

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

August 7, 2014

Global Positioning System (GPS) Device

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

1. EVENT

Location: Ruther Glen, Virginia
Date: May 9, 2014
Aircraft: Eagle C-7
Registration: N3016Z
Operator: Private
NTSB Number: ERA14FA231

On May 9, 2014, about 1940 eastern daylight time (EDT), an Eagle C-7 Balloon, N3016Z, was destroyed by fire after a landing attempt to a field and subsequent impact with powerlines near Ruther Glen, Virginia. The commercial pilot and two passengers were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight that departed from Meadow Event Park, Doswell, Virginia, approximately 3.75 miles to the south of the accident location. The flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

2. DETAILS OF DEVICE INVESTIGATION

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

Device 1: Garmin Rhino 530HCX¹
Device 1 Serial Number: 10M050315

2.1. Garmin Rhino 530HCX GPS and Radio Description

The Garmin Rhino 530HCX is a hand-held 12-channel GPS receiver combined with a two-way voice radio transceiver capable of operating on up to 22 FRS² and GMRS³ frequency band channels. Cartography from a built-in North American base-map may be displayed along with position information on a built-in color LCD display. In addition to current and past unit position, the position of other contacts can be recorded and displayed on the LCD. Other-contact position information is updated using the built-in

¹ A lighted, hand-held magnifying glass was also received but was not pertinent to this investigation.

² Family radio service.

³ General Mobile Radio Service.

transceiver whenever the call or talk key is activated, depending on user-selected settings. The unit can store tagged position information for up to 500 user-defined waypoints. A detailed tracklog (including latitude, longitude, date, time, and altitude information) is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Position is updated within the tracklog as a function of time or distance moved, depending on how the unit has been configured. Once current tracklog memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. Tracklog storage may be activated or de-activated at user discretion. All recorded data is stored in nonvolatile memory⁴. The unit contains hardware and software permitting the download of recorded waypoint, route, and tracklog information to a PC via a built-in USB port or to a built-in microSD card.

2.1.1. Garmin Rhino 530HCX GPS and Radio Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minor structural damage, as shown in figure 1. The device also contained a 4GB microSD card, as shown in figure 2. Despite damage, information was downloaded normally from the unit and the microSD card.

Figure 1. Garmin Rhino 530HCX GPS and Radio.



Figure 2. Garmin Rhino 530HCX GPS and Radio – microSD Card.



⁴ Non-volatile memory is semiconductor memory that does not require external power for data retention.

2.1.2. Garmin Rhino 530HCX GPS and Radio Data Description

The microSD card contained no data. The tracklog information downloaded from the device's internal nonvolatile memory contained tracks from September 15, 2013 through and including the accident flight. However, most of the tracklogs, including the accident flight, contained invalid or otherwise non-pertinent GPS data. For example, the tracklog on May 9, 2014, had unchanging latitude and longitude coordinates and altitudes all above 5,000 feet.