

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA25FA151

MULTIPLE ELECTRONIC DEVICES

Specialist's Factual Report

September 30, 2025

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A. ACCIDENT SUMMARY

Location: LaFayette, Georgia
Date: March 20, 2025
Time: 1430 eastern daylight time (EDT)
1830 coordinated universal time (UTC)
Aircraft: Cirrus SR22, N969SS

B. MULTIPLE ELECTRONIC DEVICES SPECIALIST

Specialist: W. Deven Chen
Electrical Engineer - Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

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

Manufacturer/Model:	Avidyne IFD5000 - PFD
Serial Number:	M081447845
Manufacturer/Model:	Avidyne IFD5000 - MFD
Serial Number:	Unknown due to damage
Manufacturer/Model:	Avidyne DFC-90
Serial Number:	Unknown due to damage
Manufacturer/Model:	Sentry ADS-B Receiver
Serial Number:	0743021

1.0 Avidyne IFD5000 Description

The Avidyne IFD5000 is a Flight Management System (FMS), GPS, and Navigator. The unit can be configured as a primary flight display (PFD) or multifunction display (MFD). It is capable of monitoring, displaying, and recording navigational information and records parameters including, but not limited to, heading, latitude, and longitude. The unit can be connected to external measurement devices to record other parameters such as attitude, attitude rates, body accelerations, pressure altitude, and airspeed. Additionally, the unit can record engine parameters as provided to the unit by external engine monitors. The IFD5000 stores its historical logs on an internal compact flash (CF) card.

1.1 Avidyne IFD5000 Condition and Data Recovery

The two Avidyne IFD5000 units sustained severe impact and thermal damage in the event, as shown in figures 1 and 2. Their internal CF cards were recovered, and despite thermal damage presented on the CF cards, the raw data were read out successfully. The raw data were then sent to the manufacturer for decoding after being written onto two properly formatted, blank CF cards provided by the manufacturer. The manufacturer decoded the raw data and provided the data in engineering units.



Figure 1. Front and top views of Avidyne IFD5000 - PFD as received by the NTSB Vehicle Recorder Laboratory.



Figure 2. Front and back views of Avidyne IFD5000 - MFD as received by the NTSB Vehicle Recorder Laboratory.

1.2 Avidyne IFD5000 Recording Description

The data provided by the manufacturer contained basic flight and engine parameters. The last recorded session was identified to be associated with the accident flight. The duration of the session was recorded as 11 minutes and 18 seconds, from 18:19:40 UTC to 18:30:58 UTC on March 20, 2025. The recording rates of the parameters varied, from engine data being recorded at every 4 seconds to GPS data being recorded at 4 samples per second. There was a previous flight recorded from 17:35:00 UTC to 17:53:21 UTC on the same day, and it is also included in this report.

1.2.1 Avidyne IFD5000 Parameters Provided

Table 1 lists the Avidyne IFD5000 parameters verified and provided in this report.

Table 1. Avidyne IFD5000 data parameters provided.

Parameter Name (unit)	Parameter Description (unit)
Amps (A)	Circuitry bus current (Amperes)
AltP (ft)	Pressure altitude (feet)
CHT # (degF)	Cylinder head temperature at cylinder # (degrees Fahrenheit)
EGT # (degF)	Exhaust gas temperature at cylinder # (degrees Fahrenheit)
Eng RPM	Engine speed in revolutions per minute
FF (GPH)	Fuel flow rate (gallons per hour)
FlightDirectorOn_Off	Flight director operation status (1 = On, 0 = Off)
FuelRemaining (gal)	Remaining fuel onboard (gallons)
Gnd (kts)	Groundspeed between current and previous data point (knots)
GPS Altitude (ft)	Altitude above mean sea level (feet)
GPS Latitude (deg)	Geographic latitude (degrees)
GPS Longitude (deg)	Geographic longitude (degrees)
Heading (deg)	Magnetic heading (degrees)
IAS (kts)	Indicated airspeed (knots)
Lat Acc (G)	Lateral acceleration (gravitational acceleration)
Long Acc (G)	Longitudinal acceleration (gravitational acceleration)
MAP (inHg)	Manifold pressure (inches of mercury)
Norm Acc (G)	Vertical acceleration (gravitational acceleration)
Oil P (PSI)	Oil pressure (pounds per square inches)
Oil T (degC)	Oil temperature (degrees Celsius)
Pitch (deg)	Pitch angle (degrees)

Parameter Name (unit)	Parameter Description (unit)
Roll (deg)	Roll angle (degrees)
TAS (kts)	True airspeed (knots)
Track (deg)	Ground track (degrees)
Volts (V)	Circuitry bus voltage (volts)
Vsp (fpm)	Vertical speed (feet per minute)

1.3 Avidyne IFD5000 Time Correlation

The data were recorded in UTC and are presented in UTC in this report. The local time of the event, EDT is behind UTC by 4 hours.

2.0 Avidyne DFC-90 Description

The Avidyne Digital Flight Control (DFC) - 90 is a digital, attitude-based autopilot system. The DFC-90 autopilot uses the output information from the Avidyne Primary Flight Display's (PFD) ADAHRS to provide automatic aircraft control. The unit controls the aircraft in both lateral and vertical modes. The unit can also provide speed-based envelope protection. The autopilot system also has a navigation capability and will maintain a pre-programed flight track profile. In addition, the autopilot is capable of flying both precision and non-precision approaches.

The unit contains an internal microSD card which logs data and information related to the operation of the DFC90 device. The card logs various parameters at three different rates (low, medium, and high fidelity) depending on the type of information being recorded. System health parameters are logged at a slower rate when compared to acceleration information.

2.1 Avidyne DFC-90 Condition and Data Recovery

Figure 3 shows the condition of the Avidyne DFC-90 as received by the NTSB Vehicle Recorder Laboratory. The device sustained severe fire damage. Its internal microSD card also sustained severe fire damaged in the event, as shown in figure 4. The extent of the damage precluded normal and advanced recovery procedures, and additional attempts were unsuccessful in yielding usable data. No data pertinent to the event was recovered from this unit.

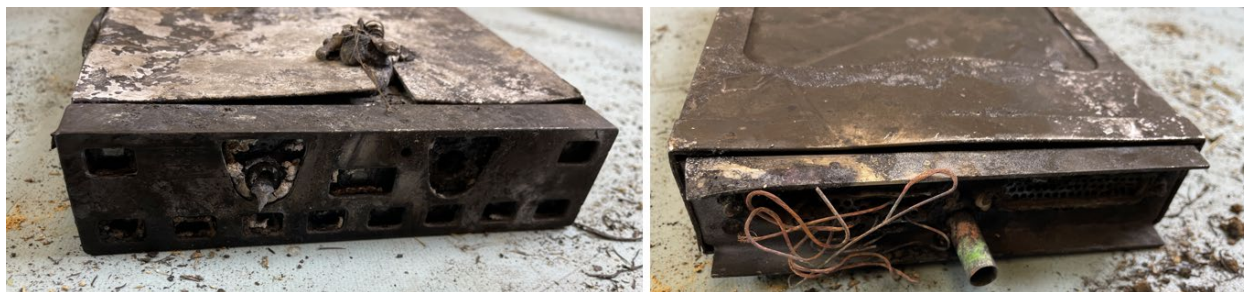


Figure 3. Front and back views of the Avidyne DFC-90 as received.



Figure 4. Severely fire damaged Avidyne DFC-90 internal microSD card.

3.0 Sentry Description

The Sentry is a portable ADS-B and GPS receiver designed by uAvionix for ForeFlight¹. The unit generates a Wi-Fi network allowing it to communicate and exchange data with portable electronic devices such as smart phones and tablets. Devices with ForeFlight (electronic flight bag software) can then receive and display inflight weather, traffic, and position data.

¹ Automatic Dependent Surveillance-Broadcast (ADS-B) is a surveillance technology deployed throughout the national airspace system. The ADS-B system is composed of aircraft avionics and a ground infrastructure. Onboard avionics determine the position of the aircraft by using the GPS and transmit its position along with additional information about the aircraft to ground stations for use by air traffic control (ATC) and other ADS-B services. This information is transmitted at a rate of approximately once per second. Operators equipped with ADS-B realize additional benefits from ADS-B broadcast services: Traffic Information Service - Broadcast (TIS-B) (traffic information) and Flight Information Service - Broadcast (FIS-B) (weather information).

3.1 Sentry Condition and Data Recovery

Figure 5 shows the Sentry as received at the NTSB Vehicle Recorder Laboratory. Its recorded data was recovered from its internal microSD card.



Figure 5. Front and back views of Sentry as received by the NTSB Vehicle Recorder Laboratory.

3.2 Sentry Recording Description

The accident flight was recorded on the device, however, all the recorded parameters from Sentry were compared to those recorded by the Avidyne IFD5000 and found to be redundant. The recordings from the Sentry are not further discussed in this report.

D. FIGURES AND TABULAR DATA

Figures 6 and 7 are plots of basic flight parameters of the accident flight. The plots are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns towards the top of the page, and nose up attitudes towards the top of the page.

Figure 8 is a plot of engine parameters of the entire accident flight. The recording rate was 1 sample every 4 seconds.

Figures 9 and 10 are Google Earth overlays of the accident flight recording. Figure 9 shows the entire flight recording, and figure 10 shows the final portion of the

accident flight. The weather and lighting conditions in Google Earth are not intended to be representative of the weather and lighting conditions present at the time of the recording.

Figures 11 and 12 are plots of basic flight parameters and engine parameters of the entire previous flight, respectively.

Figure 13 is a Google Earth overlay of the previous flight recording.

The corresponding tabular data used to create the above figures are provided in electronic comma-separated value (CSV) format as attachments to this report. Attachments 1 and 2 are the accident flight and previous flight recordings, respectively. Note that the attachments might contain additional parameters, however, not every parameter has been validated by the specialist.

Submitted by:

W. Deven Chen
Electrical Engineer – Recorder Specialist

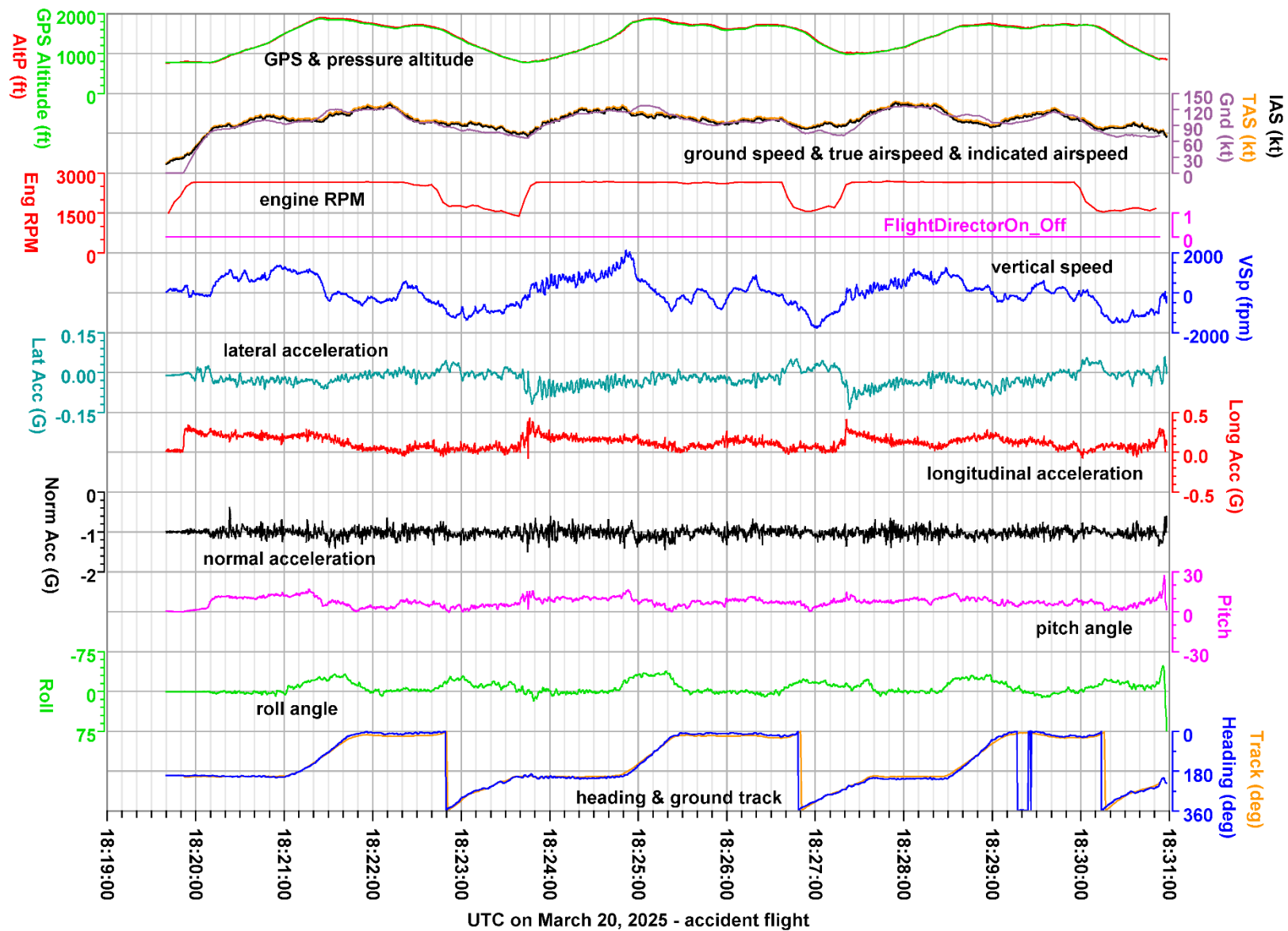


Figure 6. Plot of basic flight parameters of the entire accident flight.

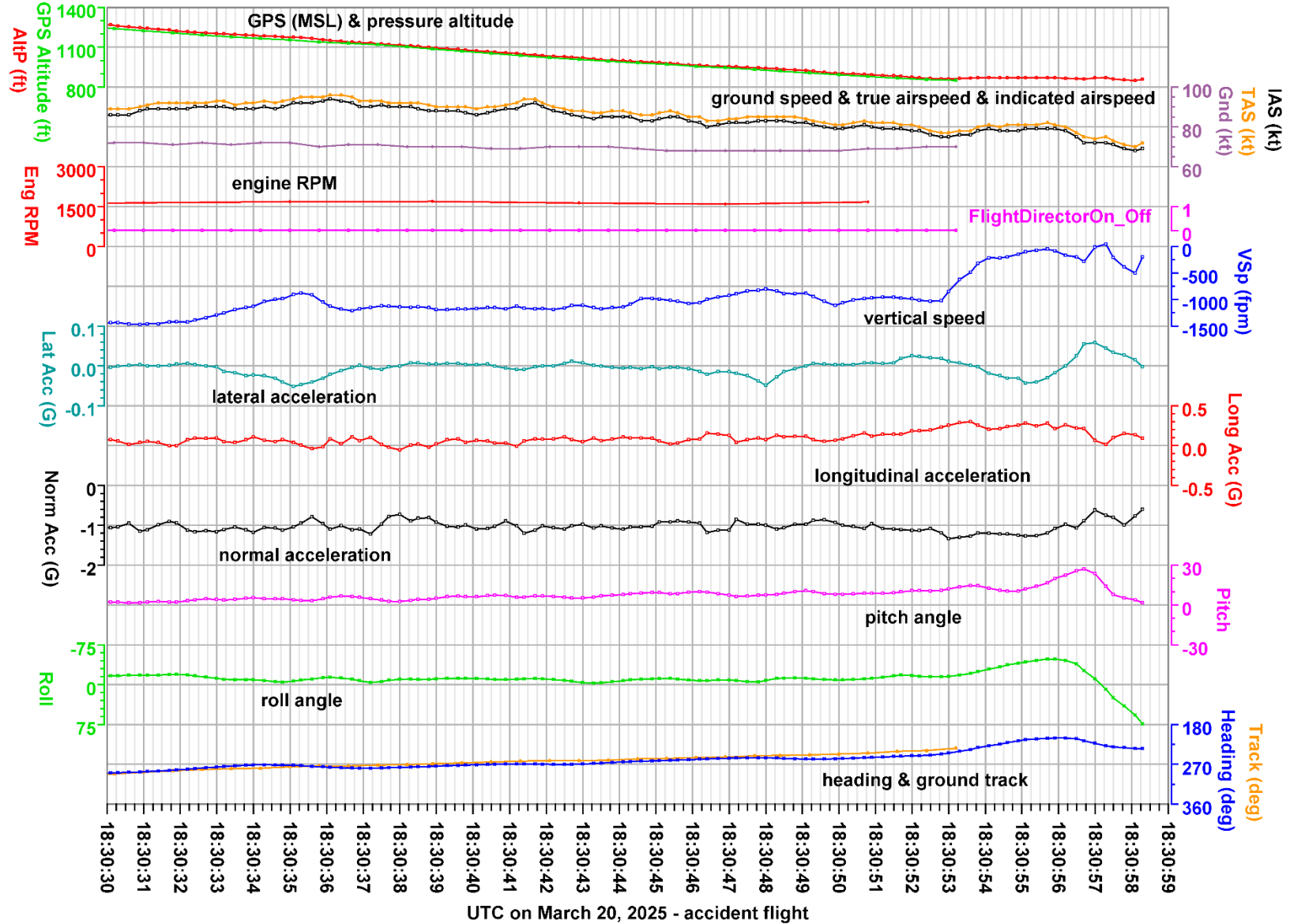


Figure 7. Plot of basic flight parameters of the final portion of the accident flight recording.

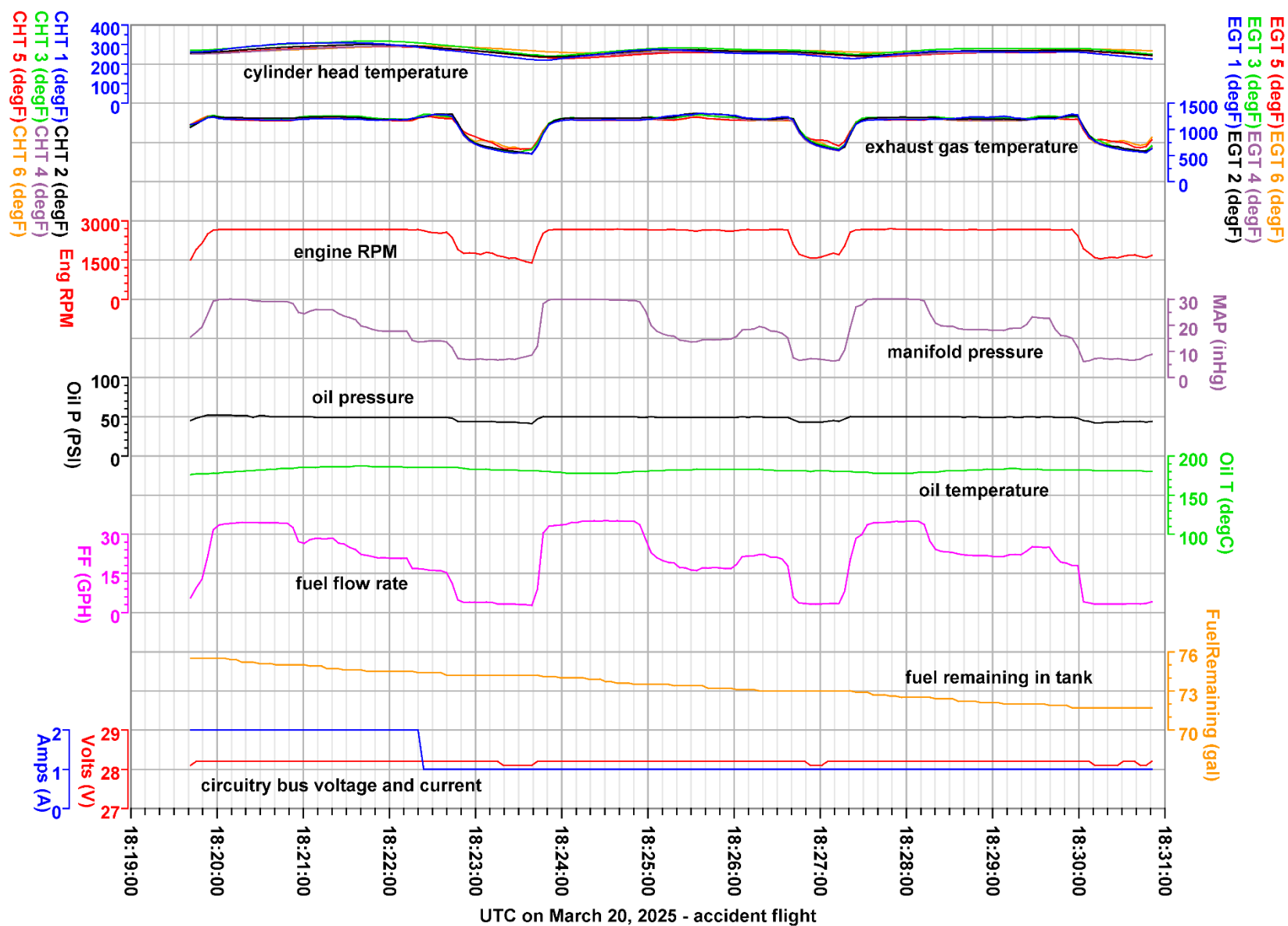


Figure 8. Plot of engine parameters of the entire accident flight.

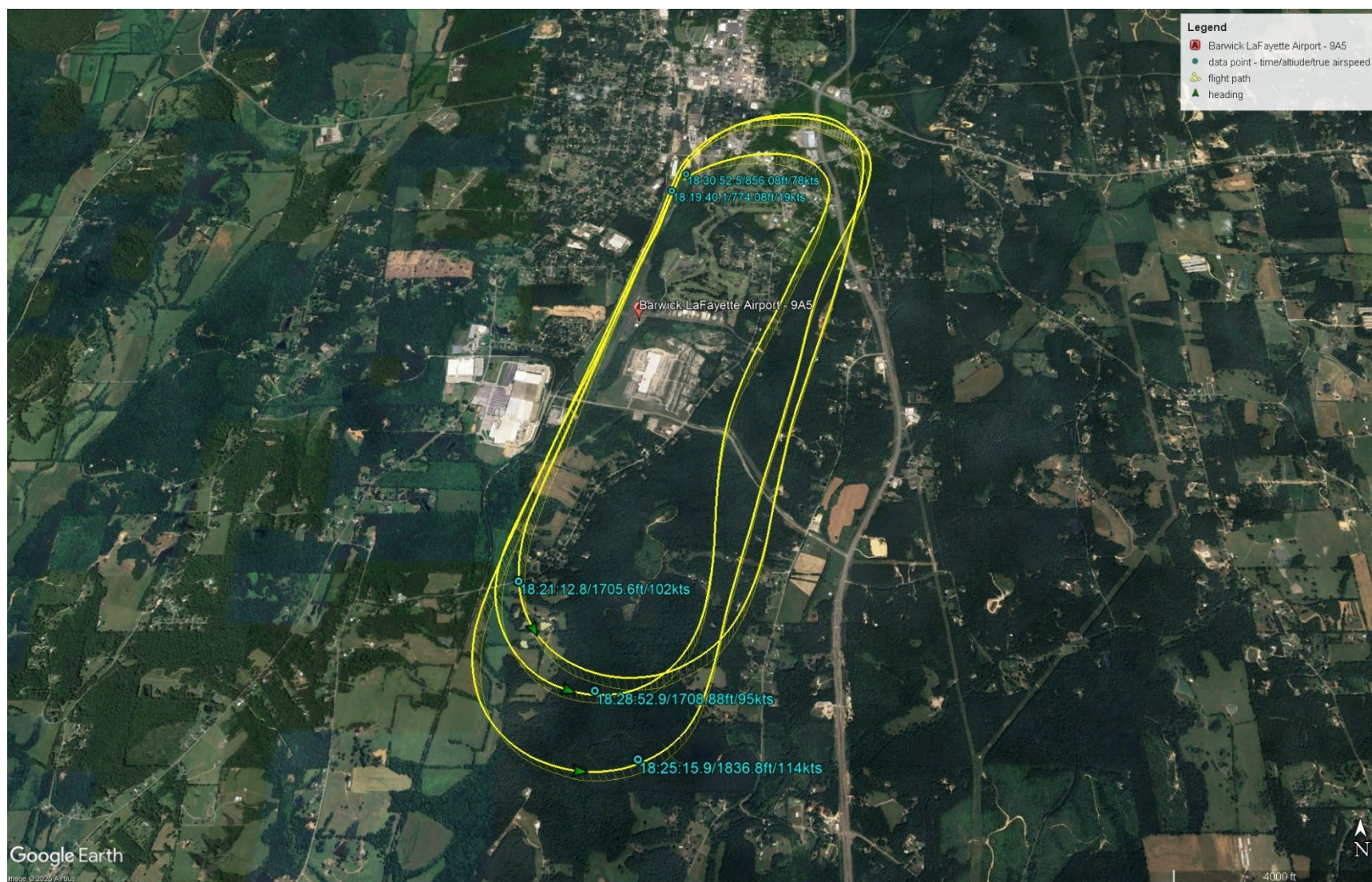


Figure 9. Google Earth overlay of the entire accident flight recording on March 20, 2025. The times are in UTC.

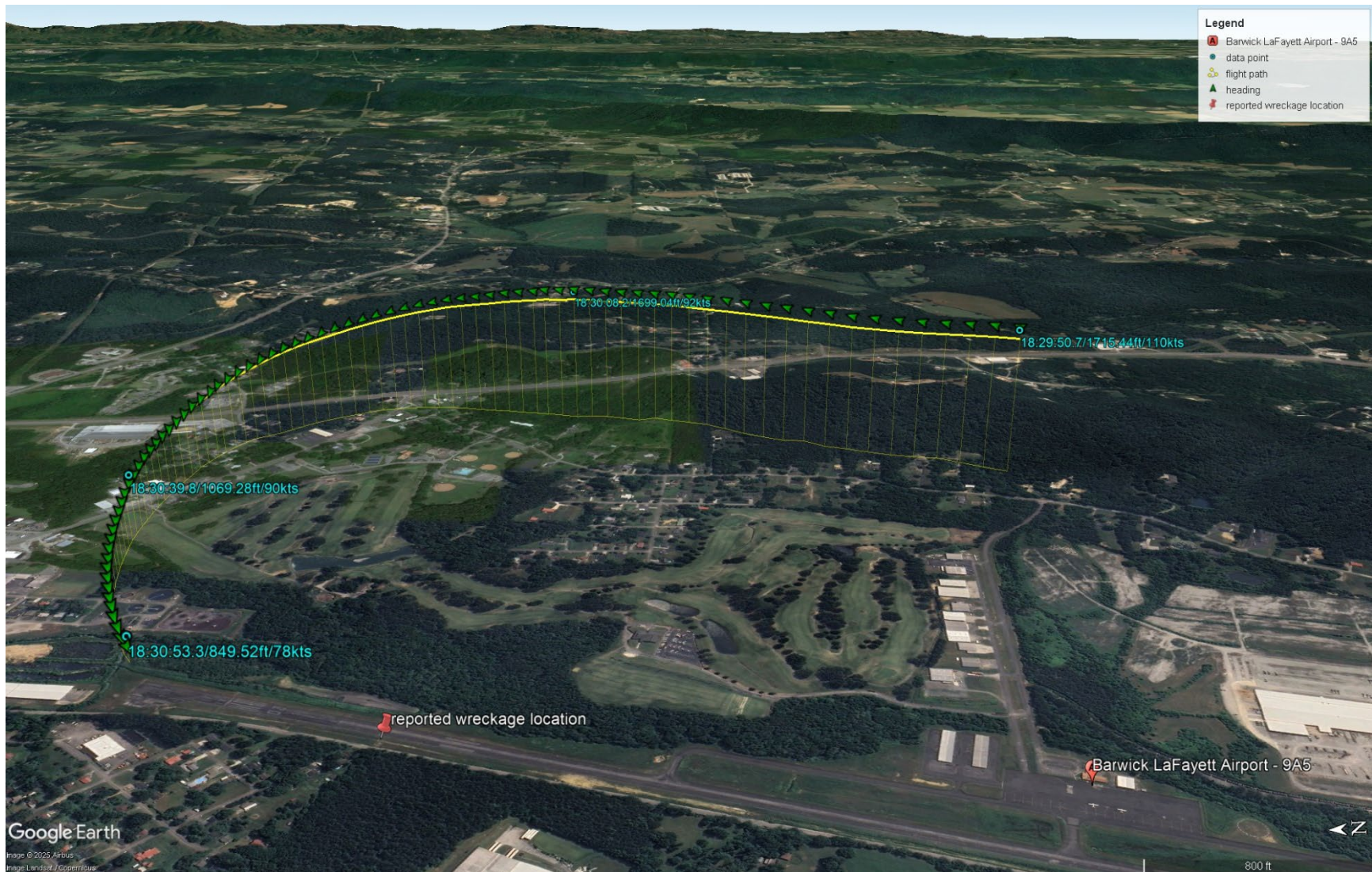


Figure 10. Google Earth overlay of the final portion of the accident flight. The times are in UTC.

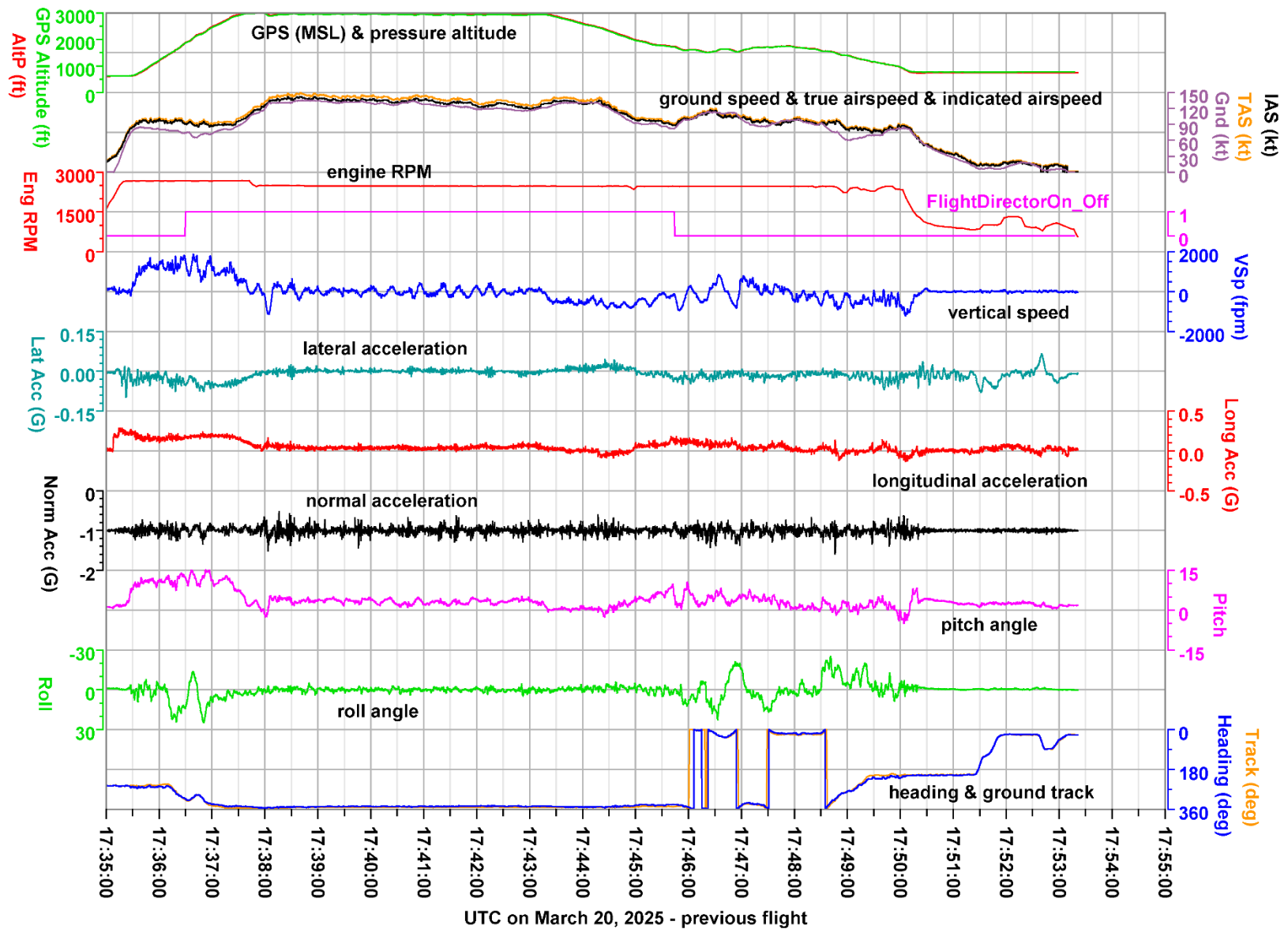


Figure 11. Plot of basic flight parameters of the previous flight on the same day.

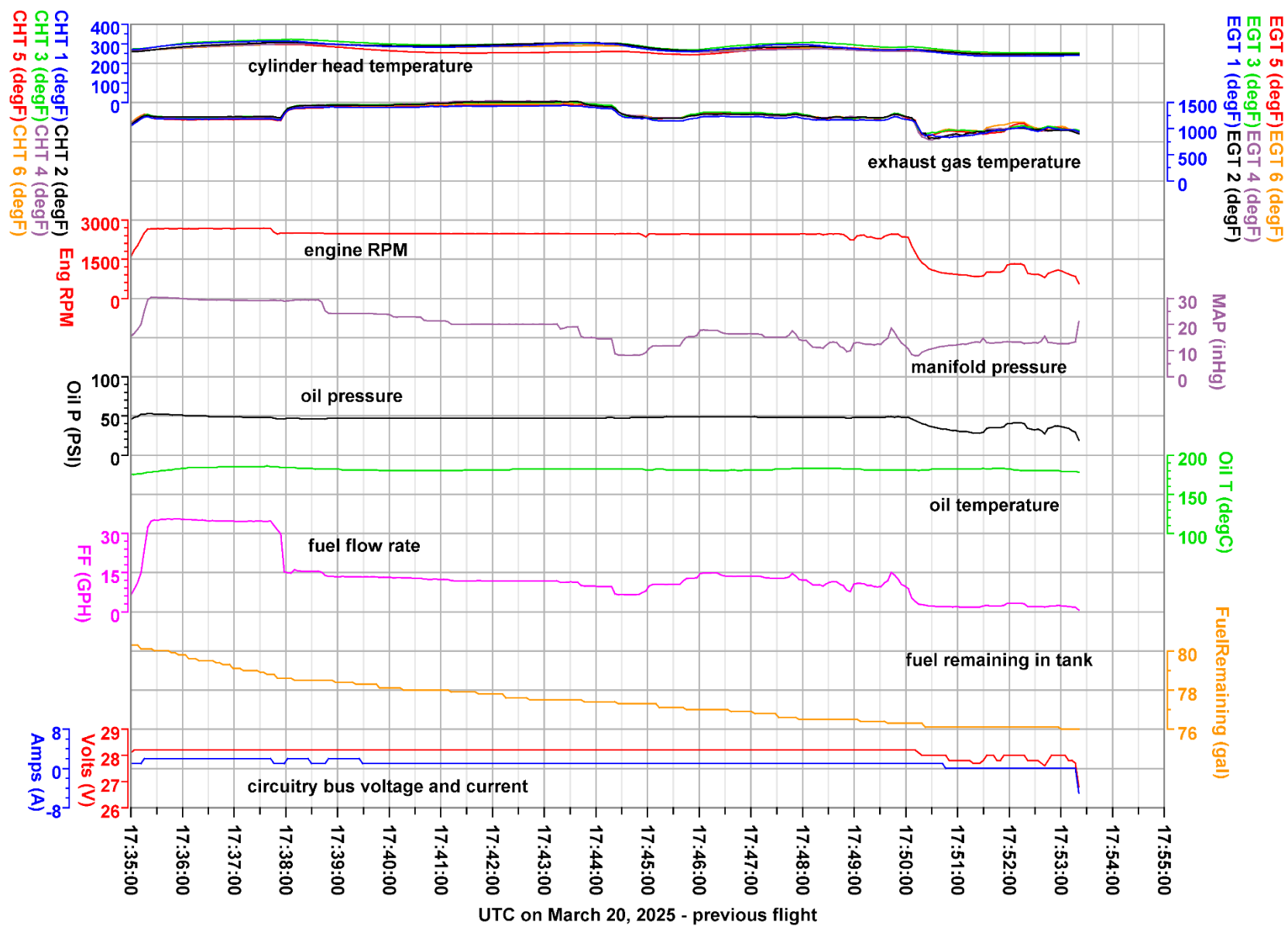


Figure 12. Plot of engine parameters of the previous flight on the same day.

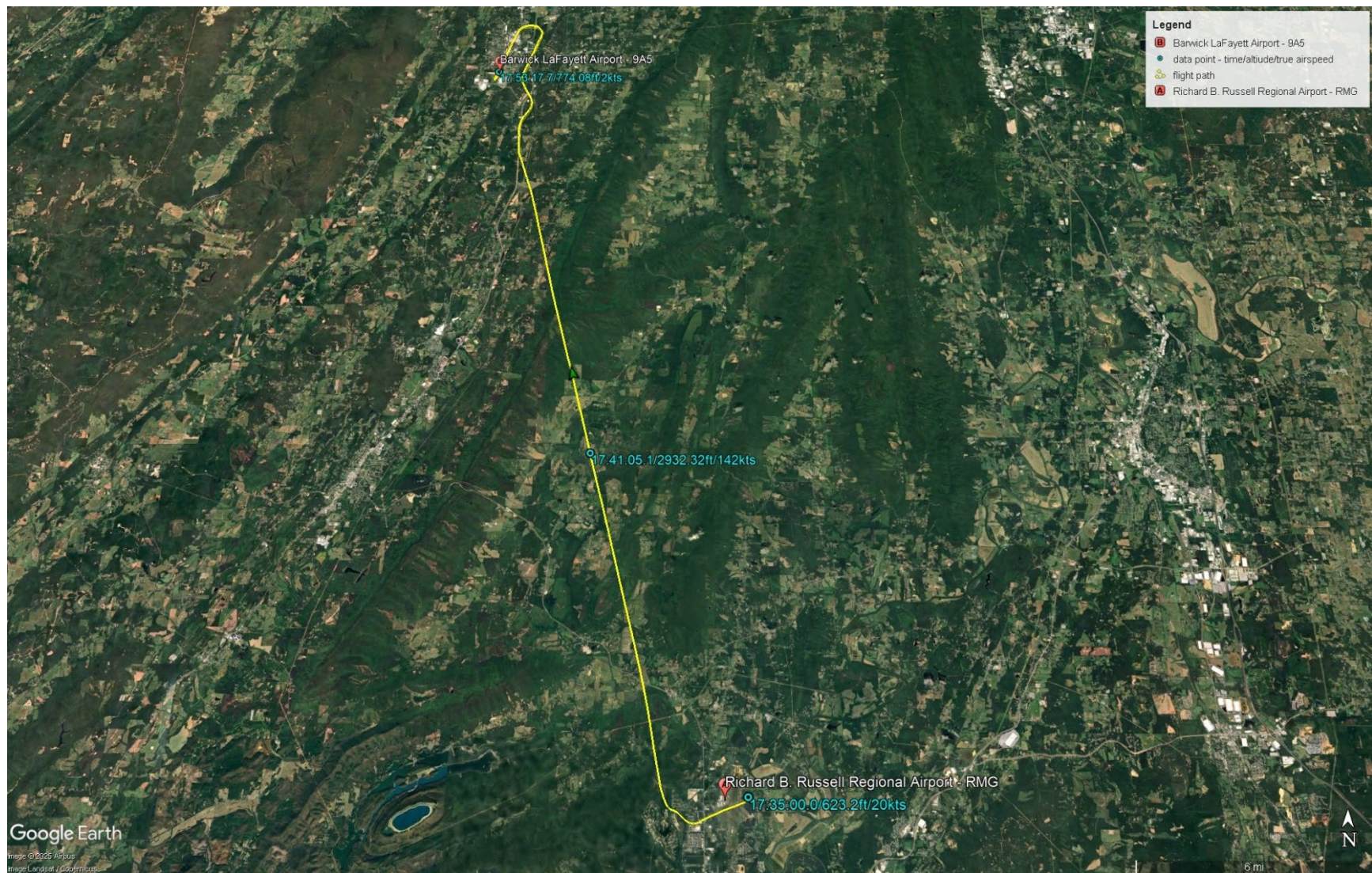


Figure 13. Google Earth overlay of the previous flight recorded on the same day. The times are in UTC.