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

July 23, 2014

Global Positioning System (GPS) Device

Specialist's Factual Report
by Bill Tuccio, Ph.D.

1. EVENT

Location:	Overton, Nevada
Date:	June 12, 2014
Aircraft:	Dittenber Express Auriga
Registration:	N55GM
Operator:	Private
NTSB Number:	WPR14FA243

On June 12, 2014, about 2105 Pacific daylight time (PDT), an experimental-Dittenber Express Auriga, N55GM, impacted terrain during landing at Echo Bay Airport (0L9), Overton, Nevada. The owner/pilot was operating the airplane under the provisions of 14 *Code of Federal Regulations* Part 91. The private pilot and passenger were fatally injured; the airplane was destroyed by impact forces and postcrash fire. The cross-country personal flight departed Minden, Nevada, about 1800. Visual meteorological conditions prevailed, and no flight plan had been filed.

2. DETAILS OF DEVICE INVESTIGATION

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

Device:	Garmin GPSMAP 696 (or 695)[1]
Device Serial Number:	Unknown

2.1. Garmin GPSMAP 696 Device Description

The Garmin GPSMAP 696 is a battery-powered portable multi-function 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 SafeTaxi airport diagrams are included for selected airfields. The unit stores date, route-of-flight, and flight-time information for up to 50 flights. A flight record

[1] Due to damage, the precise model was not determined. For the remainder of this report, the device is referred to as the Garmin 696.

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-volatile[2] 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 back-up power to the internal memory and real-time clock during those periods when main power is removed.

2.1.1. Garmin GPSMAP 696 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained significant impact damage, as shown in figure 1. An internal inspection revealed the main memory chip had separated from the printed circuit board, as shown in figure 2. Figure 3 shows numerous cracks observed in the chip. Due to the cracks, no further recovery attempts were made.

[2] Non-volatile memory is semiconductor memory that does not require external power for data retention

Figure 1. Garmin GPSMAP 696 damage photograph.

Figure 2. Garmin GPSMAP 696 main memory chip separated from component board.

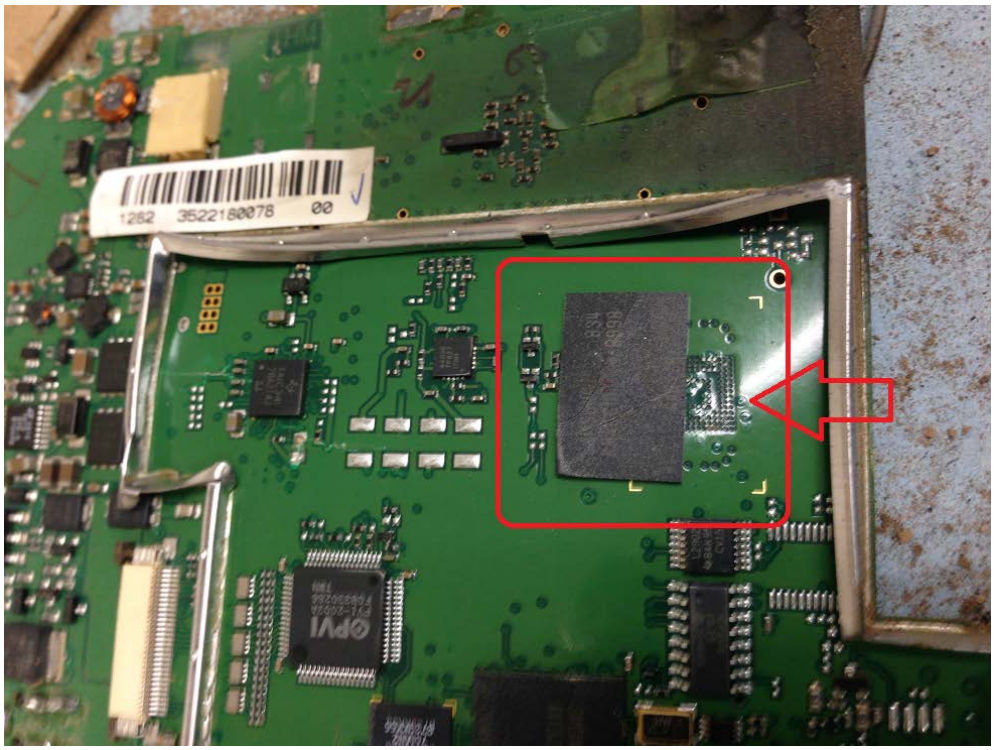
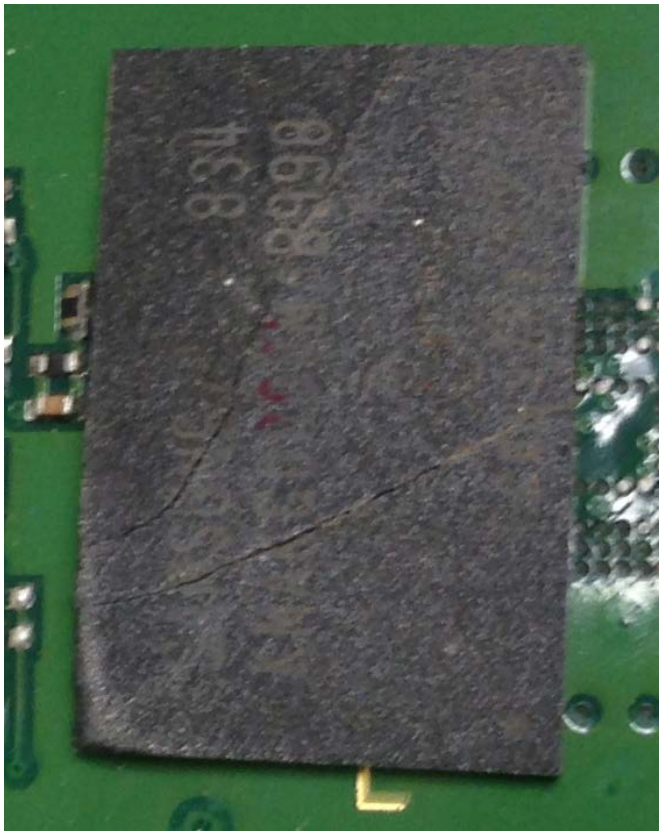


Figure 3. Garmin GPSMAP 696 main memory chip.



2.1.2. Garmin GPSMAP 696 Data Description

No data were recovered from the device.