

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

July 15, 2014

Global Positioning System Device

Specialist's Factual Report Marie Moler

1. EVENT

Location: Holland, New Jersey
Date: January 15, 2014
Aircraft/ID: Champion 8KCAB / N469J
Operator: Private
NTSB Number: ERA14FA093

2. DETAILS OF DEVICE INVESTIGATION

The Safety Board's Vehicle Recorder Division received the following device:

Device: Garmin GPSMAP 496
Device Serial Number: 19714702

Device: Apple iPad Air
Device Serial Number: DLXLM71JF4YD

The Garmin GPSMAP 496 was found in good condition (Figure 1). Power was applied to the unit using NTSB laboratory equipment. Device startup was consistent with normal operation. GPS data was downloaded using normal methods and Garmin's Mapsource software.

The Apple iPad Air was significantly damaged by impact forces (Figure 2). The device was examined using a surrogate unit. No accident-related data was found on the device. This device is not discussed further in this report.

2.1. Garmin GPSMAP 496 Device Description

The Garmin GPSMAP 496 is a portable GPS receiver capable of storing date, route-of-flight, and flight-time information for up to 50 flights. A detailed tracklog – including latitude, longitude, date, time, and groundspeed information – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. All recorded data is stored in non-volatile¹ 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. 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.

¹ Non-volatile memory is semiconductor memory that does not require external power for data retention.

2.2. GPS Data Description

The data extracted included 32 sessions from August 24, 2013² through January 15, 2014. The last recorded session on January 15, 2014 was determined to be related to the accident and is included in this report.

2.3. 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, Course, and Distance are derived from the recorded parameters.

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)
Course	Average course between current and previous data point (degrees)

3. OVERLAYS AND TABULAR DATA

Graphical overlays were generated using Google Earth for the accident flight.

Figure 3 is a Google Earth overlay of the entire last recorded session.

Figure 4 is a 3D detail view of the end of the last recorded session.

The tabular data used to create Figures 3 and 4 are included as Attachment 1. This attachment is provided in electronic comma separated value (CSV) format.

² All dates and times are referenced to Coordinated Universal Time (UTC).



Figure 1: Garmin GPSMAP 496 (S/N 19714702)



Figure 2: Apple iPad Air (S/N DLXLM71JF4YD)

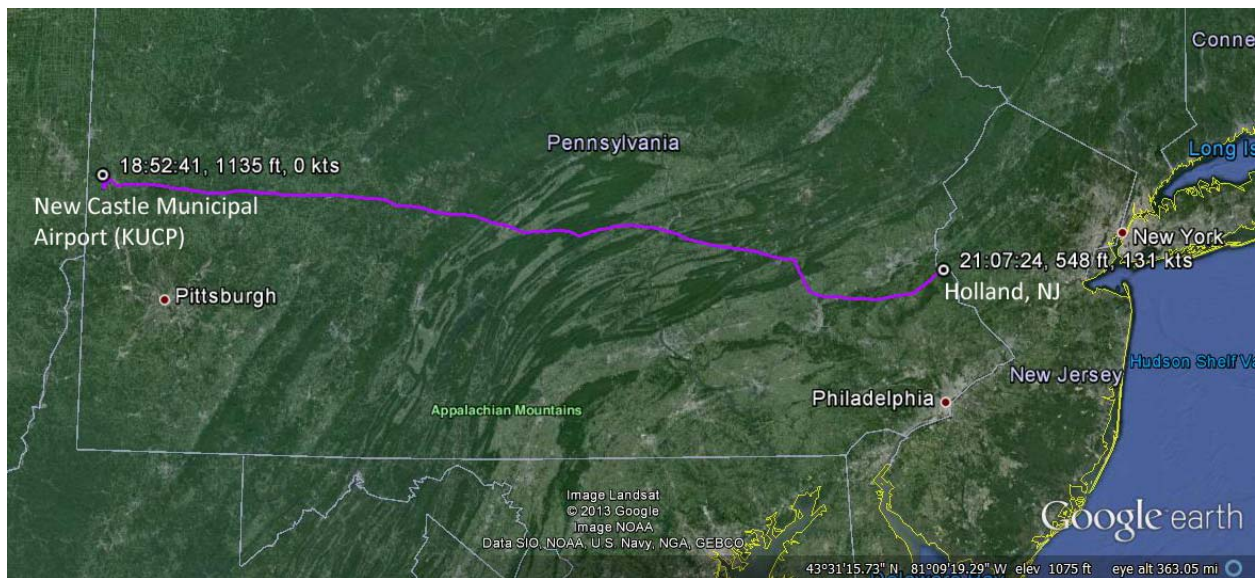


Figure 3: Google Earth overlay of last recorded session on January 15, 2014

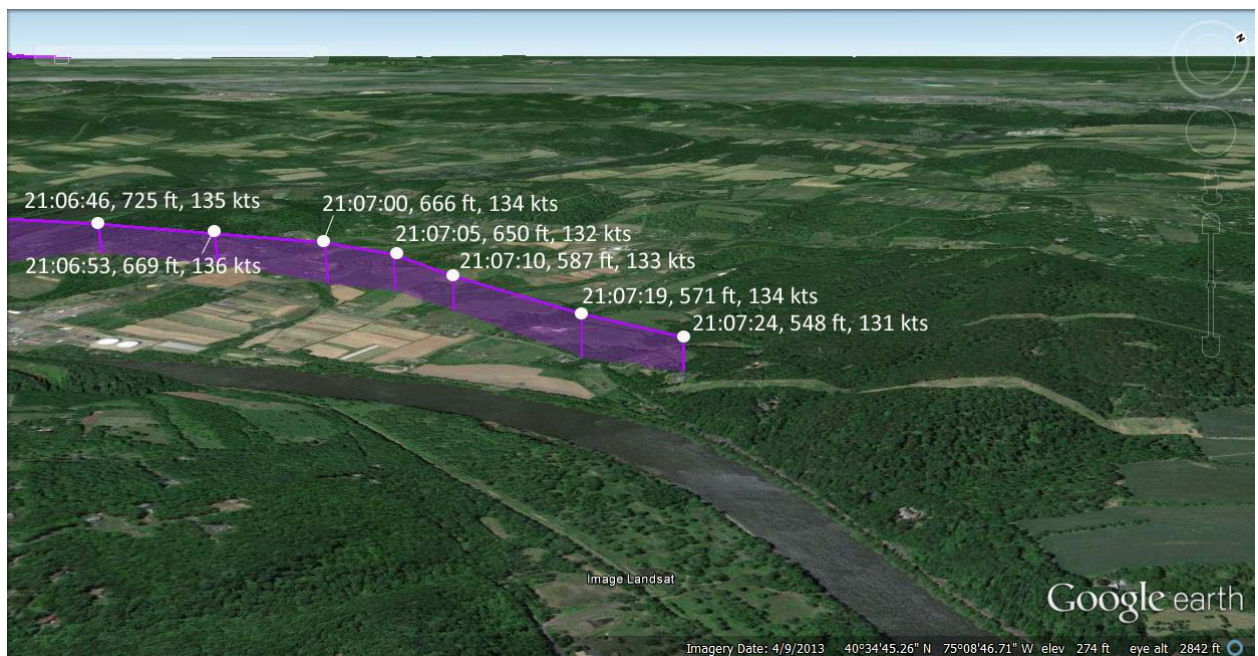


Figure 4: 3D detail view of end of last recorded session on January 15, 2014