Global Positioning System Device
Specialist’s Factual Report
By Doug Mansell

1. EVENT SUMMARY

Location: Huggins, Missouri
Date: June 12, 2015
Aircraft: Beech A36
Registration: N3193W
Operator: Private
NTSB Number: CEN15FA267

On June 12, 2015, about 0700 central daylight time (CDT), a Beech A36 airplane, N3193W, was destroyed by impact forces and a post impact fire following a loss of control during initial climb after takeoff from a private airstrip near Huggins, Missouri. The pilot and three passengers received fatal injuries. One passenger received serious injuries. The aircraft was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not on a flight plan. The flight was originating at the time of the accident and the final destination was the Provo Municipal Airport, Provo, Utah.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following global positioning system (GPS) device:

Device Manufacturer/Model: Garmin GPSmap 496
Serial Number: 19729699
3.1. Device Description

The Garmin GPSmap 496 is a battery-powered portable GPS receiver with a color LCD display. 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. The unit stores date, time, latitude, longitude, and altitude for multiple flights. A flight record is triggered when groundspeed exceeds 30 knots and altitude exceeds 500 feet, and ends when groundspeed drops below 30 knots for 10 minutes or more. A detailed track log is stored whenever the receiver has a lock on the GPS navigation signal. Entries are updated within the track log as a function of time or distance moved, depending on how the unit has been configured. Once the current track log memory becomes full, new information either overwrites the oldest information or the recording stops, depending on how the unit is configured. Track log storage may be activated or deactivated at user discretion. All recorded data is stored in non-volatile memory (NVM). Data can be downloaded from a non-damaged unit, using either a USB or serial connection. 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.

3.2. Data Recovery

The device sustained heat damage from the accident. Figures 1 through 4 show the damaged device, as received by the Vehicle Recorder Division. The device would not turn on. It was disassembled and, using a universal chip programmer, data was recovered directly from the NVM chip that contained the recorded data. Figure 5 shows the internal board; the location of the removed NVM chip is identified with a red circle.

Figure 1. Garmin GPSmap 496, as received, front
Figure 2. Garmin GPSmap 496, as received, back

Figure 3. Garmin GPSmap 496, as received, side
Figure 4. Garmin GPSmap 496, as received, bottom

Figure 5. Garmin GPSmap 496, internal circuit board
3.3. Data Description

The GPS unit contained 31 track logs, from March 5, 2015, to June 12, 2015. The last log corresponds to the accident flight. Data from the track logs immediately prior to the accident flight document recent airplane activity at the accident airstrip.

Evaluation of the GPS data indicates the airplane arrived at the private airstrip on the evening of June 1, 2015, following a cross-country flight from Provo Municipal Airport (KPVU) in Provo, UT, with a brief stop at Pratt Regional Airport (KPTT) in Pratt, KS.

A flight log on June 8, 2015, from 19:50:58 CDT to 20:10:29 CDT, originated and ended at the same private airstrip as the accident flight; takeoff was in the opposite direction as the accident takeoff.

The track log of the accident flight, on June 12, 2015, recorded data from 07:08:26 CDT to 07:11:20 CDT. The airplane taxied north and initiated a southbound takeoff. The last recorded location is near the southern end of the airstrip, west of centerline.

3.4. 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.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Description</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>Date</td>
<td>Date for recorded data point</td>
<td>mm/dd/yyyy</td>
</tr>
<tr>
<td>Time</td>
<td>Time (CDT) for recorded data point</td>
<td>hh:mm:ss</td>
</tr>
<tr>
<td>Latitude</td>
<td>Recorded Latitude</td>
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</tr>
<tr>
<td>Longitude</td>
<td>Recorded Longitude</td>
<td>degrees</td>
</tr>
<tr>
<td>GPS Alt</td>
<td>Recorded GPS Altitude</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Track</td>
<td>Derived true course</td>
<td>degrees</td>
</tr>
</tbody>
</table>

3.5. OVERLAYS AND TABULAR DATA

Google Earth was used to create graphical overlays of the accident location. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

Figure 6 is an overhead view (north up), and figure 7 is an oblique view (north up); both figures trace the track log data from the accident flight recording. Due to data buffering on the GPS unit, recording may have ended before the accident event.

Tabular data used to generate figures 6 and 7 are included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format.
Figure 6. Google Earth Overlay, accident flight track log, overhead view
Figure 7. Google Earth Overlay, accident flight track log, oblique view