

National Transportation Safety Board

Office of Research and Engineering

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WPR24FA132

ELECTRONIC DEVICES

Specialist's Factual Report

August 27, 2024

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A. ACCIDENT

Location: Anaconda, Montana
Date: April 26, 2024
Time: 0659 mountain daylight time (MDT)
1259 coordinated universal time (UTC)
Airplane: Bell 206-L4, N988B

B. ELECTRONIC DEVICES SPECIALIST

Specialist: Gerald Kawamoto
Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A group was not convened. The NTSB Vehicle Recorder Division received the following electronic devices:

Recorder Manufacturer/Model: Garmin aera 660
Recorder Serial Number: 4NN007323
Recorder Manufacturer/Model: Samsung Galaxy Tab Active3
Recorder Serial Number: TMLA00496p

1.0 Garmin aera 660 Description

The Garmin aera 660 is a battery-powered portable multi-function display and GPS receiver with a sunlight-readable 5-inch diagonal touch screen operation display. The unit includes a built-in Jeppesen database and can receive XM satellite radio for flight information including NEXRAD radar, lightning, METARs, TAFs, and TFRs. The unit can also perform and store weight and balance calculations. 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. The unit has 23 different map ranges available, from 200 feet to 800 nautical miles.

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 track log including latitude, longitude, date, time, and GPS altitude information is stored within the unit whenever the receiver has a lock on the GPS navigation signal.

Position is updated within the track log as a function of time or distance moved, depending on how the unit has been configured. Once the current track log memory becomes full, new information overwrites the oldest information or recording stops, depending on how the unit is configured. The current track log can be saved to long-term memory and 15 saved track logs can be maintained in addition to the current track log. Track log storage may be activated or de-activated at user discretion.

All recorded data is stored in non-volatile memory.¹ The unit contains hardware and software permitting the download of recorded waypoint, route, and track log information to a PC via 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.

1.1 Garmin aera 660 Data Recovery

The device was in good condition upon arrival at the Vehicle Recorder Laboratory, as shown in Figure 1. Data were downloaded normally using the manufacturer's procedures.



Figure 1. Garmin aera 660 as received.

1.2 Garmin aera 660 Data Description

The data extracted included sessions recorded from December 16, 2023, through the accident flight on April 26, 2024, coordinate universal time (UTC). All times were converted to MDT, the local time of the accident. UTC is ahead of MDT by 6 hours. The accident session started at 6:09:30 MDT and ended at 7:00:02 MDT on April 26, 2024. 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 (NVM) is semiconductor memory that does not require external power for data retention.

Table 1. Garmin aera 660 Data Parameters.

Parameter Name	Parameter Description (units)
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)

2.0 PED Description

Personal Electronic Devices (PEDs), such as the Samsung Galaxy Tab Active3, are a category of devices comprised primarily of portable computing devices and mobile phones. Portable computing devices are typically capable of internet access, email, messaging services, and can run user-installed applications to perform specific tasks. Depending on the model, mobile phones can perform many of the same tasks as portable computing devices, plus have voice call and text messaging capabilities. PED user and system data is typically stored on non-volatile memory and can be accessed through manufacturer-provided interfaces.

2.1 PED Data Recovery

The device was in good condition upon arrival at the Vehicle Recorder Laboratory, as shown in Figure 2. The device powered on normally and was configured to open an application called AirVision by Tabula Live upon power on. The manufacturer of the application provided data from the accident flight to the investigation team as KMZ files.²



Figure 2. Samsung Galaxy Tab Active3 as received.

² KMZ files are zipped Keyhole Markup Language (KML) files, which is an XML notation for expressing geographic annotation and visualization.

2.2 PED Data Description

Data included GPS position data at a resolution of about once per second. The accident session started at 6:09:21 MDT and ended at 6:59:27 MDT on April 26, 2024. When compared, the data from the AirVision application and Garmin aera 660 aligned, however the AirVision data were recorded at a higher resolution. Both flight tracks are depicted in figures 4 and 5.

D. OVERLAYS AND TABULAR DATA

Figure 3 through figure 5 are graphical overlays 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.

Figure 3 shows the entire session recorded in the AirVision app. Figure 4 shows the flight path of the helicopter after it entered the area around Anaconda, MT. Figure 5 shows the end of the flight. The AirVision track is shown in magenta and the Garmin aera track is shown in yellow.

Figure 6 is a plot of parameters for the entire accident session. The time shown is 6:08:00 MDT to 7:02:00 MDT.

Figure 7 is a plot of parameters for approximately the final 16 minutes of the accident session. The time shown is 6:44:00 MDT to 7:00:30 MDT.

Figure 8 is a plot of parameters for end of the accident flight. The time shown is 6:57:35 MDT to 7:00:05 MDT.

The corresponding tabular data used to create Figure 3 through Figure 8 are provided in electronic comma-separated value (CSV) format as attachment 1 (Garmin) and attachment 2 (AirVision) to this report.

Submitted by:

Gerald Kawamoto
Recorder Specialist

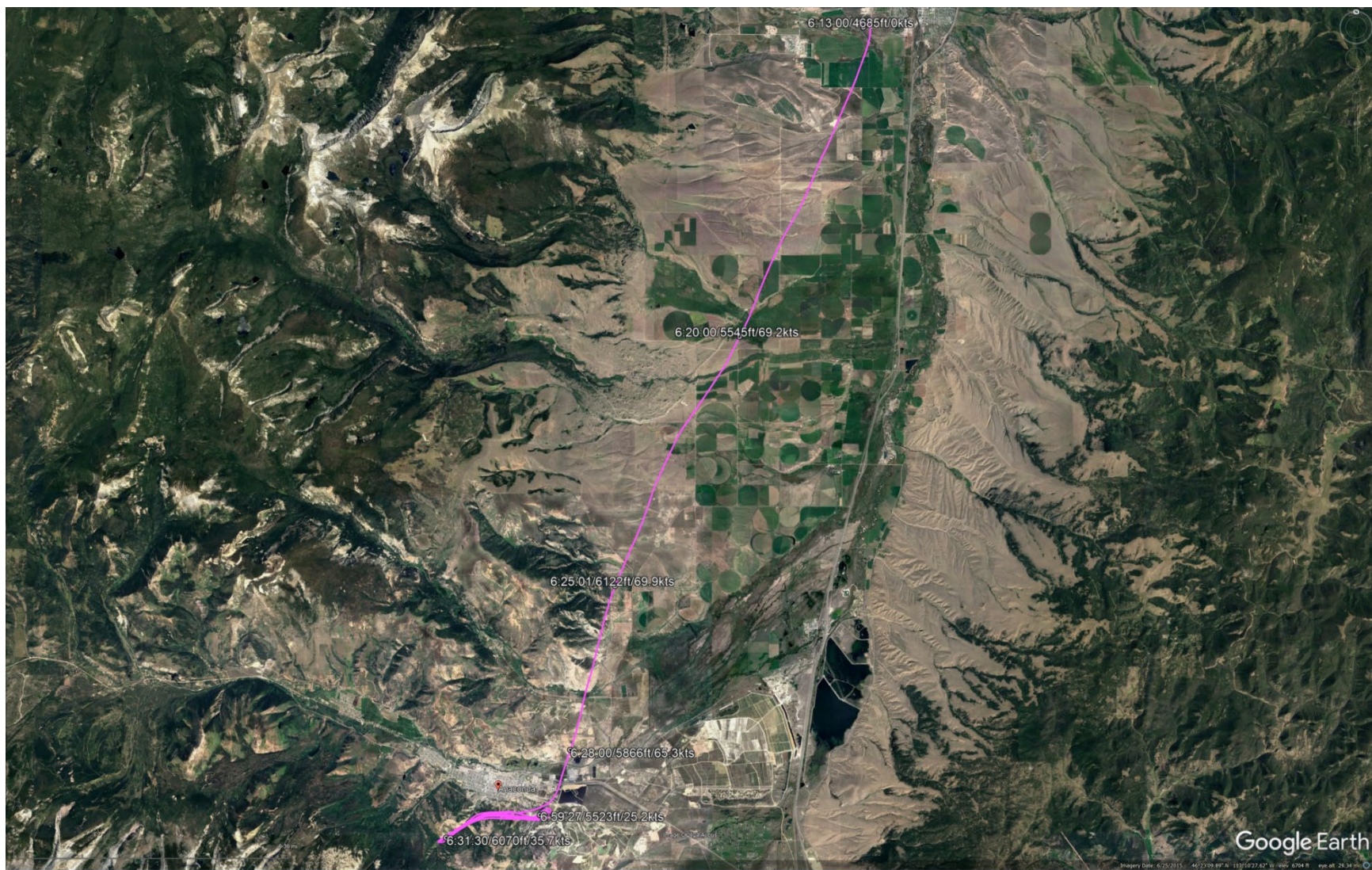


Figure 3. Google Earth overlay of the entire accident session recorded on the AirVision app.

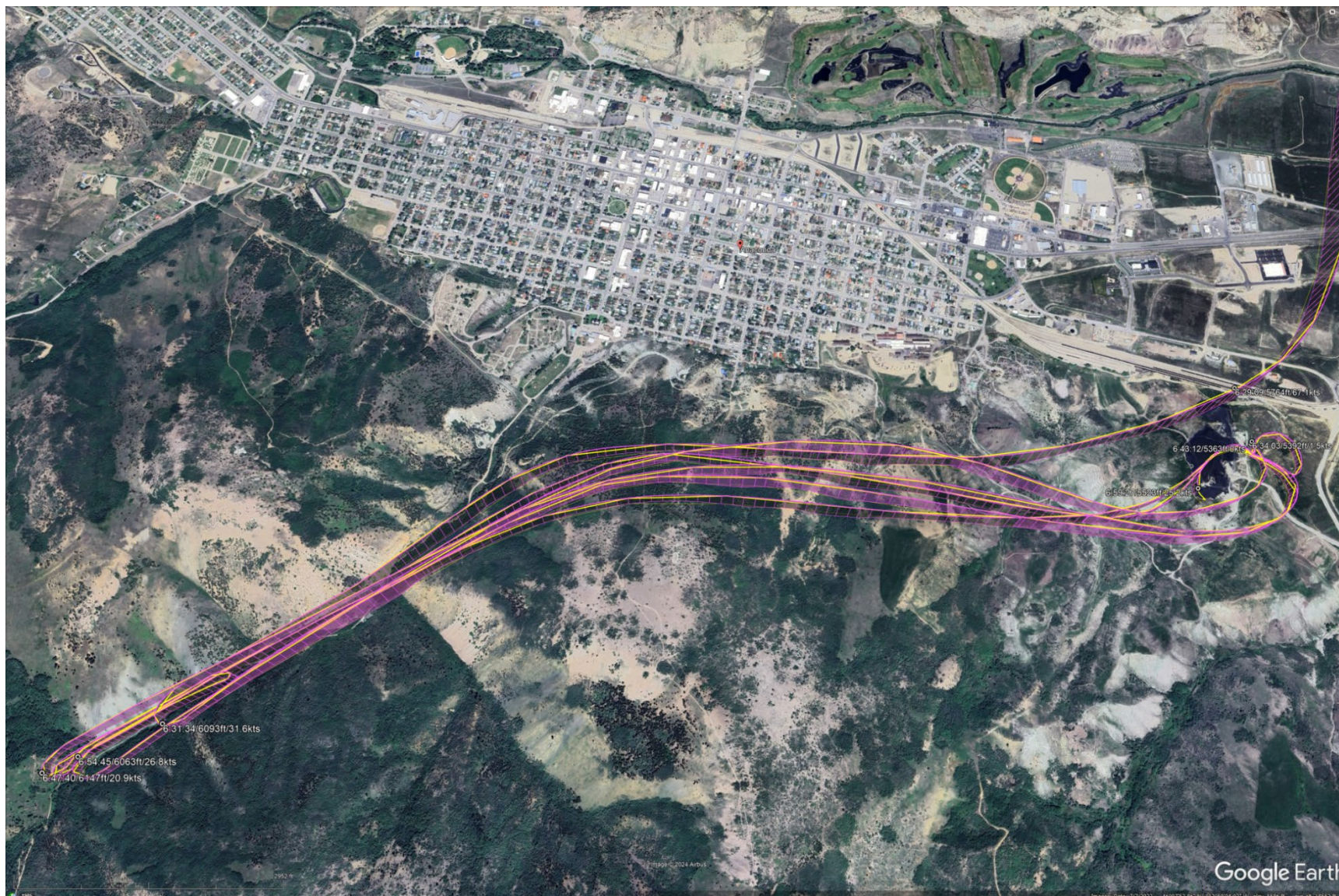


Figure 4. Google Earth overlay showing the flight path as the helicopter entered the area around Anaconda, MT. The AirVision track is shown in magenta and the Garmin aera track is shown in yellow.

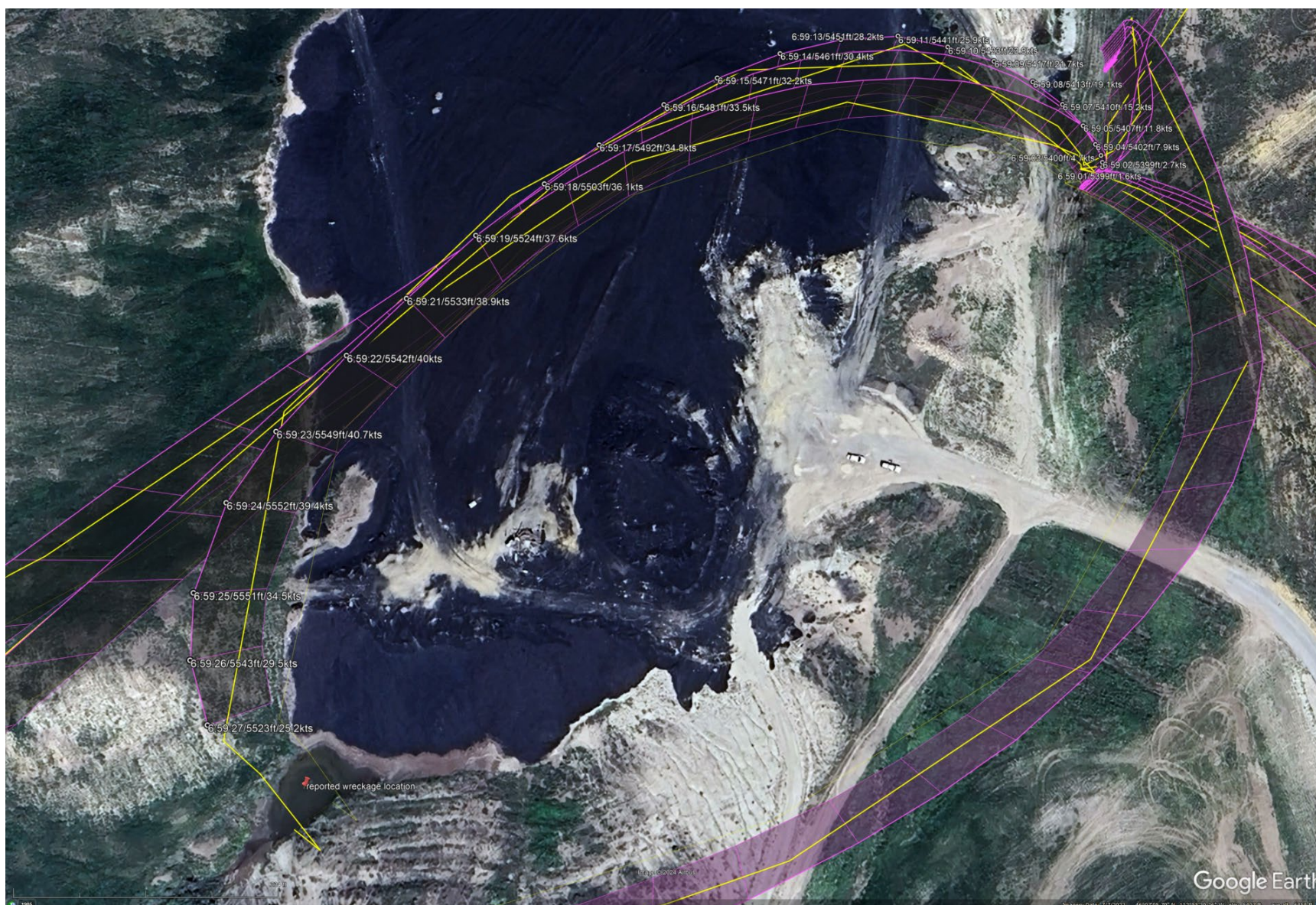


Figure 5. Google Earth overlay of the end of the accident flight. The AirVision track is shown in magenta and the Garmin aera track is shown in yellow.

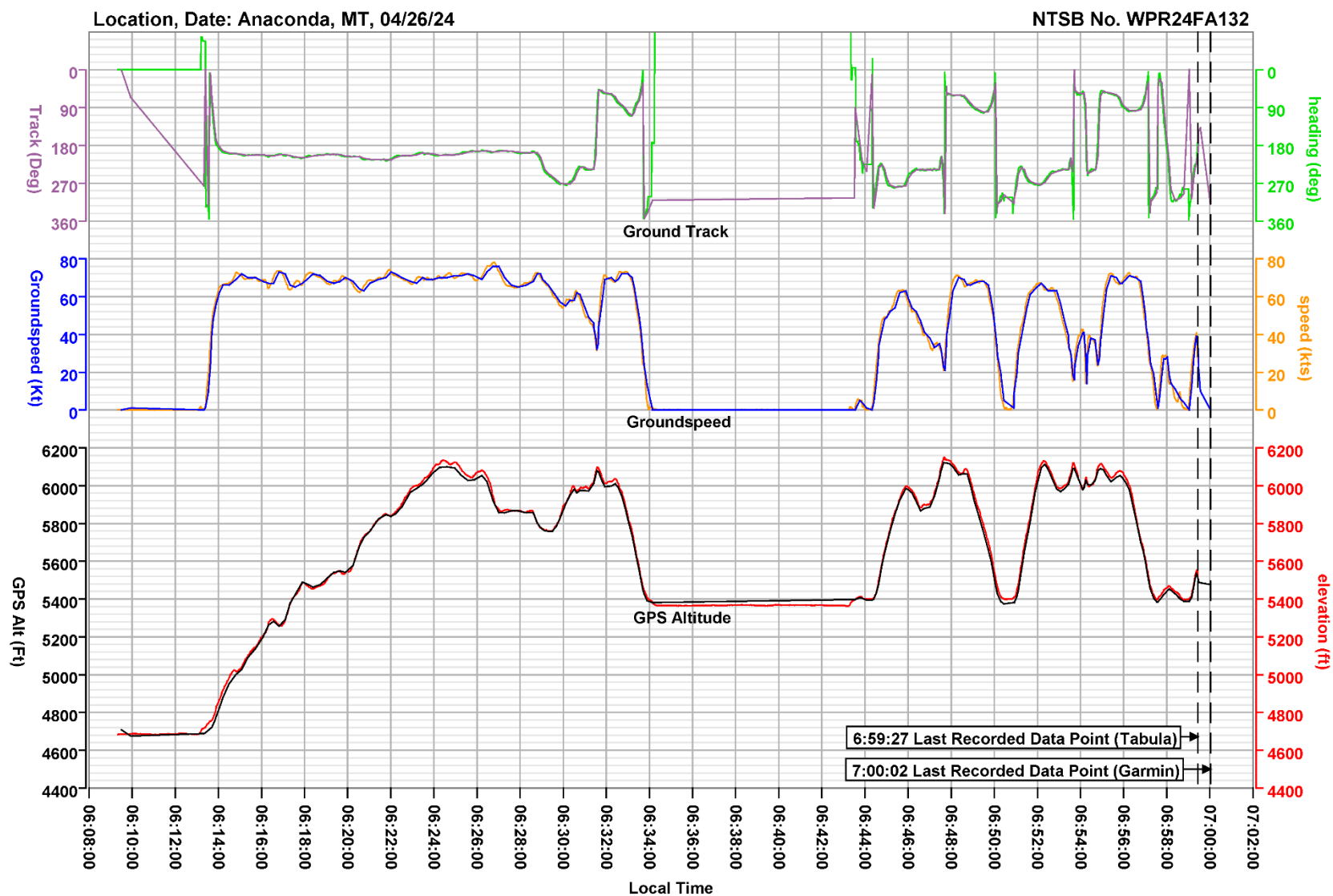


Figure 6. Plot of AirVision and Garmin aera 660 parameters for the entire accident session. AirVision parameters are shown on the right and Garmin parameters are shown on the left.

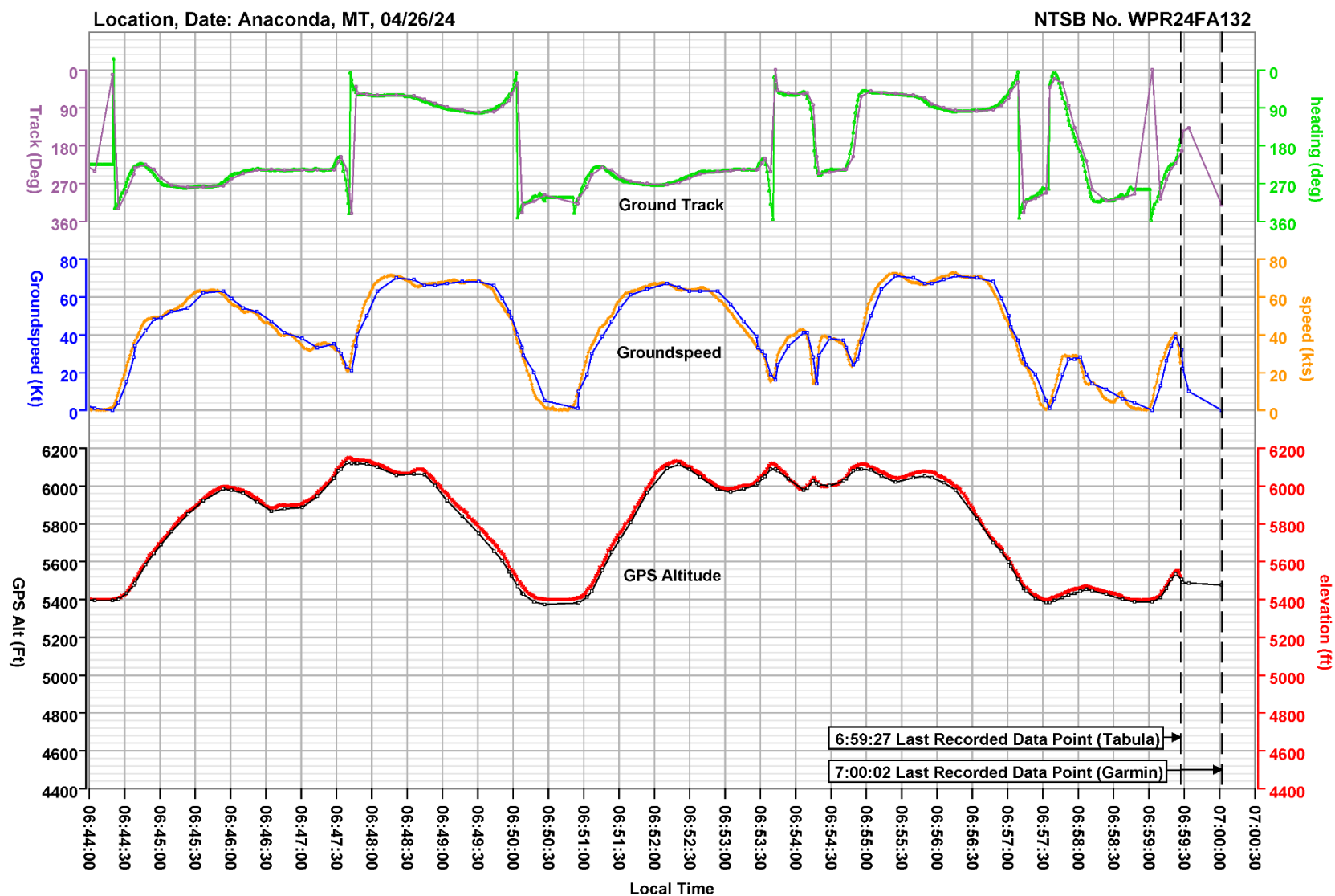


Figure 7. Plot of AirVision and Garmin aera 660 parameters for approximately the final 16 minutes of the accident session. AirVision parameters are shown on the right and Garmin parameters are shown on the left.

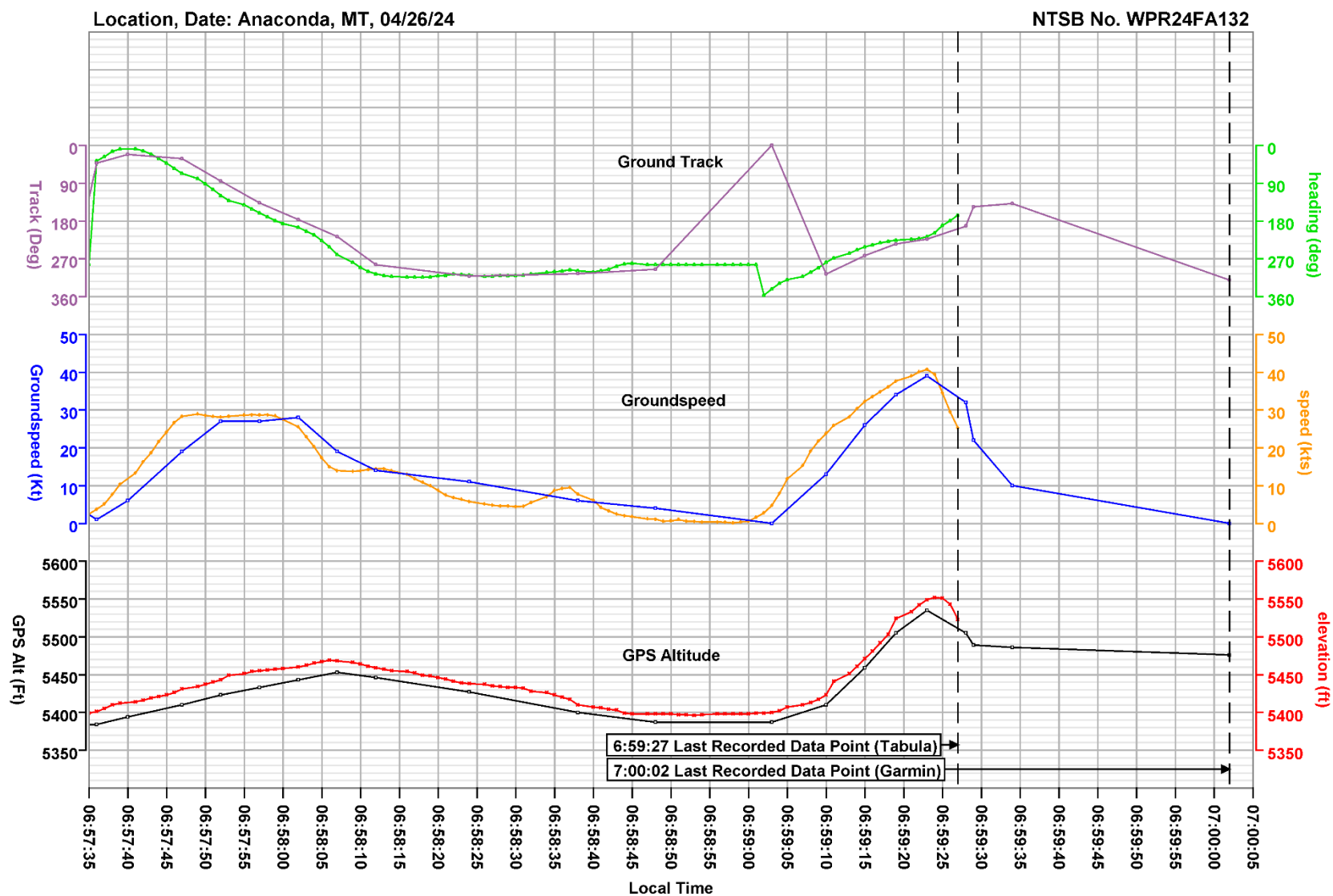


Figure 8. Plot of AirVision and Garmin aera 660 parameters at the end accident session. AirVision parameters are shown on the right and Garmin parameters are shown on the left.