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

January 7, 2020

Electronic Devices

Specialist's Factual Report
by Gerald Kawamoto

1. EVENT SUMMARY

Location:	La Grande, Oregon
Date:	September 8, 2019
Aircraft:	Piper PA32-300
Registration:	N6300Z
Operator:	Private
NTSB Number:	WPR19FA256

On September 8, 2019, about 1019 pacific daylight time (PDT), a Piper PA32-300 airplane, N6300Z impacted mountainous terrain about 17 miles southwest of La Grande, Oregon. The commercial pilot was fatally injured, and the airplane was destroyed. The airplane was registered to the pilot who was operating it as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Marginal weather conditions were reported near the accident site about the time of the flight, and no flight plan was filed. The flight originated from Richland Airport (RLD) about 0941 and was destined for Ontario Airport (ONO).

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following devices:

Device 1 Manufacturer/Model:	**JPI EDM-700**
Device 1 Serial Number:	**1935**
Device 2 Manufacturer/Model:	**Garmin GPSMAP 296**
Device 2 Serial Number:	**67015761**

3.1. JPI EDM-700 Device Description

The JPI EDM-700 is a panel-mounted gauge that allows the operator to monitor and record up to 24 parameters related to engine operations. Depending on the installation, engine parameters monitored can include: Exhaust Gas Temperature (EGT), Cylinder Head Temperature (CHT), Oil Pressure and Temperature, Manifold Pressure, Outside Air Temperature, Turbine Inlet Temperature, Engine Revolutions Per Minute (RPM), Compressor Discharge Temperature, Fuel Flow, Carburetor Temperature, and Battery Voltage.

The unit can also calculate in real time, percent of maximum horsepower, fuel used, shock cooling rate, and EGT differentials between highest and lowest cylinder temperatures. The calculations are also based on the aircraft installation.

The unit contains non-volatile memory for data storage of the parameters recorded and calculated. The rate at which the data is stored is selectable by the operator from 2 to 500 seconds per sample. The memory can store up to 20 hours of data at a 6 second-per-sample rate. The data can then be downloaded by the operator using the J.P. Instruments software.

3.1.1. JPI EDM-700 Data Recovery and Description

Upon arrival at the Vehicle Recorder Laboratory, an external examination revealed the device had sustained impact damage, as shown in Figure 1. An internal examination of the device revealed that this model of JPI EDM-700 does not have the capability to record non-volatile memory[1], as shown in Figure 2, therefore no data from this device were recovered.

Figure 1. Front and back of the JPI EDM-700 as received.

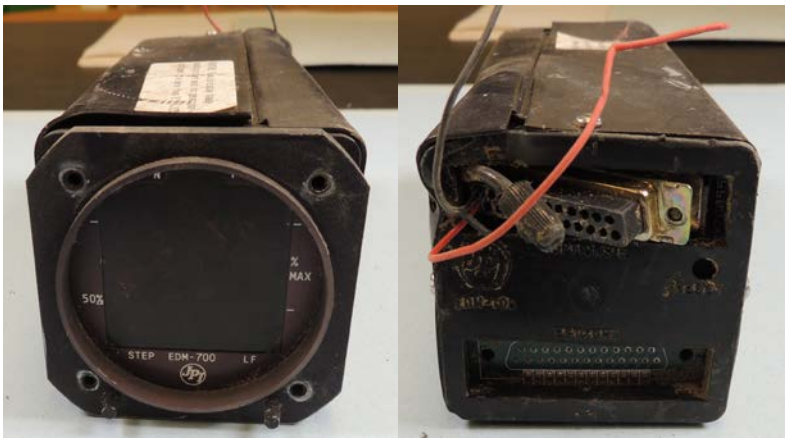

Figure 2. Internal components of JPI EDM-700. No presence of non-volatile memory.

[1] Non-volatile memory (NVM) is semiconductor memory that does not require external power for data retention.

3.2. Garmin GPSMAP 296 Device Description

The Garmin GPSMAP 296 is a portable GPS receiver capable of storing date, route-of-flight, and flight-time information. A detailed tracklog – including latitude, longitude, date, time, and groundspeed information – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. All recorded data is stored in non-volatile 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. 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.

3.2.1. Garmin GPSMAP 296 Data Recovery

Upon arrival at the Vehicle Recorder Division, an exterior examination revealed the device had sustained impact damage, as shown in Figure 3, resulting in the device becoming inoperable. An internal examination revealed damage to the logic board. The non-volatile memory chip was removed, read out and converted to engineering units using laboratory tools.

Figure 3. Front and back of the Garmin GPSMAP 296 as received.

3.2.2. Garmin GPSMAP 296 Data Description

The data extracted included 122 sessions from September 9, 2012, through September 8, 2019 UTC. The last session recorded was determined to pertain to the accident and started at 16:36:52 UTC and ended at 17:19:47 UTC on September 8, 2019. The difference between UTC and PDT is 7 hours.

3.2.3. Garmin GPSMAP 296 Parameters Provided

Table 1 describes data parameters recorded and derived by the device.

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)

4. OVERLAYS AND TABULAR DATA

Figure 4 is a graphical overlay generated using Google Earth of the entire 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. The recording started at 16:36:52 UTC and ended at 17:19:47 UTC.

Figure 5 is graphical overlay generated using Google Earth of the end of the accident flight.

The tabular data recorded by the Garmin GPSMAP 296 device is included as Attachment 1 to this report in electronic comma separated value (csv) format.

Figure 4. Google Earth overlay of the entire accident flight.

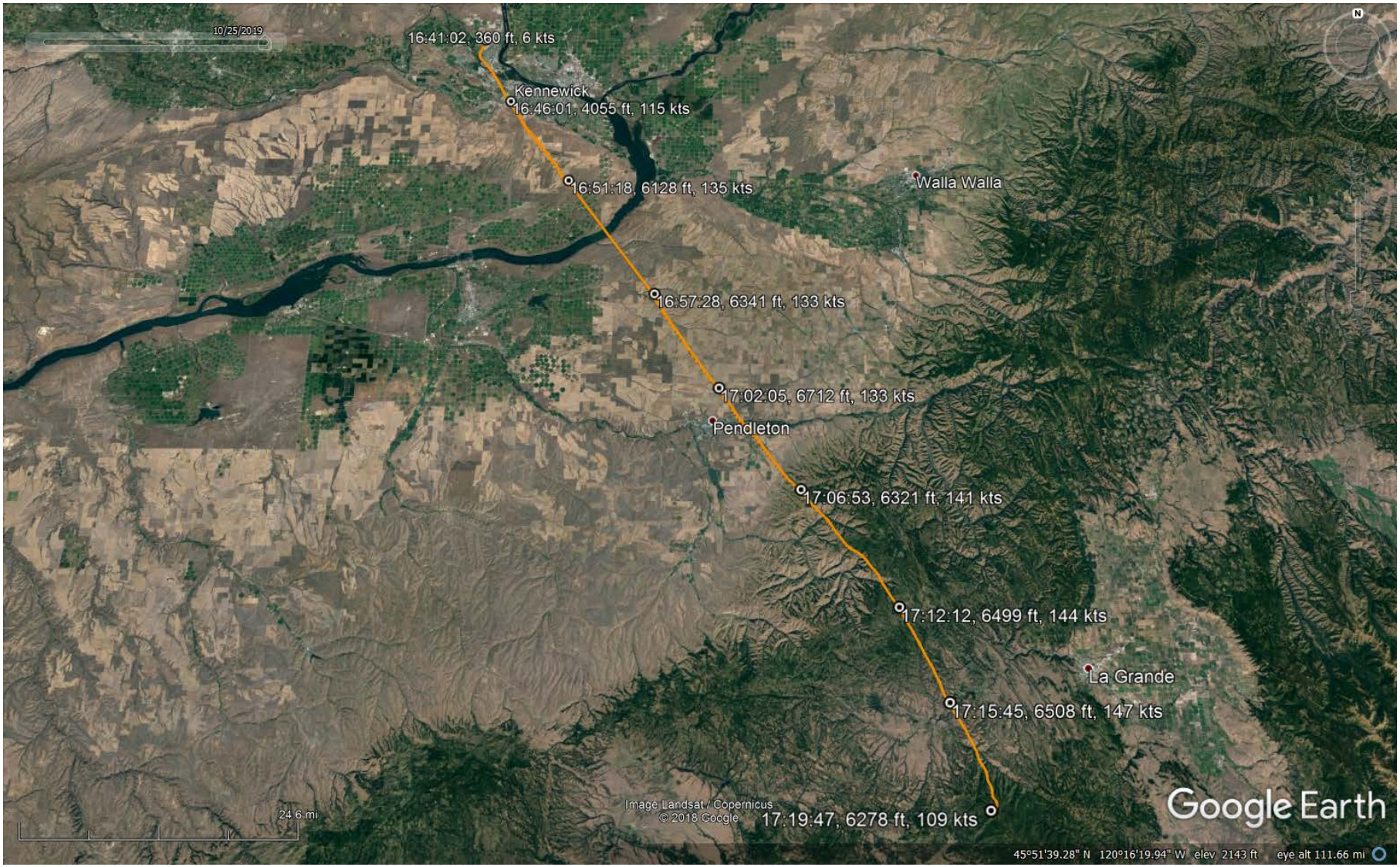

Figure 5. Google Earth overlay of the end of the accident flight.