

# NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

January 10, 2020

## Global Positioning System Device

### Specialist's Factual Report

By Sean Payne

#### 1. EVENT SUMMARY

Location: Big Spring, TX  
Date: August 23, 2019  
Aircraft: Meyers Midget 0100  
Registration: N881MM  
Operator: Private  
NTSB Number: WPR19FA235

On August 23, 2019, about 2015 central daylight time, an experimental Meyers Midget 0100 airplane, N881MM, impacted terrain about 5 miles southwest of the Big Spring McMahon-Wrinkle Airport (BPG), Big Spring, Texas. The airplane was registered to Montrex Racing, Inc and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that originated from BGP about 2000.

#### 2. GROUP

A group was not convened.

#### 3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following global positioning system (GPS) device:

|                            |                   |
|----------------------------|-------------------|
| Device Manufacturer/Model: | Garmin GPSMAP 496 |
| Serial Number:             | 19706773          |

##### 3.1. 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.[footnote] Once the current tracklog memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. The current tracklog can be saved to long-term memory and 15 saved tracklogs can be maintained in addition to the current tracklog. 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.

### **3.2. Data Recovery**

The recorder was undamaged in the accident and read out normally using a PC and the necessary software. Figure 1 is a photo of the device.



**Figure 1. Photo of undamaged GPS**

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<sup>1</sup> Semi-conductor memory that requires power be applied to retain data.

### 3.3. Data Description

The data extracted included a number of logged sessions. The last log session was consistent with the accident flight. The accident flight was recorded starting 00:42:32 UTC and ending 01:24:17 UTC on August 24, 2019.

### 3.4. 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.

**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 derived groundspeed (knots)           |
| Track          | Average derived true course (degrees)         |

### 3.5. OVERLAYS AND TABULAR DATA

Figure 2 is a graphical overlay generated using Google Earth for the accident flight. The weather and lighting conditions in Google Earth are not necessarily the weather and lighting conditions present at the time of the recording. This graphic shows all the recorded data points for the accident flight.

Figure 3 is a graphical overlay generated using Google Earth zoomed in on the last portion of recorded data. In the flight's final moments, just prior to the data showing a sharp decrease in altitude, the groundspeed increased from around 115 knots at around 6700 feet GPS altitude to around 160 knots at around 6200 feet GPS altitude. As the data began to show a steep descent trend, the groundspeed reached 169 knots. Groundspeed is a measure of the aircraft's speed over ground and is not necessarily representative of the aircraft's airspeed.

Figure 4 shows the area near impact with terrain.

Tabular data used to generate figures 2 through 3 are included as Attachment 1. This attachment is provided in electronic comma-delimited (.CSV) format].

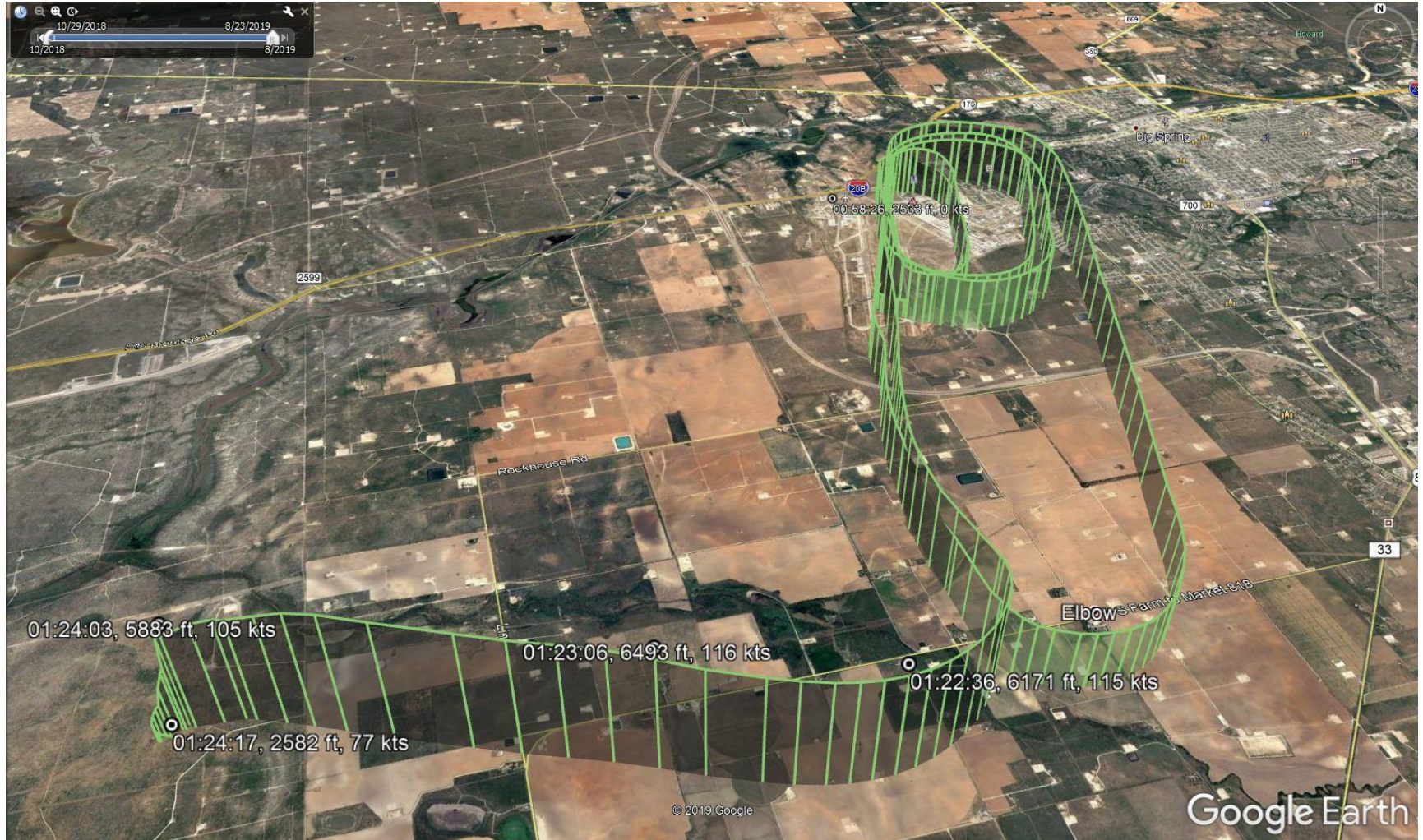
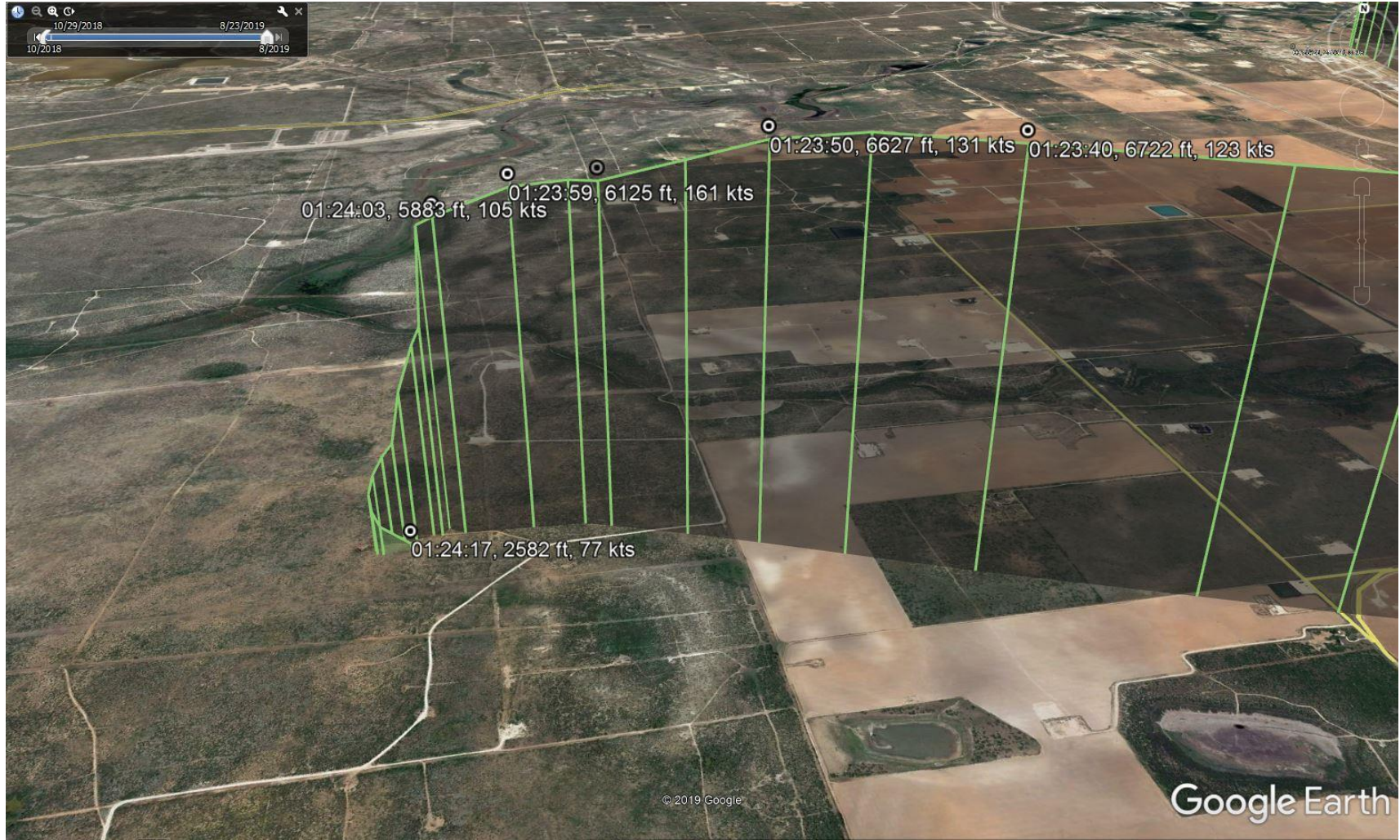
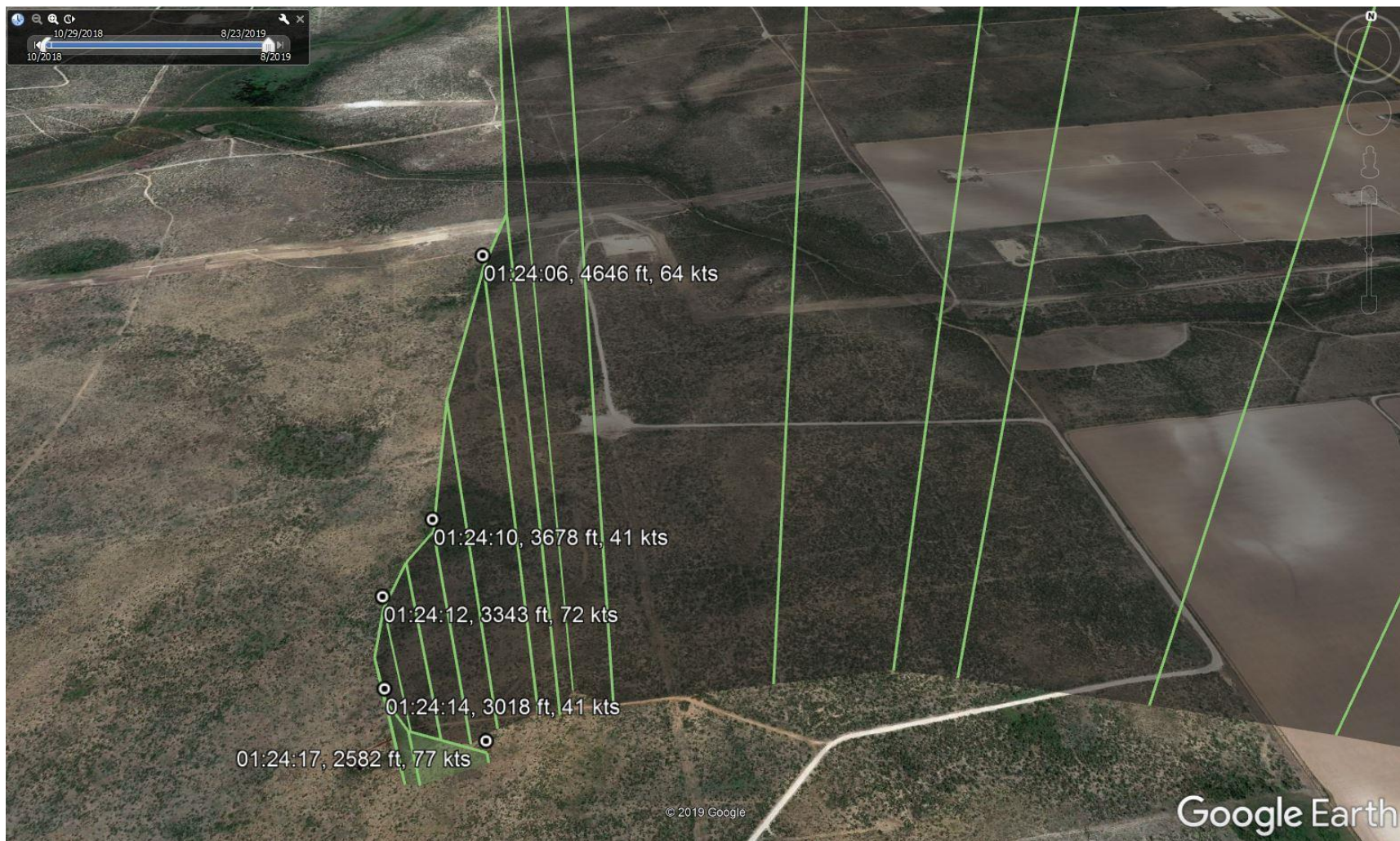


Figure 2. Google Earth overlay showing the entire recorded accident flight.



**Figure 3. Google Earth overlay showing the final portion of the recorded tracklog. Note groundspeed is derived as an average speed across two points on the ground and may not relate to indicated airspeed.**



**Figure 4. Google Earth overlay showing the final portion of the recorded tracklog. Note groundspeed is derived as an average speed across two points on the ground and may not relate to indicated airspeed.**