NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

December 27, 2011

17 - GPS Factual Report

Specialist's Factual Report
by Bill Tuccio

A. EVENT

Location:	Hailey, Idaho
Date:	November 29, 2011, 1900 Mountain Standard Time (MST)
Aircraft:	Piper PA-32RT-300T
Registration:	N36824
Operator:	Private
NTSB Number:	WPR12LA048

B. GROUP - No Group

C. SUMMARY

On November 29, 2011, about 1900 mountain standard time, a Piper PA-32RT-300T, N36824, impacted the terrain about one mile east of Friedman Memorial Airport, Hailey, Idaho. The pilot received minor injuries, his passenger received serious injuries, and the airplane, which was owned and operated by the pilot, sustained substantial damage. The 14 Code of Federal Regulations Part 91 personal transportation flight, which had just departed Hailey for Nampa, Idaho, was being operated in night visual meteorological conditions. No flight plan had been filed.

D. DETAILS OF INVESTIGATION

On December 19, 2011, the NTSB Vehicle Recorder Laboratory received the following device(s):

GPS Manufacturer/Model:	Garmin GPSMAP 496
Serial Number:	19718717

Garmin GPSMAP 496 Device Description

The Garmin GPSMAP 496 is a battery-powered portable 12-channel GPS receiver with a 256-color TFT LCD display screen. The unit includes a built-in Jeppesen database and is capable of receiving XM satellite radio for flight information including

NEXRAD radar, lightning, METARs, TAFs, and TFRs. A built-in AOPA Airport Directory and Safe Taxi Airport Diagrams are included for selected fields. The unit stores date, route-of-flight, and flight-time information for up to 50 flights. A flight record is triggered when groundspeed exceeds 30 knots and altitude exceeds 250 feet, and ends when groundspeed drops below 30 knots for 10 minutes or more. A detailed tracklog – including latitude, longitude, date, time, and GPS altitude information for an unspecified number of points – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Position is updated within the tracklog as a function of time or distance moved, depending on how the unit has been configured. Once the current tracklog memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured.

Tracklog storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile[1] memory. The unit contains hardware and software permitting the download of recorded waypoint, route, and tracklog information to a PC via a built-in serial port using the NMEA 0183 version 2.0 protocol. The unit can also communicate with external devices such as a computer using a built in USB port. An internal button-battery is used to back-up power to the internal memory and real-time clock during those periods when main power is removed.

GPS Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had not sustained any damage. Power was applied to the accident unit and recorded waypoint, route, and tracklog data was successfully downloaded from the unit via the USB port.

GPS Data Description

The data extracted included 10,014 data points in 95 sessions from October 29, 2011[2] through November 30, 2011. The accident flight session was recorded starting at 0148:06 UTC and ending at 0238:17 UTC on November 30, 2011.

GPS Parameters Provided

Table 1 describes data parameters provided by the GPS device. Date, Time, Latitude, Longitude, and GPS Altitude are recorded by the device. Groundspeed and Track are derived from the recorded parameters.

[1] Non-volatile memory is semiconductor memory that does not require external power for data retention.
[2] All dates and times are referenced to Coordinated Universal Time (UTC).

Table 1: GPS Data Parameters

Parameter Name	Parameter Description
Date	Date for recorded data point (MM/DD/YYYY)
Time	Time (UTC) for recorded data point (HH:MM:SS)
Latitude	Recorded Latitude (degrees)
Longitude	Recorded Longitude (degrees)
GPS Alt	Recorded Altitude (feet)
Groundspeed	Average groundspeed between current and previous data point (knots)
Track	Average course between current and previous data point (degrees)

OVERLAYS AND TABULAR DATA

Figure 1 is a graphical overlay generated using Google Earth showing a planview of select points of the accident flight. The first recorded point was at 0148:06 in the ramp area. At about 0157:56, the aircraft was stationary in the runup area adjacent the runway. At about 0158:46, the aircraft began its takeoff. The last point recorded consistent with the aircraft in motion was at about 0201:20. Points after 0201:20 through 0238:17, are consistent with the GPS recording a stationary position after impact.

Figure 2 is a graphical overlay generated using Google Earth showing the departure and deviation from centerline. At about 0159:10, the calculated track was about 145 degrees, true. At about 0159:30, the calculated track had started to change to about 138 degrees and continued in a left turn. At about 0200:01, the aircraft had reached its most northeasterly calculated track of about 61 degrees; after which the track began to turn right, towards the south.

Figure 3 is a graphical overlay generated using Google Earth showing the final recorded points of the flight. The recorded track shows the aircraft over rapidly rising terrain with decreasing airspeeds coincident with the right hand turn after 0200:01. The last three points recorded at 0200:35, 0200:51, and 0201:20 approximate the time of the crash.

Tabular data used to generate figures 1 through 3 are included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format.

Figure 1. Google Earth overlay — planview track of last flight.

Figure 2. Google Earth overlay — initial departure path.

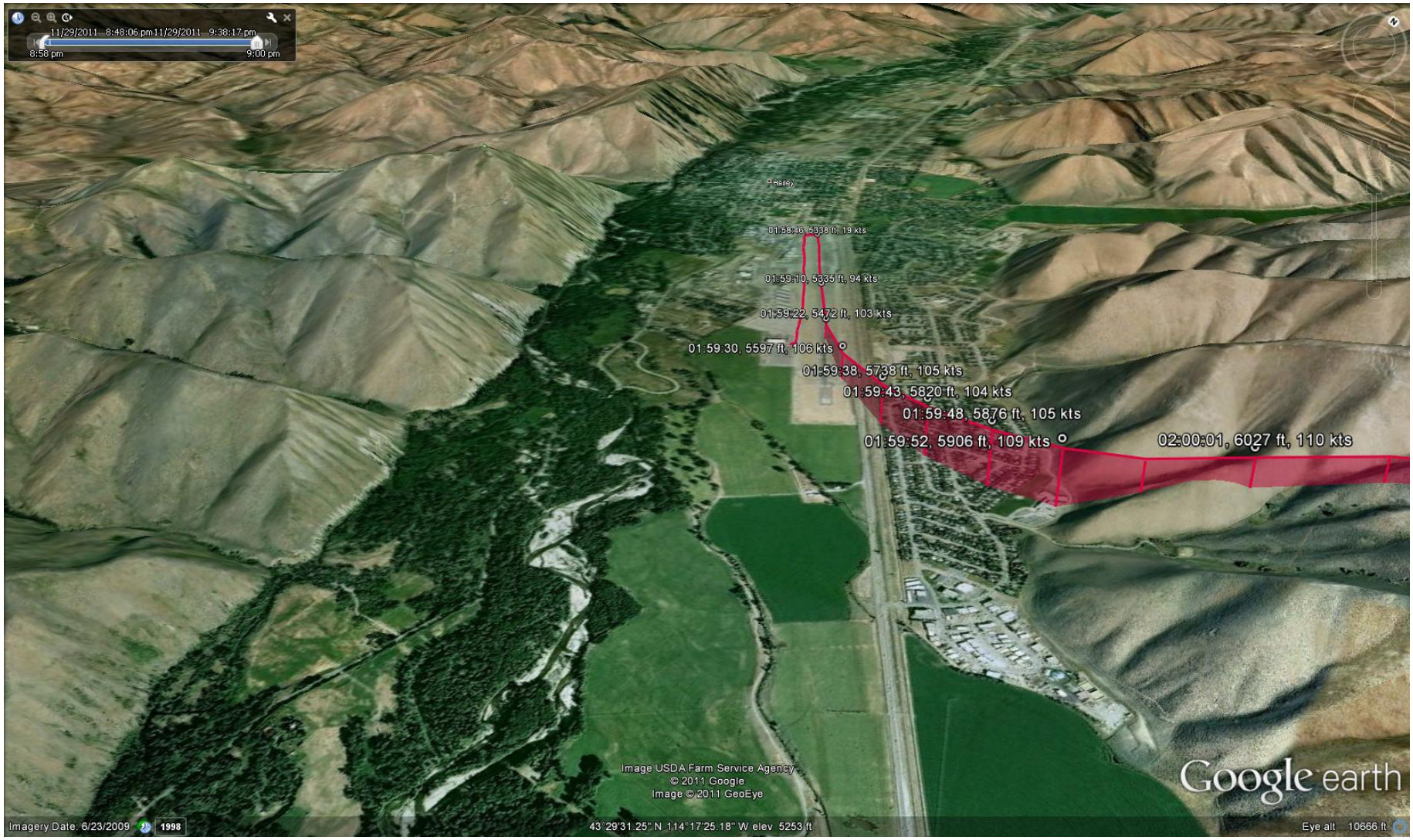

Figure 3. Google Earth overlay — crash.