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

June 7, 2013

GPS Recording Device

Specialist's Factual Report
By Ben Hsu

1. EVENT

Location:	Camp Bastion, Afganistan
Date / Time:	January 16, 2012 / 1850 PDT
Aircraft/ID:	Bell 214 / N5748M
Operator:	AAR Airlift Corp
NTSB Number:	DCA12FA024

2. DETAILS OF DEVICE INVESTIGATION

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

Device:	Garmin GPSMAP 495
Device Serial Number:	1E2000944

The Garmin Global Positioning System (GPS) device exhibited minor damage (Figure 1). Power was applied and device power-up was consistent with normal operation. Data was downloaded normally using Garmin's Mapsource software.

2.1. Garmin GPSMAP 495 Device Description

The Garmin GPSMAP 495 is a portable GPS unit capable of storing date, route of flight, and flight time information for up to 50 individual flights in the form of a flight log. A detailed tracklog – including latitude, longitude, date, time, GPS altitude, 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-volatile 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. 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 495 Data Description

The data extracted included 30 sessions from January 2, 2012 through January 16, 2012[1]. The session recorded on January 16, 2012, starting at 04:58:41, was determined to be related to the accident and is included in this report.

[1] All dates and times are referenced to Coordinated Universal Time (UTC) unless otherwise specified.

2.1.2. Garmin GPSMAP 495 Parameters Provided

Table 1 describes data parameters provided by the GPS device. Date, Time, Latitude, Longitude, and GPS Altitude are recorded by the device. Course and Groundspeed are derived from the recorded 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)

Table 1: GPS Data Parameters

3. OVERLAYS AND TABULAR DATA

Figure 2 is a Google Earth overlay of the last session recorded on January 16, 2012.

Figure 3 is a Google Earth overlay of the last session recorded on January 16, 2012 showing a 3D view of the end of the session.

The tabular data used to create Figures 2 and 3 are included as Attachment 1.

All attachments are provided in electronic comma separated value (CSV) format.

Figure 1: Garmin GPSMAP 495 (S/N 1E2000944)

Figure 2: Overview of session recorded on January 16, 2012

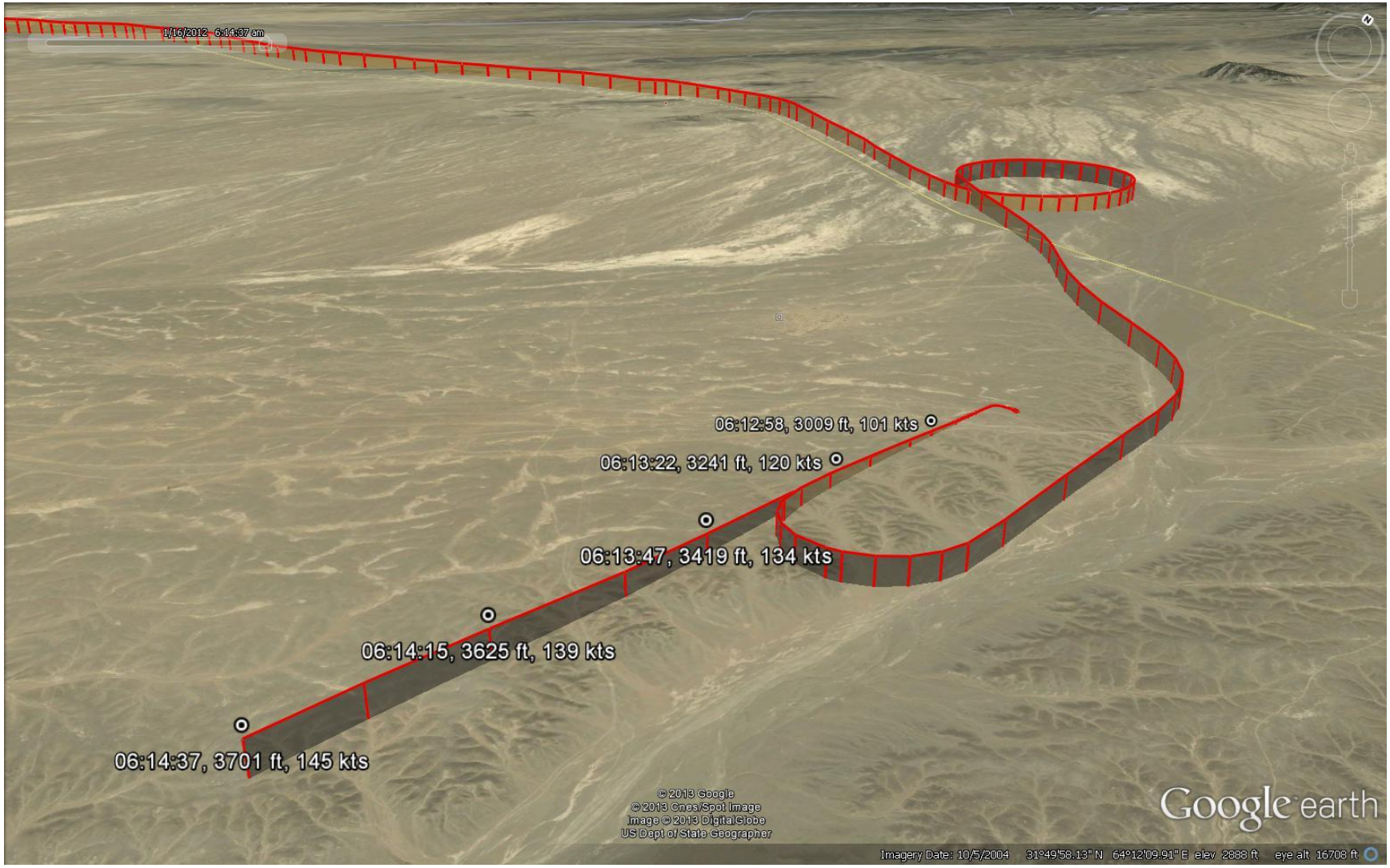

Figure 3: Detail of end of session recorded on January 16, 2012