

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

October 25, 2012

17 - GPS Factual Report

by Bill Tuccio

A. EVENT

Location: Macon, Georgia
Date: September 18, 2012
Aircraft: Beech 400
Registration: N428JD
Operator: Private
NTSB Number: ERA12FA567

B. GROUP - No Group

C. SUMMARY

On September 18, 2012, about 1003 eastern daylight time, a Beech 400, N428JD, was substantially damaged when it overran runway 28 during landing at Macon Downtown Airport (MAC), Macon, Georgia. The airplane had departed from Charleston Air Force Base/International Airport (CHS), Charleston, South Carolina about 0930. Visual meteorological conditions prevailed and an instrument flight rules (IFR) flight plan had been filed. Both Airline Transport Pilots (ATP) and one passenger sustained minor injuries. The corporate flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

D. DETAILS OF INVESTIGATION

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

GPS Manufacturer/Model:	Garmin GPSMAP 496
Serial Number:	19729915

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. A 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 memory¹. 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 unit had not sustained any damage. Power was applied to the accident unit and recorded waypoint, route, and tracklog data was successfully downloaded from the unit via the USB port.

GPS Data Description

The data extracted included 5 sessions from April 13, 2012 through September 18, 2012, consisting of 361 total data points. The accident flight was the last session recorded. The session began on September 18, 2012 at 13:07:25 UTC and ended at 13:57:38 UTC, consisting of 183 total data points.

The unit was also connected to an external Garmin GXM30 XM radio and weather receiver. The XM radio subscription was current when tested in the NTSB Vehicle Recorder Laboratory on October 5, 2012; however no historical information was recorded.

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.

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

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 MSL ³ Altitude (feet)
Groundspeed	Average groundspeed between current and previous data point (knots)
Track	Average true course between current and previous data point (degrees)

OVERLAYS AND TABULAR DATA

The graphical overlays in figures 1 through 3 were generated using Google Earth.

Figure 1 is a graphical overlay for select recorded points for the entire accident flight. The first recorded point is at 13:07:25 UTC. At 13:23:09, the groundspeed was about 97 knots and thereafter continued to increase, as did altitude. The aircraft climbed to about 16,860 feet by 13:35:42, and started to descend out of this altitude at about 13:42:37.

Figures 2 and 3 are graphical overlays of the end of the flight. The underlying image is the FAA Atlanta Sectional Chart, Edition Number 89, dated August 23, 2012. The select points show the aircraft descending through about 10,469 feet at 13:48:43. The last recorded point was at 13:57:38, with the aircraft at a recorded altitude of 2,946 feet about 16 nautical miles east of the MAC airport.

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

³ MSL means Mean Sea Level.

Figure 1. Google Earth overlay showing select points for whole flight.

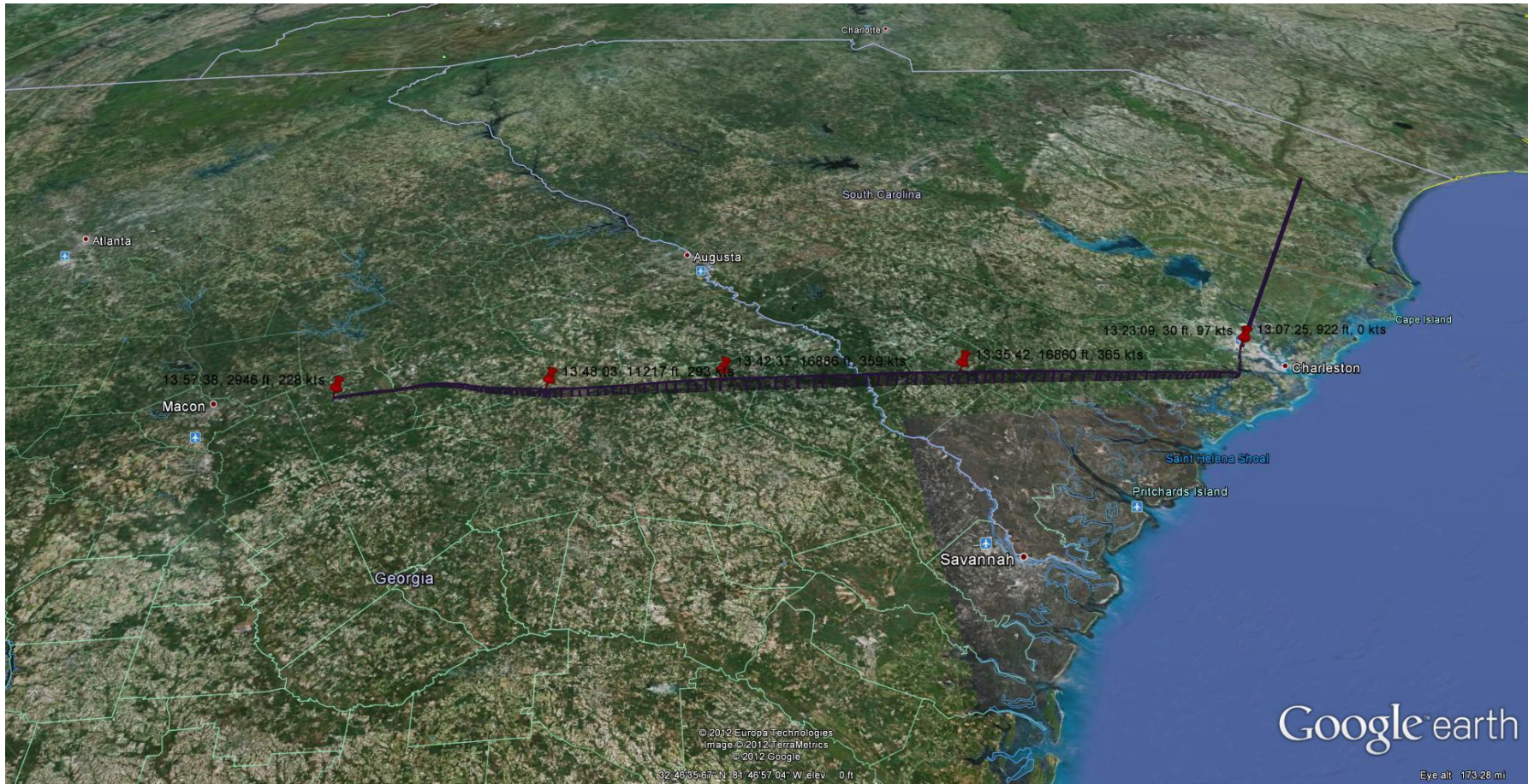


Figure 2. Sectional overlay showing select points descending into the Macon terminal area through the end of recording.

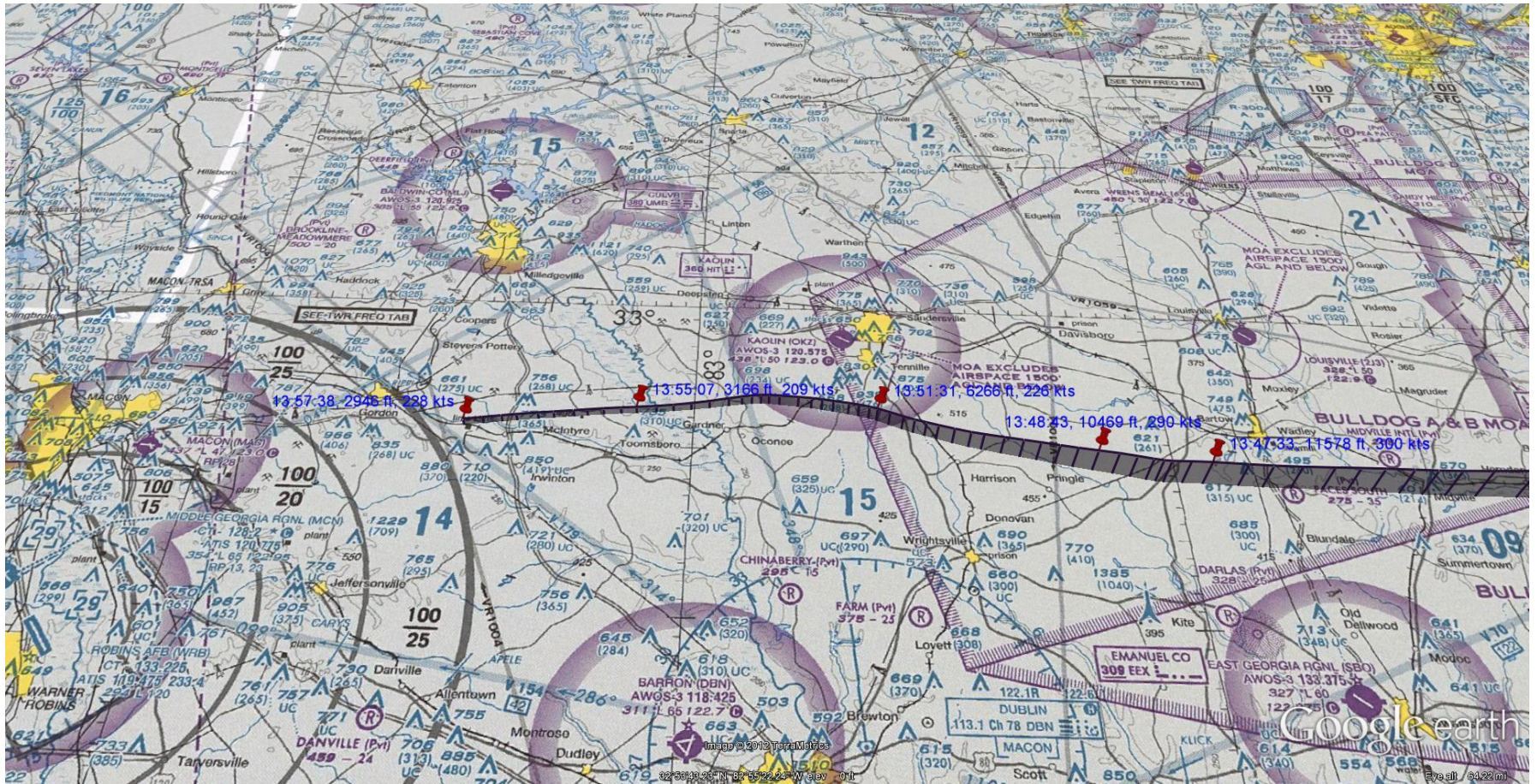


Figure 3. Sectional overlay showing select points near the end of recording.

