

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

July 24, 2012

17 - GPS Factual Report

by Joe Gregor

A. EVENT

Location: New Orleans, Louisiana
Date/Time: November 29, 2011 / 1824 Central Standard Time (CST)¹
Aircraft Type/ID: PA-31 (Navajo) / N6485L
Operator: Private
NTSB Number: CEN12FA088

B. GROUP - No Group

C. SUMMARY

On November 29, 2011, at 1824 central standard time, a Piper Aircraft, Inc., PA-31 (Navajo), N6485L, impacted obstructions during an emergency landing at Lakefront Airport (NEW), New Orleans, Louisiana. Night visual meteorological conditions prevailed and no flight plan was filed. The flight originated from Stephenville Airport (SEP), Stephenville, Texas, about 1547.

D. DETAILS OF INVESTIGATION

On 12/05/2011, the NTSB Vehicle Recorder Laboratory received the following device(s):

GPS Manufacturer/Model:	AvMap GeoPilot
Serial Number:	5101359

¹ All times in the remainder of this report are given in Central Standard Time (CST), unless otherwise noted.

GPS Manufacturer/Model:
Serial Number:

Garmin GPSMAP 295
08811299

GPS Description: AvMap GeoPilot

The AvMap GeoPilot is a battery operated, hand-portable mapping GPS receiver equipped with a 5" wide color LCD display, soft key controls, and support for custom maps. An optional antenna permits reception of XM/WX weather conditions: NEXRAD (next generation radar), and Lightning information are displayed on the map. Cartography preloaded on an internal SD memory card includes the Jeppesen® navigation database with terrain and vertical obstructions. The Map also includes Victor Airways, marine objects, ULM Aerodromes and private airports. The GeoPilot is capable of storing position information for up to 1000 waypoints. Ten 'flight plans', each representing a linked list of up to 100 waypoints, may also be stored in memory. A track log containing the latitude/longitude coordinates for thousands of separate data points can also be stored. The update rate for the tracking information may be selected by the user based on time interval, distance traveled, or an internal algorithm designed to save memory by triggering updates based on changes in position and/or direction traveled. Tracking, waypoint, and flight plan data is stored within the GeoPilot in volatile memory and may be downloaded via a built-in serial port using NMEA-0183 protocols to a PC running Jeppesen® FlightStar software. The LCD display must be functional in order to access the menu structure and set up the unit for download.

GPS Data Recovery: AvMap GeoPilot

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed that the unit had sustained so significant damage (see figure 1). The unit was powered up and data downloaded to a PC running the Jeppesen *Flightstar* software program communicating with the unit via the built-in serial port.

GPS Data Description: AvMap GeoPilot

One track log was recovered from the GeoPilot. This track log consisted of fifteen

points located in the area of Yuma, Arizona. No data relevant to the accident was recovered from the AvMap GeoPilot.

GPS Description: GPSMAP 295

The Garmin GPSMAP 295 is a hand-portable GPS unit equipped with a 16-color LCD display, soft-key controls, and employs a 12-channel receiver. The unit can be operated using external power, or alternatively by using a set of 6 internally mounted AA batteries. An external antenna, attached via a BNC-style connector, is required for normal operation. The GPSMAP 295 is capable of storing position and altitude information for up to 500 waypoints in *non-volatile*² memory. Twenty routes, each representing a linked list of up to 30 waypoints, may also be stored in memory. A detailed tracklog – composed of latitude, longitude, date, time, altitude, and groundspeed information for approximately 1000 separate data points – can also be stored. Tracklog storage may be activated or de-activated at user discretion. 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. 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: Garmin GPSMAP 295

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed that the unit had sustained no significant damage (see figure 2). The unit was powered up and track data downloaded normally to a PC running Garmin MapSource communicating with the unit via the built-in serial port.

GPS Data Description: Garmin GPSMAP 295

Five (5) track logs were recovered from the unit. The longest track log recorded data consistent with descriptions of the accident flight. Downloaded track log data included the following parameters for each recorded data point: index, date, GPS time, Latitude, Longitude, GPS altitude, average groundspeed during the previous interval,

² Non-volatile memory is semiconductor memory that does not require external power for data retention.

and average track during this previous interval. Groundspeed and track information are calculated by the download software, and are not recorded within the GPS unit itself.

Track log data corresponding to the accident flight is provided in electronic (.csv) format as Attachment 1 to this report. A key to this tabular data is given in Appendix A. Data corresponding to this track log began at 1547:36 CST with a latitude/longitude position fix corresponding to Clark Field Municipal Airport (KSEP) in Stephenville, TX. The average GPS altitude during the 52-seconds just prior to takeoff was 1281 ft. Field elevation for KSEP as reported by AirNav³ is 1321 ft (surveyed). The final GPS position location fix was recorded at 1813:55 EDT, and placed the aircraft at N30° 11.477' and W90° 01.483' with 7926 ft GPS altitude. The last calculated velocity and direction of travel was 231 mph groundspeed with a course of 165° true.

Figures 3 – 5 represent Google Earth overlays illustrating the track log history for the accident flight. Figure 3 gives an overhead view of the track log history for the entire flight. Figure 4 gives an overhead view for the last approximately 12-minuts of the flight. Figure 5 gives a 3-D view of the latter half of the flight, looking to the northwest.

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³ www.airnav.com.



Figure 1. External front view of the AvMap GeoPilot (s/n 5101359).



Figure 2. External rear view of the Garmin GPSMAP 295 (s/n 08811299).

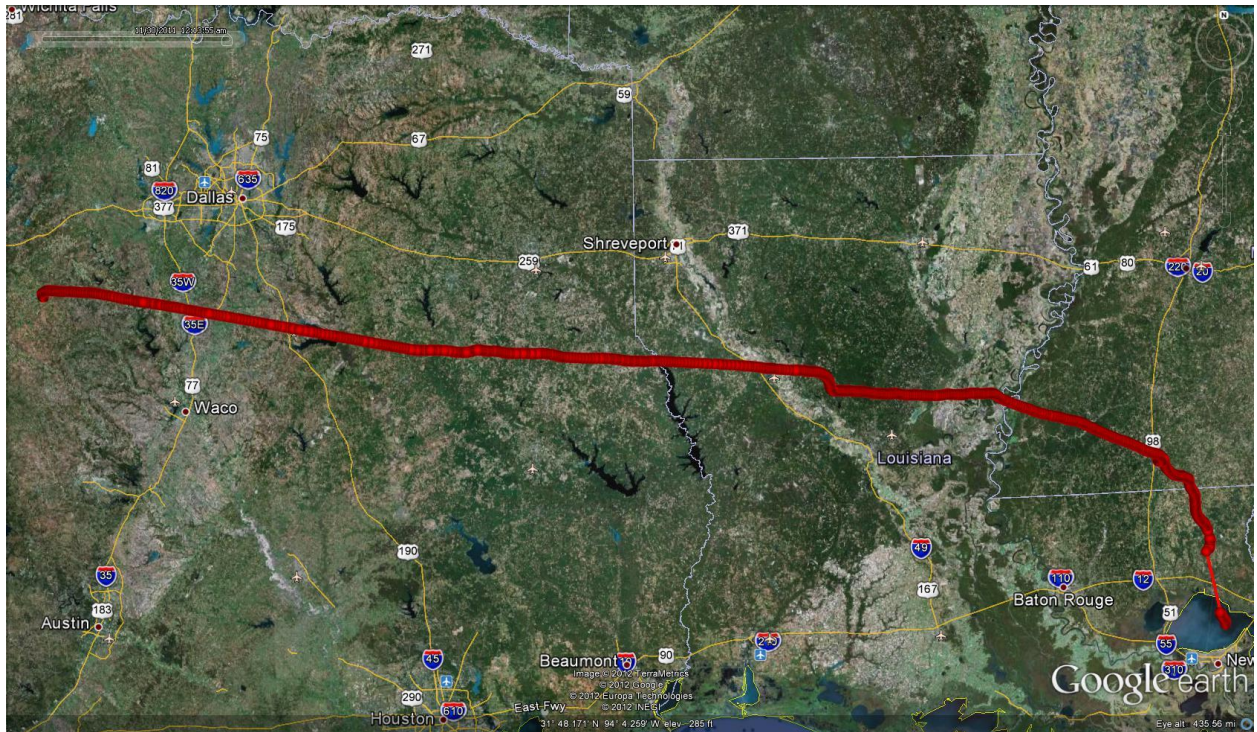


Figure 3. *Google Earth 2-D overlay depicting aircraft position using data downloaded from the Garmin GPSMAP 295 covering the period from 1547:36 to 1813:55 CST. Track log data begins at Clark Field Municipal Airport (KSEP), on the left in this figure. Track log data ends just north of New Orleans Lakefront Airport, over Lake Pontchartrain.*

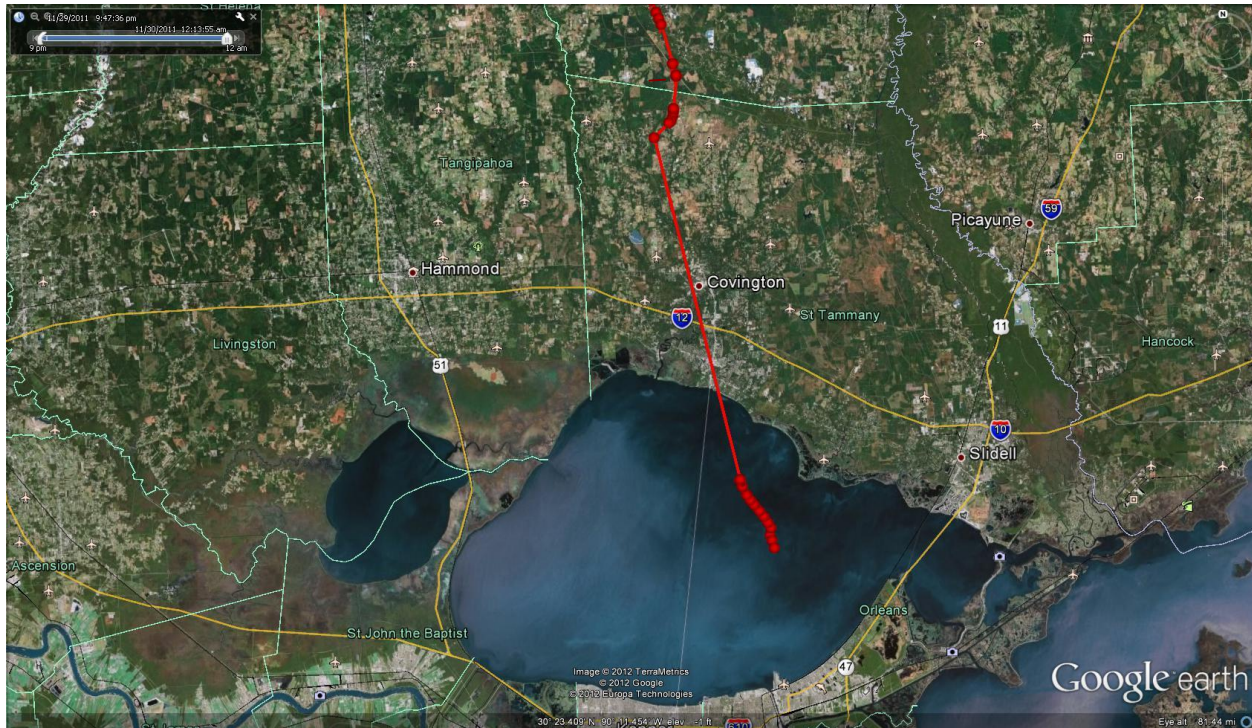


Figure 4. *Google Earth* 2-D overlay depicting aircraft position using data downloaded from the Garmin GPSMAP 295 covering the period from approximately 1802 to 1813:55 CST.

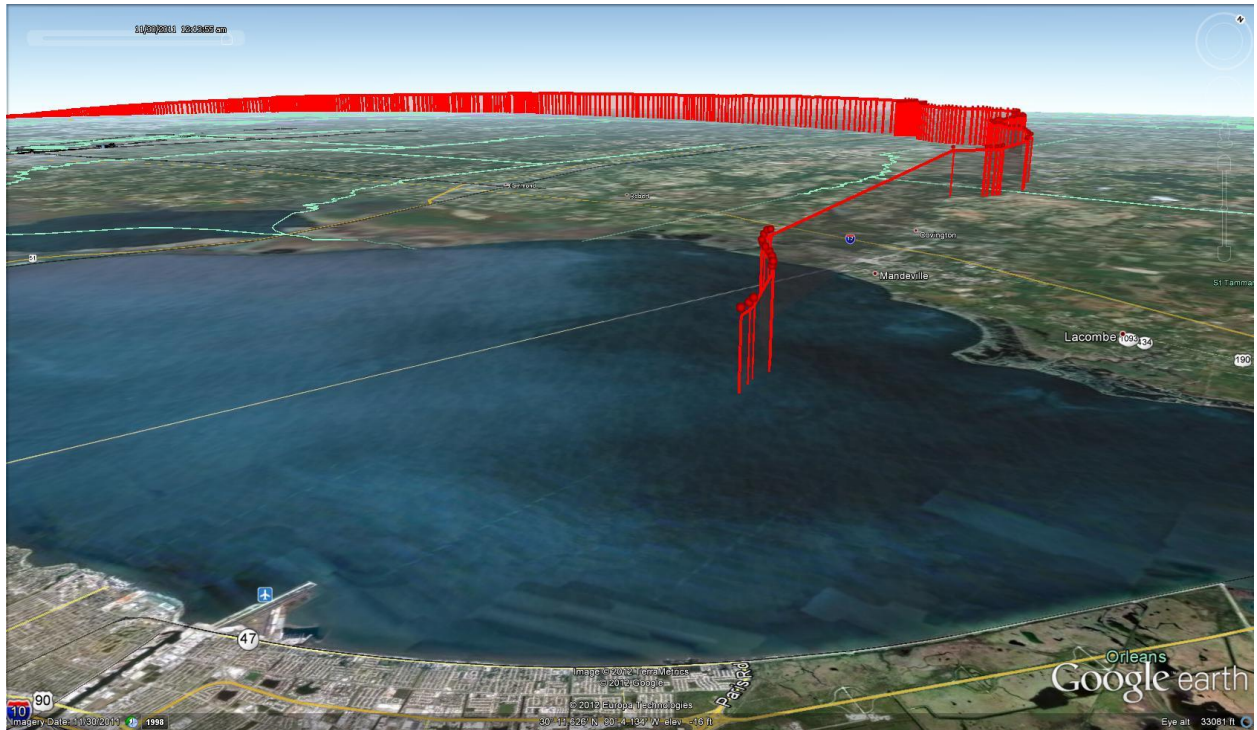


Figure 5. *Google Earth* 3-D overlay looking northwest, depicting aircraft position using data downloaded from the Garmin GPSMAP 295.

ATTACHMENTS

Tabular data corresponding to the last flight downloaded from a Garmin GPSMAP 295 (s/n 08811299) recovered from a PA-31 (N6485L) that experienced a hard landing in New Orleans, LA on November 11, 2011 is contained in Attachment 1.

LEGEND

Date	Date of recorded data point
Time	Time (CST) of recorded data point
Latitude	Latitude coordinate in degrees
Longitude	Longitude coordinate in degrees
GPS Altitude	GPS altitude in feet
Groundspeed	Average groundspeed in knots from previous data point
Track	Average ground track in degrees-true from previous data point