), when an overcast ceiling at 400 feet prevailed. The pilot did not attempt the ILS approach.

The pilot then diverted a second time, about 4 hours 20 minutes into the flight, to an airport that was not equipped with an ILS approach. He performed a GPS approach to that airport, down to about 250 feet GPS altitude, which was below the published minimum descent altitude of 310 feet agl, when an overcast ceiling of 300 feet prevailed, which resulted in a missed approach. After the missed approach, about 5 hours into the flight, the pilot reported to air traffic control that he was low on fuel. The pilot then diverted for a third time, to another airport that did not have an ILS approach, but he planned to attempt a VOR approach at that airport. The pilot could have declared an emergency and performed an ILS approach to a military airport that he overflew enroute to the VOR approach, and was in radio and radar contact with; however, he continued on and was cleared for the VOR approach about 5 hours 5 minutes into the flight and declared emergency 6 minutes later, reporting fuel exhaustion. At that time, the airplane was provided radar vectors to the military airport, but impacted wooded terrain about 2 miles prior to the runway.

## Probable Cause and Findings

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

The pilot's failure to fly the two GPS approaches to the published descent altitude at the first diversion airport, his failure to attempt an instrument landing system approach at that airport, and his delay in declaring an emergency, which resulted in fuel exhaustion in low instrument meteorological conditions.

## Findings

<b>Aircraft</b>	Descent/approach/glide path - Not attained/maintained
<b>Personnel issues</b>	Incorrect action performance - Pilot
<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Personnel issues</b>	Delayed action - Pilot

## Factual Information

### History of Flight

<b>Approach-IFR final approach</b>	Fuel exhaustion (Defining event)
<b>Approach-IFR final approach</b>	Loss of engine power (total)
<b>Emergency descent</b>	Off-field or emergency landing
<b>Emergency descent</b>	Collision with terr/obj (non-CFIT)

### HISTORY OF FLIGHT

On January 13, 2013, about 1845 eastern standard time, a Piper PA-28R-200, N4975S, operated by a private individual, was substantially damaged during a forced landing, following a total loss of engine power while on approach to Dover Air Force Base (DOV), Dover, Delaware. The private pilot was fatally injured. Night instrument meteorological conditions prevailed and an instrument flight rules flight plan was filed for the planned flight to Summit Airport (EVY), Middletown, Delaware. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91 and originated from Kaolin Field (OKZ), Sandersville, Georgia, about 1330.

Review of the pilot's flight plan revealed an estimated time enroute of 3 hours 45 minutes, with 5 hours 30 minutes of fuel onboard. The pilot filed for a cruising altitude of 5,000 feet mean sea level (msl) and listed an alternate airport of Baltimore/Washington International Airport (BWI), Baltimore, Maryland. Review of fueling records revealed that the pilot completely fueled the airplane before departing on the accident flight. According to information provided by the U.S. Air Force, Federal Aviation Administration (FAA) and obtained from a handheld GPS, the airplane was in radio and radar contact with Dover Approach at 1647, while descending for a GPS approach to EVY.

The controller advised the pilot that a previous airplane had to fly a missed approach at EVY due to weather, then flew another missed approach at Wilmington, Delaware, before diverting again. At 1649, the pilot asked the controller what the weather was at Salisbury Regional Airport (SBY), Salisbury, Maryland. The controller replied that the 1629-recording included a ceiling that was 400 foot overcast and a visibility of 8 miles. The pilot replied that he wanted to try an approach at SBY. The controller cleared the flight direct to SBY and the airplane reversed direction to south, about 15 miles south of EVY, at 1650.

The pilot then attempted two GPS approaches to runway 14 at SBY and performed a missed approach both times. The descent altitude for the approach, utilizing localizer performance with vertical guidance (LPV), was 355 feet msl, or 306 feet above ground level (agl); however the pilot discontinued the first approach at a GPS altitude of 581 feet, when the airplane was aligned with the runway, about 1.7 miles from the runway. During the second approach, the airplane descended to 928 feet GPS altitude while aligned with the runway, but then veered right and continued to descend to 529 feet, before performing another missed approach. At that time, the pilot advised air traffic control that his GPS was not working right and he was going to try it again.

The wind was reported as calm and runway 32 (6,400 feet long) at SBY was equipped with an instrument landing system (ILS) approach; however, the pilot did not request that approach and did not attempt another GPS approach to SBY. After the second missed approach, the pilot requested to divert to Sussex Country Airport (GED), Georgetown, Delaware at 1753. At that time, the controller reported the last recorded ceiling at GED, which was 700 feet overcast. At 1801, when the pilot was cleared for the GPS runway 22 approach to GED, the controller advised that the updated weather recording, which was 7 minutes old, included an overcast ceiling of 300 feet. The pilot thanked the controller for the information and continued to fly to GED. At 1816, the pilot reported that he was established on the approach. The published minimum for the GPS approach to runway 22 at GED, with LPV, was 360 feet msl (310 agl). The pilot flew that approach to a GPS altitude of 250 feet and at 1826, reported that he was on a missed approach, requested the same approach again, and advised that he was running low on fuel.

The controller then asked the pilot if he was going to need an alternate airport and the pilot asked if there was anything easier than the approach at GED. The controller replied that he could try Delaware Airpark (33N), Dover, Delaware. The controller added that 33N used DOV weather recording, which was currently visibility 10 miles and ceiling 500 feet overcast. At 1830, while being vectored for an approach at 33N, the pilot asked if there was any chance he could land at DOV. The controller replied, "...negative sir, unless it's an emergency, there is no way you can land here."

At 1835, the pilot was cleared for the VOR RWY 27 approach at 33N. At 1841, the pilot declared an emergency and reported that he was out of fuel. At that time, the controller provided vectors for the ILS runway 19 approach at DOV; however, the airplane was about 2,000 feet msl, 7 miles north of DOV, and had to reverse course as it was flying north, away from the airport. After completing the turn, the airplane was flying toward DOV, between the final approach courses for runways 14 and 19. At 1843, the controller advised that DOV was at the pilot's 12 o'clock position and 6 miles, which the pilot acknowledged. At 1844, the controller reported that the airplane was heading in the right direction and the pilot could expect to land on runway 14. The pilot replied that he was "on to tower right now," and no further communications were received from the accident airplane. A GPS target was recorded at 1845:33, indicating the airplane was at 500 feet, on an approximate 3-mile final for runway 14.

#### PERSONNEL INFORMATION

The pilot held a private pilot certificate, with ratings for airplane single-engine land and instrument airplane. The pilot received his instrument rating on June 9, 2010. His most recent FAA third-class medical certificate was issued on July 28, 2011. Review of the pilot's logbook revealed that he had accumulated a total flight experience of approximately 598 hours; of which, about 77 hours and 35 hours were actual instrument and simulated instrument experience, respectively. The pilot had flown about 31 hours and 15 hours during the 90-day and 30-day periods preceding the accident, respectively. He flew 2.2 hours and 0.8 hours in actual instrument meteorological conditions during the 90-day and 30-day period, respectively. The pilot flew four instrument approaches and one instrument approach during the 90-day and 30-day period, respectively.

The pilot was a surgeon and was scheduled to perform surgery during the morning following the accident.

#### AIRCRAFT INFORMATION

The four-seat, low-wing, retractable tricycle-gear airplane, serial number 28R-35693, was manufactured in 1970. It was powered by a Lycoming IO-360, 200-horsepower engine, equipped with a McCauley constant-speed propeller. Review of the airplane's logbooks revealed that its most recent annual inspection was completed on June 2, 2012. At that time, the airplane had accumulated 5,613 total hours of operation. The engine had accumulated approximately 953 hours since major overhaul. The airplane was IFR equipped and had a Garmin 430 GPS that was wide area augmentation system (WAAS) enabled. The airplane was also equipped with an STEC 30 autopilot that would fly the lateral portion of a GPS approach, but not the vertical. Additionally, the pilot had a handheld Garmin Area 796 GPS.

#### METEOROLOGICAL INFORMATION

The pilot obtained weather information and filed a flight plan with direct user access terminals about 1016. The weather the pilot obtained included the terminal forecast for New Castle Airport (ILG), Wilmington, Delaware. From 1300 to 1600, the forecast weather included visibility 2 miles in mist and an overcast ceiling at 400 feet; however, from 1600 to 1900, the forecast weather at ILG included visibility 6 miles in mist and a broken ceiling at 1,200 feet. From 1100 to 1700, the forecast weather at BWI included visibility 2 miles in light drizzle and mist and a broken ceiling at 300 feet. From 1700 to 2200, the forecast weather at BWI included visibility greater than 6 miles and a broken ceiling at 3,000 feet.

The recorded weather at SBY, at 1629, was: wind from 150 degrees at 8 knots; visibility 8 miles; overcast ceiling at 400 feet; temperature 13 degrees C; dew point 11 degrees C; altimeter 30.06 inches Hg. The recorded weather at SBY, at 1654, included visibility 7 miles and an overcast ceiling at 400 feet.

The recorded weather at BWI, at 1654, included visibility 1/2 mile in light drizzle and fog, and an overcast ceiling at 200 feet.

The recorded weather at GED, at 1654, was: wind from 190 degrees at 7 knots; visibility 10 miles; overcast ceiling at 700 feet; temperature 13 degrees C; dew point 11 degrees C; altimeter 30.07 inches Hg. The recorded weather at GED, at 1751, included visibility 6 miles in mist and overcast ceiling at 300 feet.

The recorded weather at DOV, at 1842, was: wind from 330 degrees at 3 knots; visibility 4 miles in mist; overcast ceiling at 400 feet; temperature 8 degrees; dew point 8 degrees; altimeter 30.04 inches Hg.

#### AERODROME INFORMATION

In addition to a decision altitude of 355 feet msl for the GPS approach to runway 14 at SBY, the decision height for the ILS approach to runway 32 was 253 feet msl (200 feet agl).

The decision altitude for the GPS approach to runway 22 at GED, with LPV, was 360 feet msl (310 feet agl). GED was not equipped with an ILS approach.

The minimum descent altitude for the "VOR RWY 27" approach at 33N was 520 feet msl (477 feet agl). Further review of the published procedure revealed, "Procedure NA at night."

In addition to SBY, both DOV and BWI were equipped with ILS approaches.

#### WRECKAGE AND IMPACT INFORMATION

Examination of the wreckage by an FAA inspector revealed that the airplane impacted several trees and came to rest inverted in a wooded area, about 2 miles from DOV. The inspector observed an approximate 150-foot debris path, extending on a course about 190 degrees magnetic, from the first tree branch separation, to the main wreckage. The right wingtip and right flap were observed at the beginning of the debris path. The right wing and a section of vertical stabilator were located about 100 feet along the debris path, with the remainder of the fuselage and engine at the end of the debris path.

The wings and fuselage were substantially damaged, exhibited several tree strikes, and there was no postcrash fire. Both main fuel tanks were compromised. The inspector observed no fuel in the right main fuel tank and approximately 1/2 gallon in the left main fuel tank. The inspector did not observe any preimpact mechanical malfunctions with the airframe or engine.

#### MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the State of Delaware, Office of the Chief Medical Examiner, Wilmington, Delaware, on January 14, 2013. Toxicological testing was performed on the pilot by the FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma. Review of the toxicological report revealed:

"10 (ug/ml, ug/g) Acetaminophen detected in Urine  
0.081 (ug/mL, ug/g) Dihydrocodeine detected in Urine  
Dihydrocodeine NOT detected in Blood (Heart)  
Hydrocodone detected in Urine  
Hydrocodone NOT detected in Blood (Heart)  
0.194 (ug/mL, ug/g) Hydromorphone detected in Urine  
Hydromorphone NOT detected in Blood (Heart)  
Naproxen detected in Urine"

#### TESTS AND RESEARCH

A handheld GPS receiver was recovered from the wreckage and data were successfully downloaded at the NTSB Vehicle Recorders Laboratory, Washington, DC (for more information, see GPS Device Factual Report in the public docket).

Review of a make and model pilot operator handbook revealed that the airplane held 48 gallons of usable (and 2 gallons unusable) fuel and burned 9.16 gallons per hour at 65 percent power, which would consume 48.09 gallons over a 5 hour 15 minute period. The calculations did not include fuel used for takeoff and climbs (missed approaches).

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	55
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Unknown
<b>Instrument Rating(s):</b>	Airplane	<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 28, 2011
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	July 1, 2012
<b>Flight Time:</b>	598 hours (Total, all aircraft), 537 hours (Total, this make and model), 31 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N4975S
<b>Model/Series:</b>	PA-28R-200	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1970	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	28R-35693
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	June 2, 2012 Annual	<b>Certified Max Gross Wt.:</b>	2650 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	5613 Hrs as of last inspection	<b>Engine Manufacturer:</b>	LYCOMING
<b>ELT:</b>	C91 installed, not activated	<b>Engine Model/Series:</b>	IO-360
<b>Registered Owner:</b>	TUREN CLIFFORD H	<b>Rated Power:</b>	180 Horsepower
<b>Operator:</b>	TUREN CLIFFORD H	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Instrument (IMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>	DOV,28 ft msl	<b>Distance from Accident Site:</b>	2 Nautical Miles
<b>Observation Time:</b>	18:42 Local	<b>Direction from Accident Site:</b>	345°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	4 miles
<b>Lowest Ceiling:</b>	Overcast / 400 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	3 knots /	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	330°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	30.04 inches Hg	<b>Temperature/Dew Point:</b>	8°C / 8°C
<b>Precipitation and Obscuration:</b>	N/A - None - Mist		
<b>Departure Point:</b>	Sandersville, GA (OKZ )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Middletown, DE (EVY )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	13:30 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	Dover Air Force Base DOV	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	28 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<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>	39.1725,-75.49028



## Administrative Information

<b>Investigator In Charge (IIC):</b>	Duprie, Terry
<b>Additional Participating Persons:</b>	Constantine Karamargin; FAA/FSDO; Philadelphia, PA
<b>Original Publish Date:</b>	January 13, 2014
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=86014">https://data.ntsb.gov/Docket?ProjectID=86014</a>

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