

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

December 5, 2017

Global Positioning System Device

Specialist's Factual Report

By Jane Foster

1. EVENT SUMMARY

Location: Albany, Georgia
Date: January 30, 2016
Aircraft: Lancair IV-P
Registration: N401PT
Operator: Private
NTSB Number: ERA16FA097

On January 30, 2016, at 1445 eastern standard time, an experimental amateur-built Lancair IV-P, N401PT, operated by a private individual, was destroyed when it impacted terrain shortly after takeoff from the Southwest Georgia Regional Airport (ABY), in Albany, Georgia. The commercial pilot, pilot rated passenger and one additional passenger were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight, which was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

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 Aera 796
Serial Number:	Unknown

3.1. Device Description

The Garmin GPSMAP 796 is a battery-powered portable touch screen display and GPS receiver with a 7-inch diagonal high resolution 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. The unit

can also perform and store weight and balance calculations. 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 track log – 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 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 recording stops, depending on how the unit is configured. The current track log can be saved to long-term memory and 15 saved track logs can be maintained in addition to the current track log. Track log storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile¹ memory.

The unit contains hardware and software permitting the download of recorded waypoint, route, and track log information to a PC via a built-in USB port. An internal button-battery is used to power the internal memory and real-time clock during those periods when main power is removed.

3.2. Data Recovery

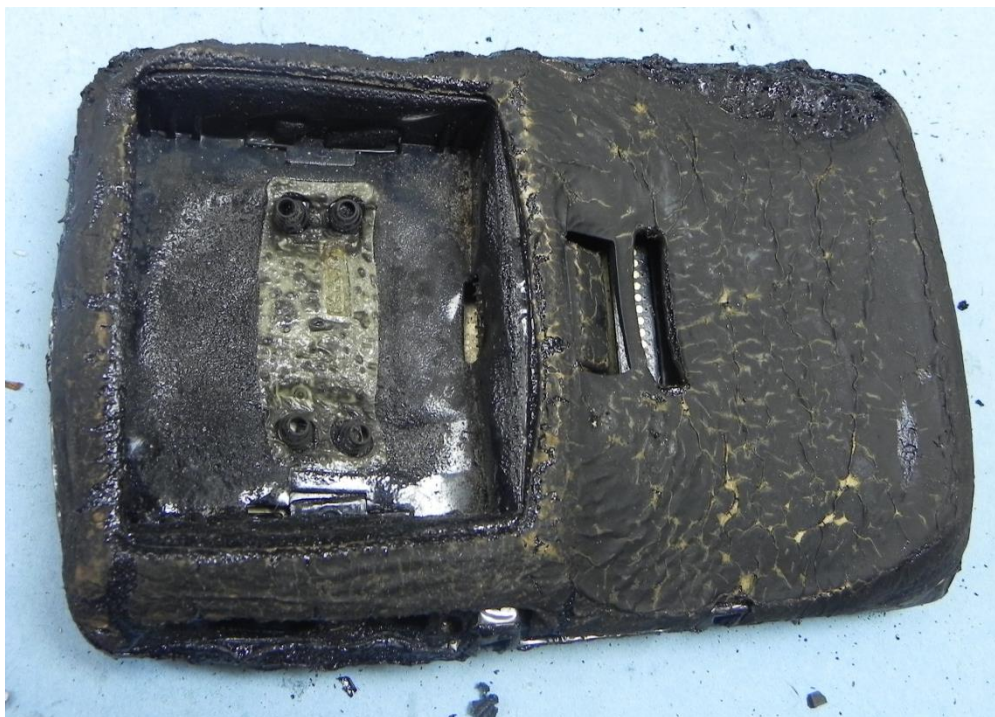
Upon arrival at the Vehicle Recorder Laboratory, an examination revealed the unit had sustained heavy fire and impact damage. The display screen was shattered and the casing was badly melted. The extent of the damage is shown in figures 1 and 2.

Figure 1. Front of device as received.



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

Figure 2. Back of device as received.



The chip containing the unit's non-volatile memory (NVM) was identified. The NVM chip was removed from the board. The chip was found to be in good condition after removal and was restored to working condition so data could be extracted. The chip read out normally using an adapter socket appropriate for the type and model of chip. The read out resulted in a binary file which was converted to engineering units using laboratory software. The binary readout and subsequent conversion produced files consistent with a normally operating GPS device.

3.3. Data Description

The data extracted included 69 track logs from January 5, 2016² through January 30, 2016. The accident flight was recorded starting 19:33:55 UTC and ending 19:45:14 UTC on January 30, 2016.

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.

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 GPS Altitude (feet)
Groundspeed	Average derived groundspeed (knots)
Track	Average derived true course (degrees)

3.5. OVERLAYS AND TABULAR DATA

Figure 3 is a graphical overlay generated using Google Earth for the accident flight. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording.

The recorded flight shows the vehicle taxiing along the runway at ABY. The last recorded parameter was at 19:45:14 UTC on January 30, 2016, with a GPS altitude of 221 feet above Mean Sea Level (MSL) and a ground speed of 18 knots. Due to data buffering on the GPS unit, the data recording may have ended before 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 image showing accident flight.

