

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

December 19, 2014

17 - GPS Factual Report

by Jane Foster

A. EVENT

Location: Middleton, Tennessee
Date: August 27, 2014
Aircraft: Cessna A188B
Registration: N5850G
Operator: Commercial
NTSB Number: ERA14LA409

B. GROUP - No Group

C. SUMMARY

On August 27, 2014, about 0850 central daylight time, a Cessna A188B, N5850G, collided with power lines and terrain during aerial application operations near Middleton, Tennessee. The commercial pilot received fatal injuries, and the airplane was destroyed. The airplane was operated under the provisions of 14 CFR Part 137 by the pilot. Day, visual meteorological conditions prevailed for the local, aerial application flight, and no flight plan was filed. The flight originated at Bolivar, Tennessee (M08) at 0837.

D. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Laboratory received the following device(s):

GPS Manufacturer/Model: Garmin GPSMAP76Cx
Serial Number: 10R-022508

Garmin GPSMAP 696 Device Description

The Garmin GPSMAP 76 is a hand-portable GPS unit equipped with a 4 level grayscale LCD display, soft-key controls, and employs a 12-channel receiver. The unit can be operated using external power, or alternatively by using a set of 2 internally

mounted AA batteries. An internal patch antenna is employed for GPS signal reception. The GPSMAP 76 is capable of storing position and altitude information for up to 1000 waypoints in non-volatile memory. Fifty routes, each representing a linked list of up to 50 waypoints, may also be stored in memory. A detailed tracklog – composed of latitude, longitude, date, time, and altitude information for an unspecified number of data points – may also be stored. Up to ten of these tracklogs may be manually saved into long term memory. The unit contains hardware and software permitting the download of recorded waypoint, route, and tracklog information via a Garmin proprietary interface. The unit communicates with other electronic devices via a serial port employing the NMEA 0183 protocol. 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 minor damage to the external case (see figures 1 and 2). The recorded data was extracted using the manufacturer's software normally and without difficulty.

Figure 1. Photo of front of GPSmap 76CSx



Figure 2: Photo of back of GPSmap 76CSx



GPS Data Description

The data extracted included 16 sessions from August 23, 2014¹ through September 2, 2014. The accident flight was recorded starting 12:24:47 UTC and ending at 13:51:09 UTC on August 27, 2014. The device remained at the crash location and continued recording from 13:51:09 UTC to 03:22:12 UTC on August 27, 2014.

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 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 3 is a graphical overlay generated using Google Earth for the accident flight. The flight departed the airport at approximately 12:24:47 UTC. The last recorded parameter was as at 23:33:44 UTC on August 27, 2014, with a GPS altitude of 381 feet above Mean Sea Level (MSL) and a ground speed of 0 knots. Due to the battery on the GPS unit, the data recording may have continued after the accident event.

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

Figure 3. Google Earth overlay showing the track log of the GPSmap 76Cx on August 27, 2014

