

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

April 26, 2019

Global Positioning System

Specialist's Factual Report by Alice Park

1. EVENT

Location: Fort Walton Beach, Florida
Date: August 30, 2018
Aircraft: Beech 60
Registration: N1876L
Operator: Henry Leasing Company, LLC
NTSB Number: CEN18FA358

On August 30, 2018, about 1030 central standard time, a Beechcraft BE-60 airplane, N1876L, impacted terrain during an approach to Destin Executive Airport (DTS), Destin, Florida. The commercial rated pilot and three passengers were fatally injured, and the airplane was destroyed. The airplane was registered to and operated by Henry Leasing Company, LLC, as a 14 *Code of Federal Regulations* Part 91 cross-country flight. The flight departed the Toledo Executive Airport (TOL), Millbury, Ohio about 0747 central standard time en route to Destin Executive Airport (DTS), Destin, Florida, and an instrument flight plan had been filed. The airplane wreckage was in a remote, wooded area of the Eglin Air Force Base (AFB) reservation property, about 8.5 miles northwest of the Destin Executive Airport (DTS) and 2.5 miles northwest of the Eglin AFB.

2. DETAILS OF DEVICE INVESTIGATION

The National Transportation Safety Board Vehicle Recorder Division received the following Global Positioning System (GPS) device:

Device: Garmin GPSMAP 496
Device S/N: 19724050

2.1. Garmin GPSMAP 496 Device Description

The Garmin GPSMAP 496 is a battery-powered portable 12-channel GPS receiver with a 256-color TFT display screen. The unit includes a built-in City Navigator base map, Jeppesen aviation database and can receive XM satellite radio for flight information, high-resolution weather data for the United States. Weather information includes Next Generation Radar (NEXRAD), Aviation Routine Weather Report (METARs), Lightning, Terminal Aerodrome Forecasts (TAFs), Temporary Flight Restrictions (TFRs).

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. Updated rate of track point is 5 per second, and 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*¹ memory (NVM).

The unit contains hardware and software permitting the download of recorded waypoint, route, and tracklog information to a PC. 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.

2.1.1. Garmin GPSMAP 496 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed that the unit had sustained impact damage during the accident and would not power on (Figures 1 and 2). It was disassembled for further examination.

The GPSMAP 496 stores recorded data in *non-volatile* memory (FLASH)². The integrated circuit that was removed and read out was an AMD AM29DL323GB-90E1 NOR FLASH chip. It was read out using an NFI MTK II FLASH memory chip reader and the data converted using our in-house software program, SuperScrap (2.21.9.0).

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

² FLASH memory is a form of re-writable, non-volatile memory that can retain data without external power.

Figure 1. External view of the Garmin GPSMAP 496 - front (s/n 19724050).



Figure 2. External view of the Garmin GPSMAP 496 - back (s/n 19724050).



2.1.2. Garmin GPSMAP 496 Data Description

Track log data was recovered directly from the FLASH memory chip. And the track log dated August 30, 2018 was identified with the date of the accident.

3. GPS PARAMETERS PROVIDED

Table 1 describes the data parameters provided. Date, Time, Longitude, Latitude, and GPS Altitude are recorded by the device. Groundspeed and Track are derived by the download software using recorded information. Data from the accident flight recorded is provided in tabular format as Attachment 1 to this report.

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 (ft)
Groundspeed	Average groundspeed between current and following data point (knots)
Track	Average true course between current and following data point (degrees)

4. OVERLAYS AND TABULAR DATA

Graphical overlays in this report were generated using Google Earth Pro. Note that the weather and lighting conditions depicted in Google Earth imagery do not necessarily reflect the conditions present during the accident flight.

Recorded track log of the accident flight began at 1142:39 Universal Time Coordinated (UTC) on August 30, 2018, departing at Toledo Executive Airport (TOL), Millbury, Ohio. The accident flight flew straight south to Destin Executive Airport (DTS), Destin, Florida

as shown in Figure 3. Figure 4 shows that at about 1530, the accident flight approached Destin Executive Airport (DTS) with a steady descending altitude and decreasing speed. The last data point at 1532:53 indicates sudden altitude drop from 947 ft to 489 ft as shown on Figure 5. As explained Table 1, the computed average ground speed between the last two recorded latitude and longitude points was 118 knots.

Figure 3 Overhead view of the entire flight

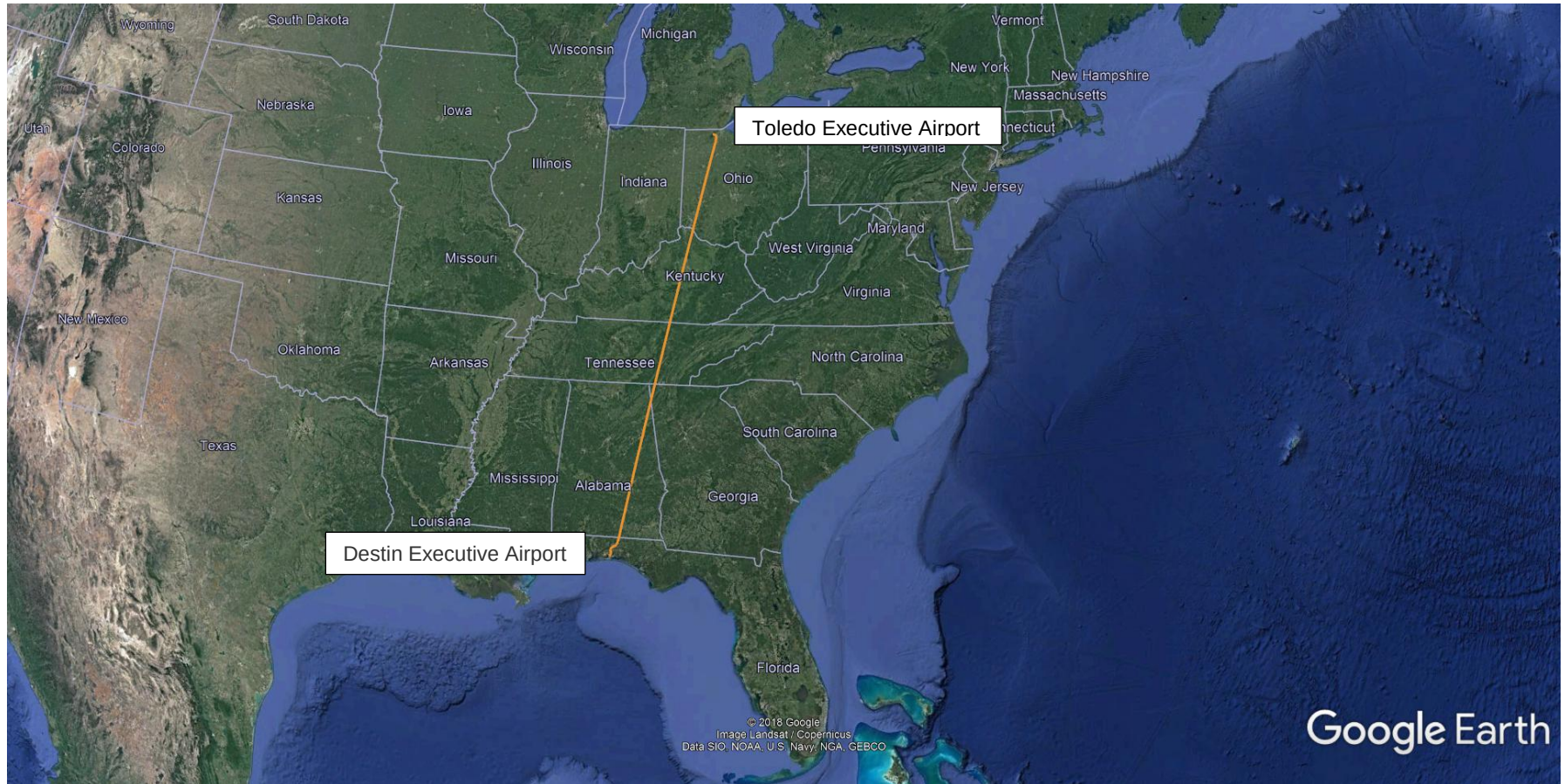


Figure 4 Oblique view of an approach to Destin Executive Airport

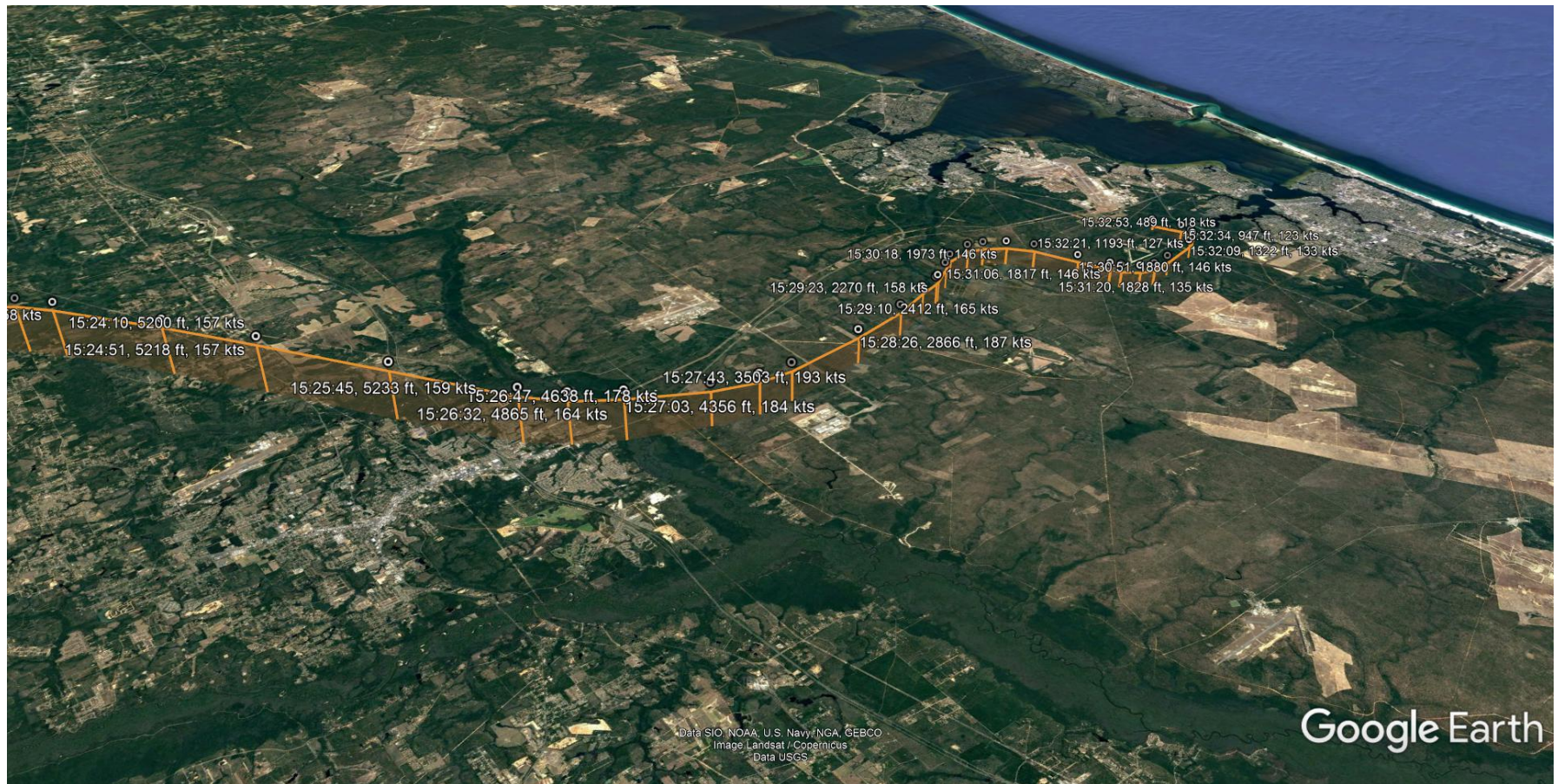


Figure 5 Close view of the last segment of the accident flight data

