

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

June 29, 2016

GPS and Personal Electronic Devices

**Specialist's Factual Report
by Joe Gregor**

1. EVENT

Location: Climax, Georgia
Date: November 9, 2015
Aircraft: Cessna 441
Registration: N164GP
Operator: Private
NTSB Number: ERA16FA035

On November 9, 2015, at 1016 eastern standard time (EST), a Cessna 441, N164GP, was destroyed by collision with trees, terrain and a post-crash fire following a loss of control while maneuvering near Climax, Georgia. The commercial pilot/owner and the commercial pilot-rated passenger were fatally injured. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the personal flight, which departed Lakeland Linder Regional Airport (LAL), Lakeland, Florida, at 0906, and was destined for the Cairo-Grady County Airport (70J), in Cairo, Georgia. The flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

2. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following devices:

Device 1:	Garmin GNS 530
Device 1 Serial Number:	Unknown
Device 2:	Samsung Galaxy Note II
Device 2 Serial Number:	Unknown
Device 3:	Garmin Aera 796
Device 3 Serial Number:	2CY003427

2.1. Garmin GNS 530 Device Description

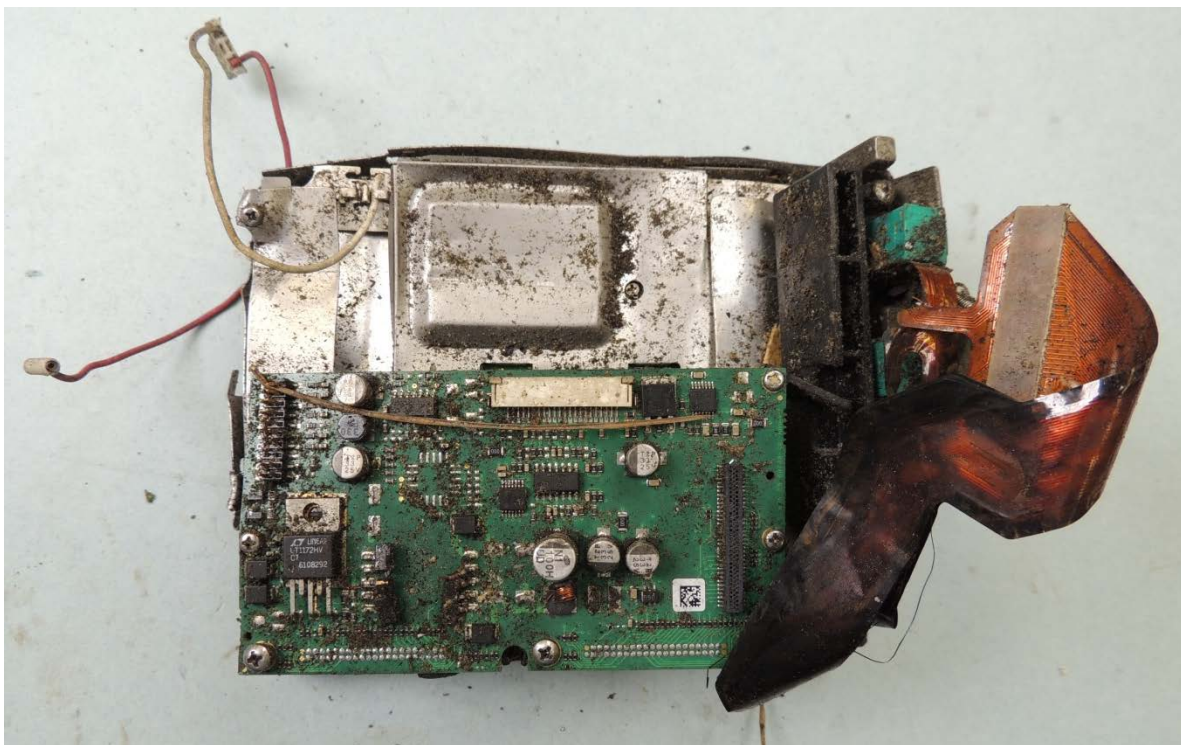
The Garmin Model GNS 530 is a panel-mounted GPS receiver featuring a 5-inch color liquid crystal (LCD) display and offering navigation and communication data, along with precision and non-precision approach certification in the IFR environment. The unit has a slot for a Jeppesen database (front-loading data card) containing all airports, VORs,

NDBs, intersections, Approach, STAR/SIDs and SUA information. A flight plan composed of multiple waypoints, including user-defined waypoints, can be programmed in the unit. However, no provision has been made to record and store position information within the unit. Data related to last known frequency settings and last known GPS location is stored in volatile memory and may be read from the front panel display upon power-up. There are no provisions for downloading stored data to a PC. 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 GNS 530 Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the unit had sustained catastrophic impact damage. Only the front bezel assembly was received (see figure 1). Two data cards were recovered from the front bezel assembly (see figure 2). These cards had suffered minor impact damage and biohazard exposure. The cards were inspected and cleaned and inserted into a surrogate GNS 430¹ to determine the effective dates for the software databases installed on the card.

Figure 1. Front panel bezel assembly from the Garmin GNS 530.



¹ The database cards are largely interchangeable between the Garmin GNS-430 and GNS-530.

Figure 2. Database cards recovered from the Garmin GNS 530.



2.1.2. Garmin GNS 530 Data Description

The surrogate GNS-430 displayed the following database information upon startup:

- Basemap Land Database 4.00
- Terrain Database 2.04
- Airport Terrain Database 2.04
- Obstacle Database Expired 08-APR-2010
- Aviation Database Expired 05-MAR-2015

This information was changed from that displayed upon startup with the stock database cards inserted; indicating that this database information reflects the data stored on the accident database cards, and not data stored on some other form of memory internal to the unit.

2.2. Samsung Galaxy Note II Device Description

Personal; Electronic Devices (PEDs) are a category of devices comprised primarily of portable computing devices and mobile phones. PEDs are typically capable of internet access, email, messaging services, and can run user-installed applications to perform specific tasks. Depending on the model, mobile phones can perform many of the same tasks as portable computing devices, plus have voice call and text messaging capabilities. PED user and system data is typically stored in non-volatile memory² and can be accessed through manufacturer-provided interfaces.

² Non-volatile memory is (generally) semiconductor memory capable of storing data in the absence of external power.

The Samsung Galaxy Note II is a device that combines the features of a large profile smartphone with a small profile tablet computer. The Galaxy Note II runs the Android OS and includes a smart pen for data entry.

2.2.1. Samsung Galaxy Note II Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained catastrophic impact damage. An internal inspection revealed that the internal circuitry was damaged beyond repair.

Figure 3. External view of the Samsung Galaxy Note II as received.



2.2.2. Samsung Galaxy Note II Data Description

No data was recovered from the Samsung Galaxy Note II.

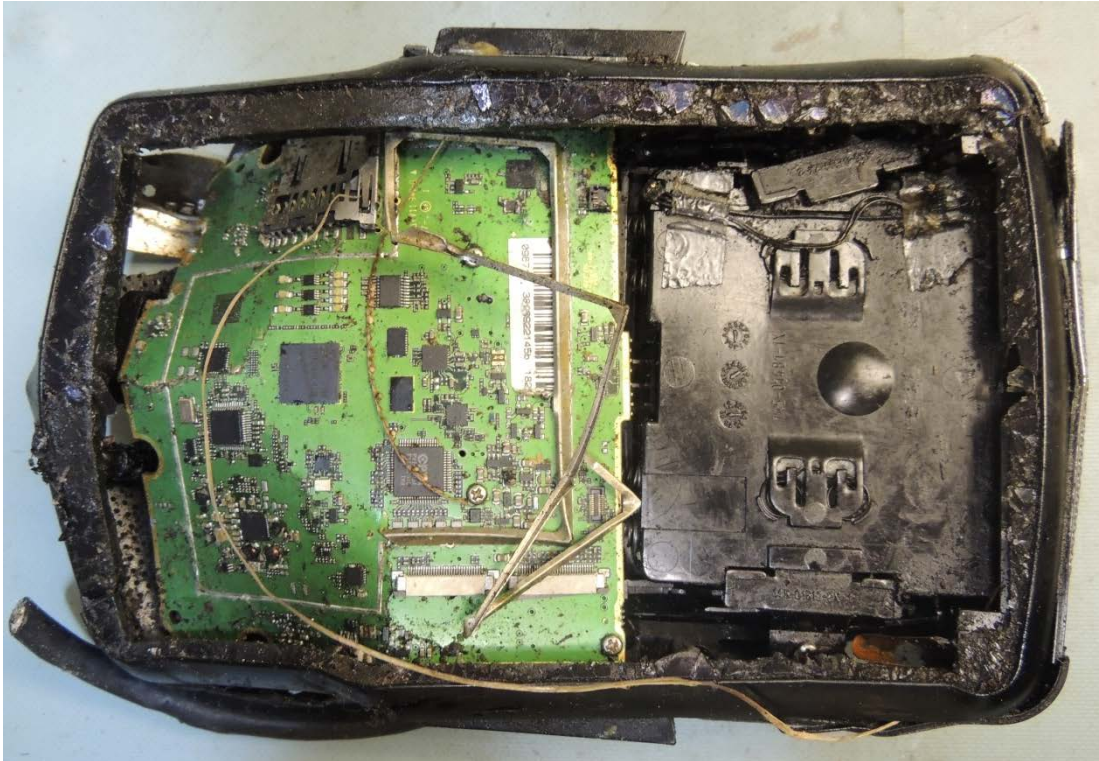
2.3. Garman Aera 796 Device Description

The Garman Aera 796 is a portable GPS receiver and display unit designed for the aviation market. The Aera 796 is designed to fulfill the role of either a Class I or Class II electronic flight bag, and includes 3-D vision as well as internal terrain and obstacle databases to support terrain avoidance warning. The unit also supports the downloading and display of aeronautical chart data for navigation. The Aera 796 displays this data on a 7-inch sunlight viewable LCD screen.

2.3.1. Garman Aera 796 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained catastrophic impact damage. An internal inspection revealed that the internal circuitry was damaged beyond repair. Additionally, the integrated circuit FLASH memory device that stored track log data was missing from the unit, consistent with ejection at the time of impact.

Figure 4. View of the Garman Aera 796 as received.



2.3.2. Garman Aera 796 Data Description

No data was recovered from the Garman Aera 796.