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

October 25, 2012

17 - GPS Factual Report

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A. EVENT

Location:	Delta Junction, Alaska
Date:	August 7, 2012
Aircraft:	McDonnell Douglas MD 600N
Registration:	N737TV
Operator:	Aurora Aviation Services, Inc
NTSB Number:	ANC12FA084

B. GROUP - No Group

C. SUMMARY

On August 7, 2012, about 1633 Alaska daylight time, a McDonnell Douglas MD 600N helicopter, N737TV, sustained substantial damage while landing on a remote helipad near Pogo Mine, 38 mile northeast of Delta Junction, Alaska. The helicopter was being operated by Aurora Aviation Services, Inc, as a 14 Code of Federal Regulations (CFR) Part 135 visual flight rules (VFR) on-demand charter flight when the accident occurred. The certificated airline transport pilot was fatally injured. Visual meteorological conditions prevailed, and company flight following was in effect. The flight departed from Pogo Mine.

D. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Laboratory received the following device(s):

GPS Manufacturer/Model:	Garmin GPSMAP 496
Serial Number:	19722368

Garmin GPSMAP 496 Device Description
The Garmin GPSMAP 496 is a battery-powered portable 12-channel GPS receiver with a 256-color TFT 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. 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 tracklog – 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 tracklog as a function of time or distance moved, depending on how the unit has been configured. Once the 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 non-volatile memory[1]. 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 using the NMEA 0183 version 2.0 protocol. The unit can also communicate with external devices such as a computer using 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.

GPS Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the battery pack to be missing but the unit had not sustained any damage (figures 1 and 2). A surrogate battery was used and power was applied to the accident unit. Recorded waypoint, route, and tracklog data was successfully downloaded from the unit via the USB port.

Figure 1. Front photo of recovered Garmin 496 unit.

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

Figure 2. Back photo of recovered Garmin 496 unit.

GPS Data Description

The data extracted included 5 sessions from August 7, 2012[2] through August 8, 2012 and consisted of 1,755 total data points. The accident flight was recorded starting 00:02:16 UTC and ending 00:41:29 UTC on August 8, 2011, consisting of 269 data points.

GPS 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.

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[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 groundspeed between current and previous data point (knots)
Track	Average course between current and previous data point (degrees)

OVERLAYS AND TABULAR DATA

Figure 3 is a graphical overlay generated using Google Earth for the entire accident flight. The overlay shows the entire flight profile from which the pilot made several takeoffs and landings before the final data point. The data points selected begin at 00:39:14 on August 8, 2012 and lead up to the last recorded parameter at 00:41:29 UTC, with a GPS altitude of 2,717 feet above Mean Sea Level (MSL) and a ground speed of 0 knots.

Figure 4 is a graphical overlay generated using Google Earth and highlights five points of data before the final recorded data point, with MSL altitudes ranging from 2490 feet to 2723 feet. Position and GPS altitudes may lose accuracy depending on GPS orientation.

Tabular data used to generate figures 3 and 4 are included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format.

Figure 3. Google Earth overlay showing accident flight.

Figure 4. Google Earth overlay showing final data points.

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