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

GPS Factual

DCA07MA003

by

Joseph A. Gregor

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November 20, 2006

GPS

Factual
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A. EVENT

Location:	Manhattan, NY
Date:	October 11, 2006,1442 Eastern Daylight Time (EDT)
Aircraft:	Cirrus SR-20, N929CD
Operator:	Private
NTSB Number:	DCA07MA003

B. GROUP - No Group

C. SUMMARY

On October 11, 2006, about 14:42 PM eastern daylight time, a Cirrus SR-20, N929CD, crashed into an apartment building in Manhattan. A Garmin GPSMAP 396 and a Garmin GPSMAP 496 were sent to the National Transportation Safety Board's Vehicle Recorder Laboratory for data recovery.

D. DETAILS OF INVESTIGATION

On October 13, 2006, the NTSB Vehicle Recorder Laboratory received the following devices:

GPS Manufacturer/Model:	Garmin GPSMAP 396
Serial Number:	28208301

GPS Manufacturer/Model:	Garmin GPSMAP 496
Serial Number:	19703418

GPS Description

The Garmin GPSMAP 396 is a battery-powered portable GPS receiver with a 256-color TFT[1] LCD[2] display screen. The unit includes a built-in Jeppesen database and is capable of receiving XM satellite radio for flight information including NEXTRAD radar,[3] lightning, METARs,[4] TAFs,[5] and TFRs.[6] 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 500 feet, and ends when groundspeed drops below 30 knots for 10 minutes or more. In addition, the unit records date/time-stamped latitude/longitude information updated up to once per second in a virtual continuous loop for as long as the unit is receiving GPS signals. Once this 'tracklog' memory is full, new data overwrites older data on a first-in first-out basis. The current track may be saved in a separate section of memory, and 15 such independent tracklogs can be maintained separate from the current tracklog. Both current and saved tracklogs, along with any saved waypoints[7] and routes,[8] may be downloaded to a personal computer (PC) for subsequent evaluation and overlay on a surface map.

The Garmin GPMAP 496 has all of the features of the GPSMAP 396 plus a built-in AOPA Airport Directory and Safe Taxi Airport Diagrams for selected fields. A flight log entry in the GPSMAP 496 is triggered when the aircraft climbs above 250 feet, as opposed to the 500 feet used by the GPSMAP 396.

GPS Damage

Upon arrival at the Vehicle Recorder laboratory, it was evident that both GPS units had sustained moderate impact and water damage. For both units, the case showed signs of external impact, shattering the main LCD display. Several ferrite coils within the units were damage and/or separated from the printed circuit board. These coils were repaired, and all traces of corrosion due to freshwater exposure were

[1] TFT – Thin Film Transistor, a technology used to provide super-sharp display resolution.
[2] LCD - Liquid Crystal Display.
[3] A standard dataset of radar reflectivity images for the U.S. Hourly NEXTRAD radar maps are provided to FASTNET by the National Climatic Data Center where they are used to delineate the spatial-temporal pattern of precipitation.
[4] METeorological Aerodrome Report - a format for reporting weather information and used predominantly by pilots in fulfillment of part of the pre-flight weather briefing requirement.
[5] Terminal Airdrome Forecast.
[6] Temporary Flight Restriction.
[7] Latitude/longitude position corresponding to a waypoint, fix, airport, or other reference point.
[8] A collection of waypoints constituting a flight plan.

cleaned, prior to unit activation. When powered-up, the backlight for the displays did not activate, and the LCD displayed no usable information.

GPS Data Description

Impact damage repair and recovery efforts at the NTSB Recorder Lab were unsuccessful. Both units were forwarded to Garmin for repair and download. Garmin reported that they were unable to repair and recover any information from either device due to extensive impact and water damage.[9]

Joseph A. Gregor
Data Recover Specialist

[9] Information reported via e-mail from Garmin, Int'l.