

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

November 14, 2011

## **17 - GPS Factual Report**

### **Specialist's Factual Report by Bill Tuccio**

**A. EVENT**

Location: Miami, Florida  
Date: October 29, 2011  
Aircraft: Interplane SRO Skyboy  
Registration: N58784  
Operator: Private  
NTSB Number: ERA12FA052

**B. GROUP - No Group**

**C. SUMMARY**

On October 29, 2011, about 1022 eastern standard time (EST), an experimental light sport aircraft (E-LSA), Czech Republic, Interplane SRO Skyboy, airplane, N58784, registered and operated by an individual, incurred substantial damaged from ground impact at Richards Field Airport (04FA), Miami, Florida. Both pilots on board were killed. Visual meteorological conditions prevailed at the time and no flight plan was filed for the Title 14 Code of Federal Regulations, Part 91 personal flight. The flight originated from the same airport earlier that day, about 0940.

**D. DETAILS OF INVESTIGATION**

On Nov 02, 2011, the NTSB Vehicle Recorder Laboratory received the following device:

GPS Manufacturer/Model:	Garmin GPSMAP 496
Serial Number:	1972482

## **Garmin GPSMAP 496 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<sup>1</sup> 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 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 that the unit had sustained minimal damage (see figures 1 and 2). Power was applied to the accident unit and recorded waypoint, route, and tracklog data was successfully downloaded from the unit via the USB port. Figure 3 shows the unit was set to record track data in Resolution<sup>2</sup> mode with a value of 82 feet.

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

<sup>2</sup> The Garmin 496 Owner's Manual defines Resolution record mode as, "Resolution records track points based on the resolution. The higher the resolution entered, the more points the unit creates to make the track."

Figure 1. Front of device.



Figure 2. Back of device.



Figure 3. Track record mode.



### GPS Data Description

The data extracted included 28 sessions from June 11, 2011<sup>3</sup> through October 29, 2011 1421:01 UTC. The accident flight was recorded starting 1357:53 UTC and ending 1421:01 UTC on October 29, 2011. In addition, one previous flight on October 29, 2011, starting at 1316:34 UTC and ending 1342:19 UTC, was determined to be of interest and is included in this report.

### 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, Course, and Distance are derived from the recorded parameters.

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 Altitude (feet)
Groundspeed	Average groundspeed between current and previous data point (knots)
Course	Average course between current and previous data point (degrees)
Distance	Distance traveled down runway (only calculated for limited sections of selected flights)

<sup>3</sup> All dates and times are referenced to Coordinated Universal Time (UTC).

## **OVERLAYS AND TABULAR DATA**

Figure 4 is a graphical overlay generated using Google Earth for the second to last flight starting 1316:34 UTC and ending 1342:19 UTC, October 29, 2011. The track shows a number of passes spanning the length of the runway at slow speed and at field elevation prior to take-off. The aircraft then departed towards the west, flew around the airport, and landed to the west.

Figure 5 is a graphical overlay generated using Google Earth for the accident flight starting 1357:53 UTC and ending 1421:01 UTC on October 29, 2011. The track shows the departure, maneuvering to the north of the airport, and then a return to the west of the airport.

Figure 6 zooms in on the end of the accident flight. The overlay shows the aircraft flying southwest at an altitude of 2,031 feet at 1419:43. Between 1420:28 and 1420:45 the aircraft began losing altitude and the track turned towards the south. Thereafter the track shows a loss of altitude and the track continuing to turn counterclockwise. The position and altitude during the last six points may be degraded in accuracy due to the rapid position and track changes. The groundspeeds and track calculated by the GPS during the descent may likewise have degraded accuracy.

Tabular data used to generate Figures 4-6 is included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format.



Figure 4. Second to last flight.





Figure 5. Accident flight.

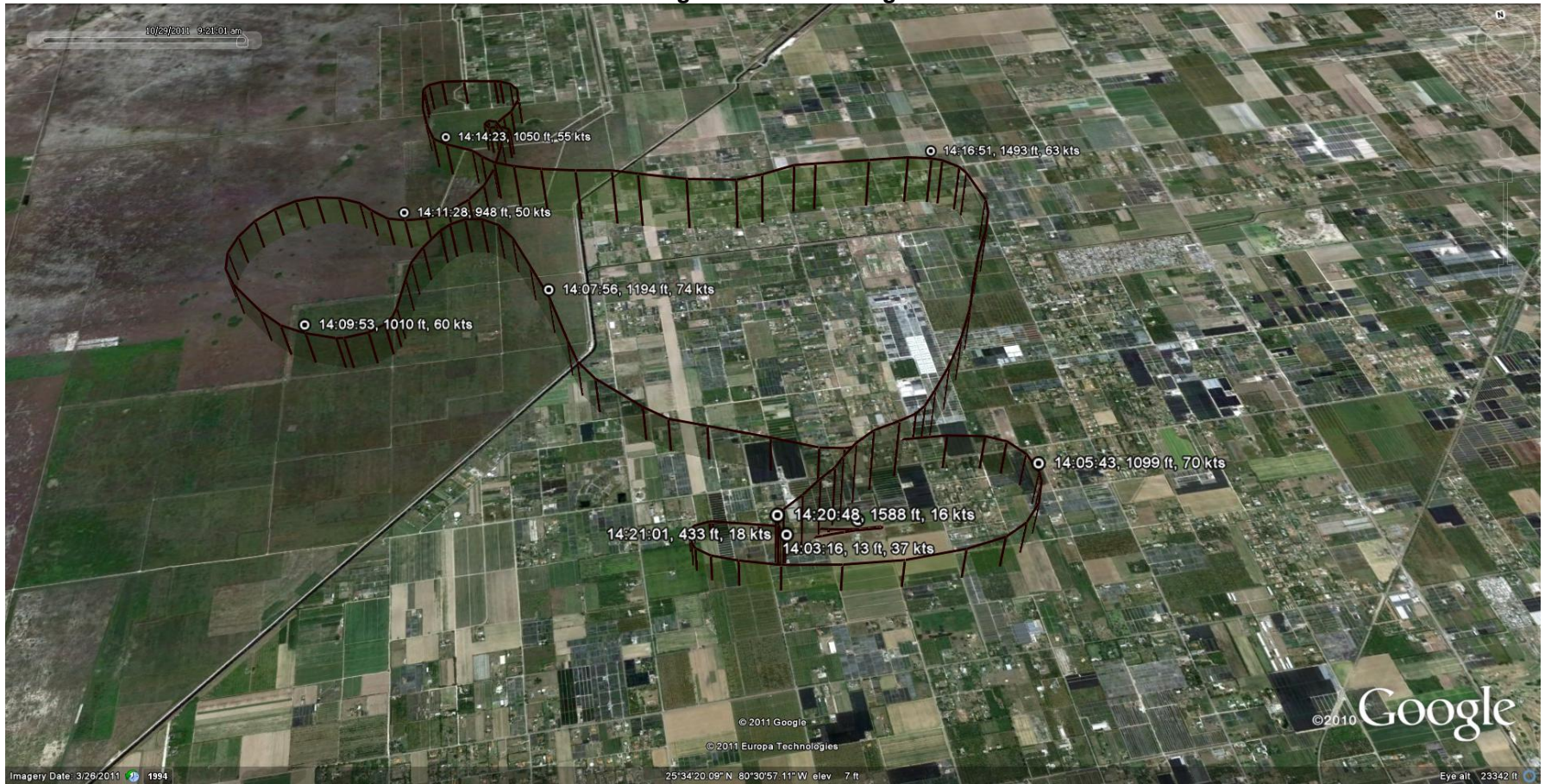




Figure 6. End of accident flight.

