

Flight Planning Summary

Completed By: Andrew Todd Fox, NTSB Air Safety Investigator

A direct flight from Sullivan Regional Airport (UUV) to M. Graham Clark Downtown Airport (PLK) is 158.6 statute miles on a 226 degree true course.

The pilot reported that the airplane typically achieved a cruise speed between 105-115 miles per hour (mph) while at a cruise altitude of 2,500-3,000 feet msl.

The pilot/owner reported that the carburetor mixture control was safety-wired in the full-rich position.

The pilot reported that the fuel tank had been topped-off before departing on the accident flight.

Fueling records indicated that at 16:30 central standard time, the pilot/owner purchased 11.49 gallons of Avgas at UUV.

Without any wind considerations, the non-stop direct flight between UUV and PLK would have taken between 1 hour 23 minutes and 1 hour 31 minutes, at 115 mph and 105 mph respectively.

However, upper atmosphere wind modeling suggested that the wind aloft averaged 45 mph from 195 degrees at the cruise altitudes used during the accident flight:

Departure Airport (UUV)

01/03/2014 -- 1800 cst

2,582 ft msl, wind 190 degrees at 38.25 mph

3,291 ft msl, wind 219 degrees at 38.03 mph

01/03/2014 -- 2100 cst

2,497 ft msl, wind 200 degrees at 58.16 mph

3,222 ft msl, wind 216 degrees at 51.00 mph

Midpoint Location (37.4235 N, 92.2205 W)

01/03/2014 -- 1800 cst

2,595 ft msl, wind 174 degrees at 41.83 mph

3,304 ft msl, wind 201 degrees at 44.29 mph

01/03/2014 -- 2100 cst

2,510 ft msl, wind 183 degrees at 54.81 mph

3,225 ft msl, wind 205 degrees at 55.03 mph

Destination Airport (PLK)

01/03/2014 -- 1800 cst

2,592 ft msl, wind 174 degrees at 37.13 mph

3,310 ft msl, wind 203 degrees at 40.71 mph

01/03/2014 -- 2100 cst

2,520 ft msl, wind 181 degrees at 46.98 mph

3,242 ft msl, wind 204 degrees at 52.12 mph

According to the Piper PA-22-108 Owner's Handbook performance charts, at 3,000 feet msl and 75-percent engine power, the fuel consumption rate would be 7.8 gallons per hour (full-rich mixture) at a true airspeed of 112 mph. At 3,000 feet and 65-percent engine power, the fuel consumption rate would be 7.2 gallons per hour (full-rich mixture) at a true airspeed of 104 mph.

Performance calculations established that with the expected winds aloft, the non-stop direct flight, at 75-percent engine power, would have taken 2 hours and 14 minutes at a ground speed of 71 mph and used 17.4 gallons of fuel. That same flight, completed at 65-percent engine power, would have taken 2 hours and 31 minutes at a ground speed of 63 mph and used 18.125 gallons of fuel.

The official flight manual for the Piper PA-22-108 listed the amount of unusable in the fuel system as 2.25 gallons when the cockpit fuel gauge indicated empty. However, this value is believed to be for airplanes equipped with a second, optional, 18 gallon fuel tank. The accident airplane was equipped with a single 18 gallon fuel tank, so the unusable fuel would have been 1.125 gallons, leaving 16.875 gallons useable for the accident flight (assuming that the fuel tank was completely full at departure).

Alternatively, the average fuel consumption rate could be estimated if the entire usable fuel supply (16.875 gallons usable) had been consumed during the accident flight. The accident occurred about 8 miles from the destination airport, or about 150 miles from UUV. If the airplane had maintained a ground speed of 71 mph for the 150 mile flight, it would have taken 2 hours 7 minutes to reach the accident site and the average fuel consumption rate would have been about 8.0 gallons per hour. If the airplane had maintained a ground speed of 63 mph, it would have taken 2 hours 23 minutes to reach the accident site and the average fuel consumption rate would have been about 7.1 gallons per hour.

(These calculations do not account for any additional fuel consumed during taxi, engine run-up, takeoff, and climb to cruise altitude.)