

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR25LA027

RECOVERABLE DATA MODULE

Specialist's Factual Report

March 5, 2026

A. ACCIDENT

Location: St. George, Utah
Date: October 27, 2024
Time: 1812 Mountain daylight time (MDT)
Aircraft: CIRRUS SR20, N27WF

B. RECOVERABLE DATA MODULE INVESTIGATOR

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C. DETAILS OF THE INVESTIGATION

A recorder group was not convened. The NTSB Vehicle Recorder Division received the following recoverable data module (RDM):

Recorder Manufacturer/Model:	Appareo RDM-300
Part Number:	unk
Recorder Serial Number:	unk

1.0 Device Description

The Appareo RDM is designed for Cirrus aircraft to record flight data in a crash and fire-resistant housing. The unit records flight, engine, and autopilot parameters. Depending on the recording software, over 75 parameters may be recorded. Data is logged up to five times per second and stored internally on four thin small outline package (TSOP) memory chips inside the crash-hardened enclosure. When the storage limit of the memory device is reached, the oldest recording is overwritten.

1.1 Data Recovery

The Appareo RDM-300 sustained severe fire damage from the accident, as shown in Figure 1. Figure 2 shows its internal circuit board and the memory module. The non-reversible temperature indicator had turned dark grey from its original color (white), indicating the circuit board had exposed to temperatures of over 138 degrees Celsius.

The main circuit board and the memory module of the RDM-300 were in fair condition, but the connector port was damaged. Data were downloaded using

laboratory equipment. The downloaded raw data, which was encrypted, was then decoded and converted into engineering unit data by a Cirrus Aircraft representative at NTSB headquarters.



Figure 1. RDM as received.



Figure 2. Memory module (bottom left) and main circuit board (top right).

1.2 Recording Description

The data extracted included 546 sessions. The file recorded on October 27, 2024, from 17:51:12.0 to 18:13:24.2 MDT, was determined to be related to the accident flight. The data were sampled at 5 Hz.

1.3 Parameters Provided

Table 1 lists the parameters verified and provided in this report. The recorded parameters include basic flight parameters, engine parameters, autopilot, ESP¹ (Electronic Stability and Protection) parameters, and some selected parameters.

Table 1. Appareo RDM data parameters provided.

Parameter Name (unit)	Parameter Description
AltMSL (ft)	GPS Altitude (feet)
Amp (A)	Circuitry bus current (Amperes)
AOA ESP Engaged (BIN)	1 if AOA (angle of attack) exceeds AOA threshold and the system is activated to drive the pitch angle down. Otherwise, 0.
AP/FD (BIN)	Autopilot/Flight director status (1 = engaged and 0 = off)
CAPS handle pulled (BIN)	Cirrus Airframe Parachute System activation handle pulled (1 = yes and 0 = no)
CAPS rocket deployed (BIN)	Cirrus Airframe Parachute System deployed through rocket action (1 = yes and 0 = no)
CHT# (degF)	Cylinder # head temperature (degrees Fahrenheit)
EGT# (degF)	Cylinder # exhaust gas temperature (degrees Fahrenheit)
ESP Enabled (BIN)	1 if ESP is not failed (see ESP FAIL) AND ESP is enabled in configuration, AND the pilot has not inhibited it, AND the autopilot is not engaged. Otherwise, 0.
ESP Enabled by Pilot (BIN)	0 if the pilot has deactivated ESP in the System Settings menu. Otherwise, 1.
FFlow (GPH)	Fuel flow rate (gallons per hour)
Flaps command 0%/50%/100% (BIN)	Flap extension position at 0%/50%/100%
FQtyL/R (gal)	Fuel quantity at left/right tank (gallons)
Heading (deg)	Heading (degrees)
IAS (kt)	Indicated airspeed (knots)
LatAcc (g)	Acceleration at lateral direction (g)
Latitude (deg)	Geometric latitude (degrees)
LonAcc (g)	Acceleration at longitudinal direction (g)
Longitude (deg)	Geometric longitude (degrees)
Volt (V)	Circuitry bus voltage (volts)
Manifold Pressure (in. Hg)	Manifold pressure (inches of mercury)

¹ ESP - Electronic Stability and Protection is a flight auto-control system designed by Garmin, which monitors the aircraft's condition, functioning independently of the autopilot, and it applies a control force towards stable flight whenever pitch or roll deviations exceed recommended limits.

Parameter Name (unit)	Parameter Description
NormAcc (g)	Acceleration at normal direction (g)
OAT (degC)	Outside air temperature (degree Celsius)
Oil P (PSI)	Oil pressure (pounds per square inches)
Oil T (degC)	Oil temperature (degrees Celsius)
Percent Power (%)	Engine power in percentage (%)
Pitch (deg)	Pitch angle (degrees)
Roll (deg)	Roll angle (degrees)
RPM (rpm)	Engine revolutions per minute
STALL - VOICE (BIN)	Stall voice status (1 = on and 0 = off)
Stall Warning ACTIVE (BIN)	Stall warning active status (1 = active and 0 = not active)
TAS (kt)	True airspeed (knots)
Vspd (fpm)	Vertical speed (feet per minute)

1.4 Time Correlation

The data were recorded in UTC and were converted to MDT, the local time of the accident, for this report. MDT is 6 hours behind UTC.

D. FIGURES AND TABULAR DATA

All parameters listed in Table 1 are plotted. Figures 3 to 8 contain data recovered from the Appareo RDM-300 for the accident flight on October 27, 2024.

Figure 3 and Figure 4 are plots of basic flight and ESP parameters from the accident flight with different time ranges: the entire flight and from 18:11:20 MDT to the end of the accident flight, respectively.

Figure 5 and Figure 6 are plots of engine parameters from the accident flight with different time ranges: the entire flight and from 18:11:20 MDT to the end, respectively.

These plots are configured such that right turns are indicated by the trace moving toward the bottom of the page, left turns toward the top of the page, and nose-up attitudes toward the top of the page.

Figure 7 and Figure 8 are Google Earth overlays of the accident flight.

Figure 7 is a Google Earth Overlay of the entire accident flight.

Figure 8 is a Google Earth overlay showing the end of 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. Note that the entire flight path of the accident flight recorded on the RDM presents in an abnormal zig-zag shape rather than a smooth line. This is a known issue with Appareo RDM in recording GPS location data, and the appearance of the flight track may not be representative of the airplane's actual flight track. This pattern may be attributed to the update rate of GPS parameters as well as the software encoding of the GPS input to the device.

The corresponding tabular data used to create figures 3 to 8 are provided as attachment 1 in CSV format to this report. Note: All parameters downloaded from the RDM were included in this attachment, however, only parameters included in the figures below were validated by the specialist.

Submitted by:

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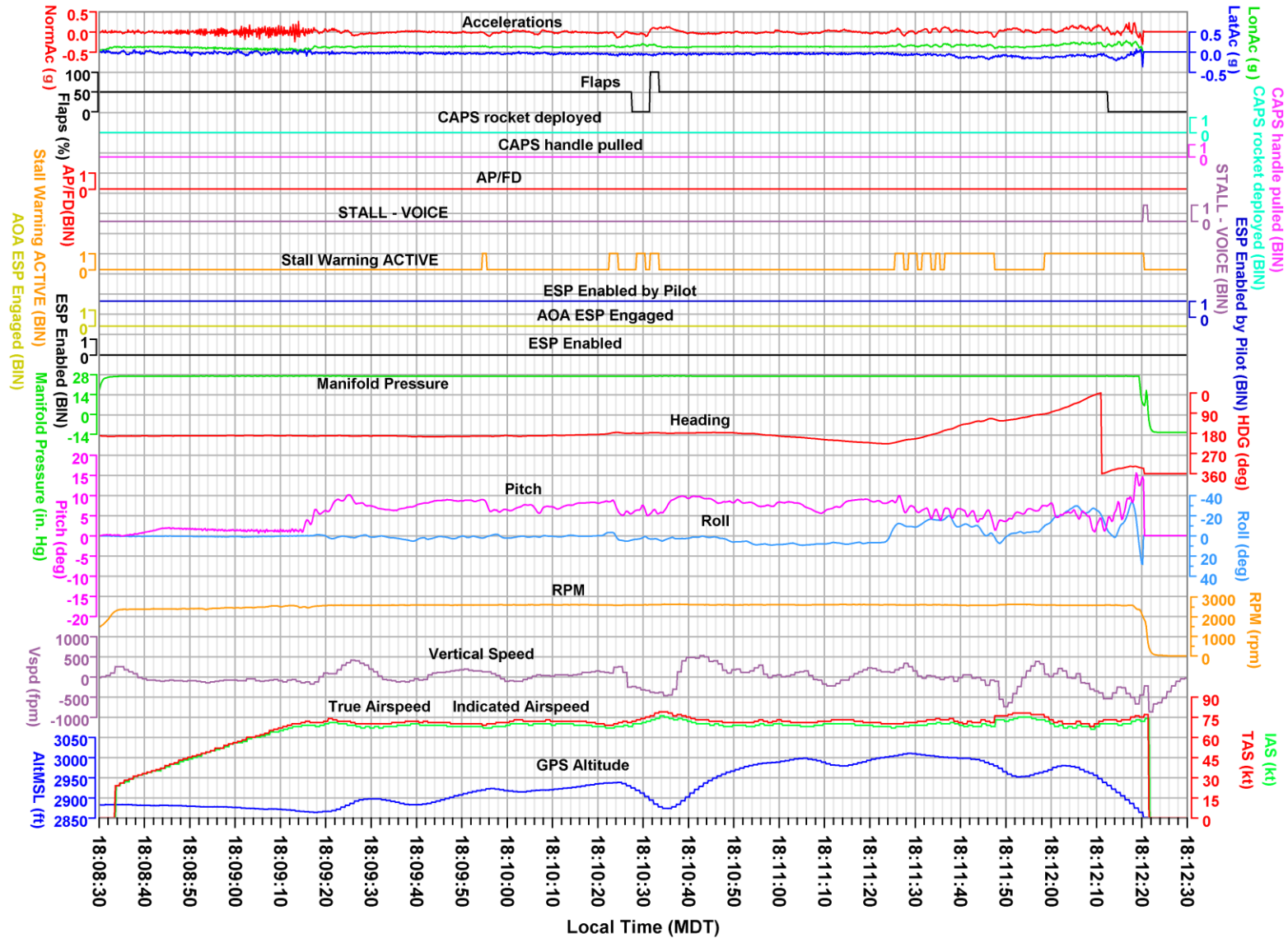


Figure 3. Plot of basic flight and ESP parameters of the entire accident flight.

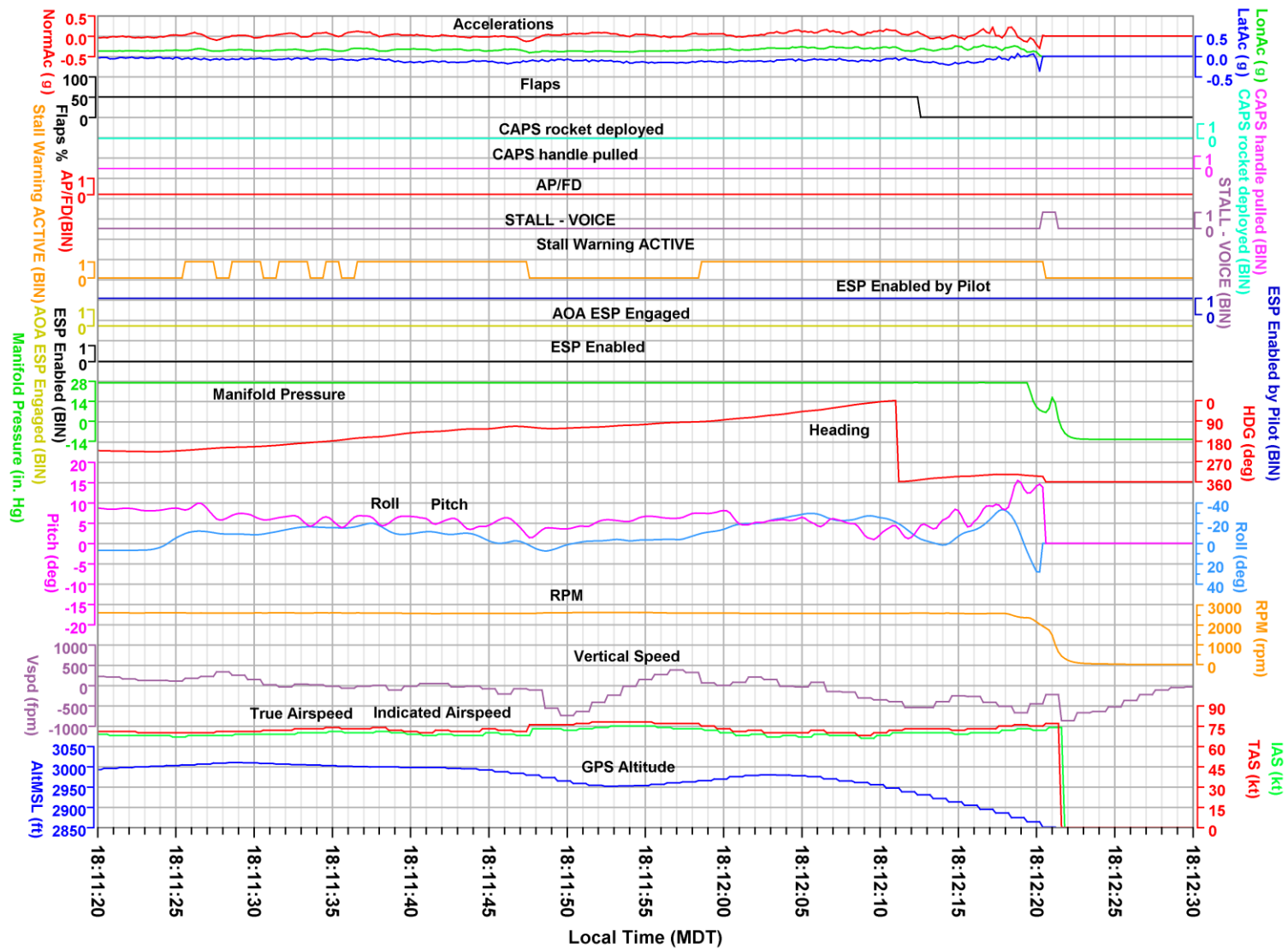


Figure 4. Plot of basic flight and ESP parameters of the accident flight from 18:11:20 MDT to the end.

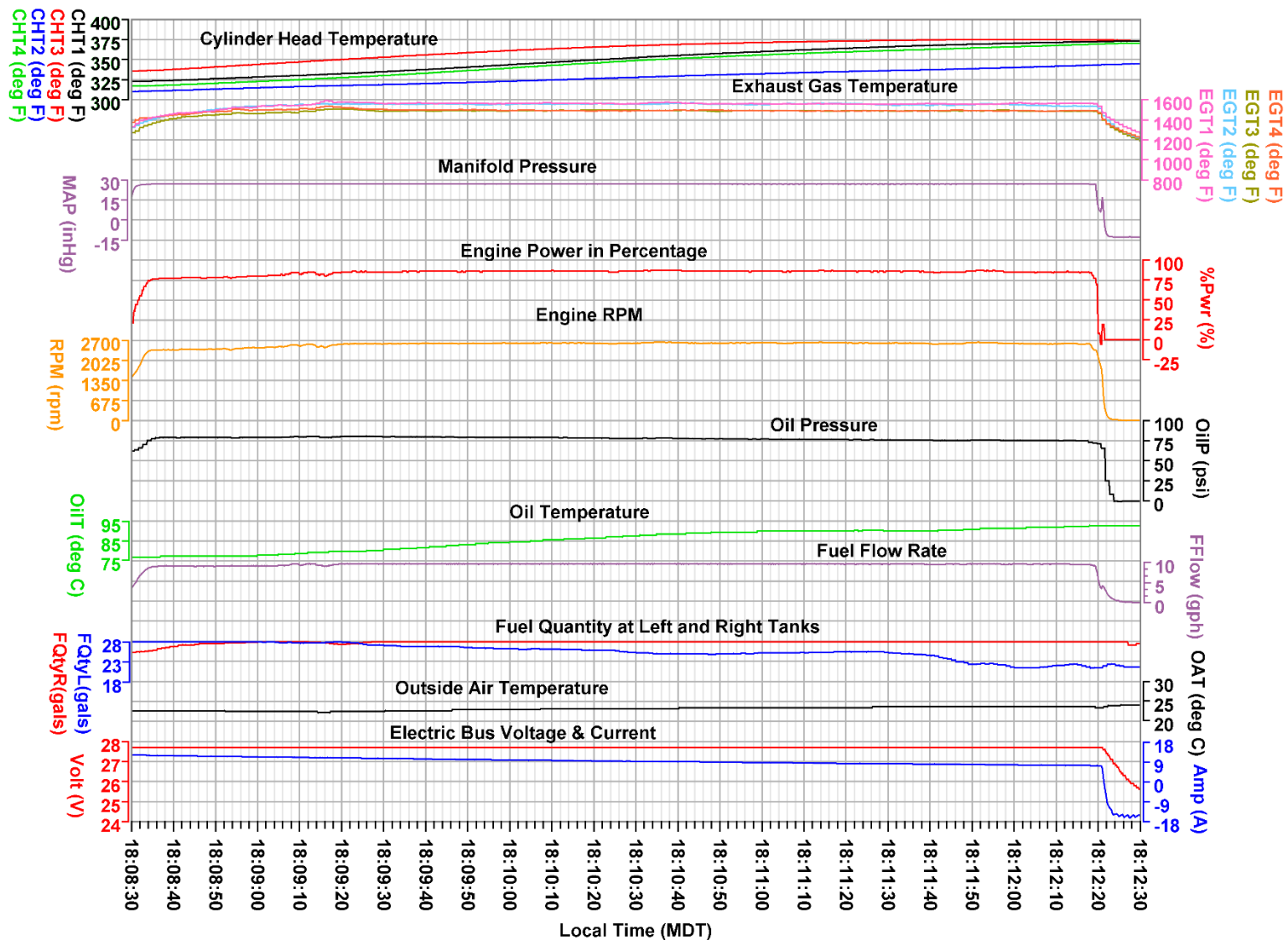


Figure 5. Plot of engine parameters of the entire accident flight.

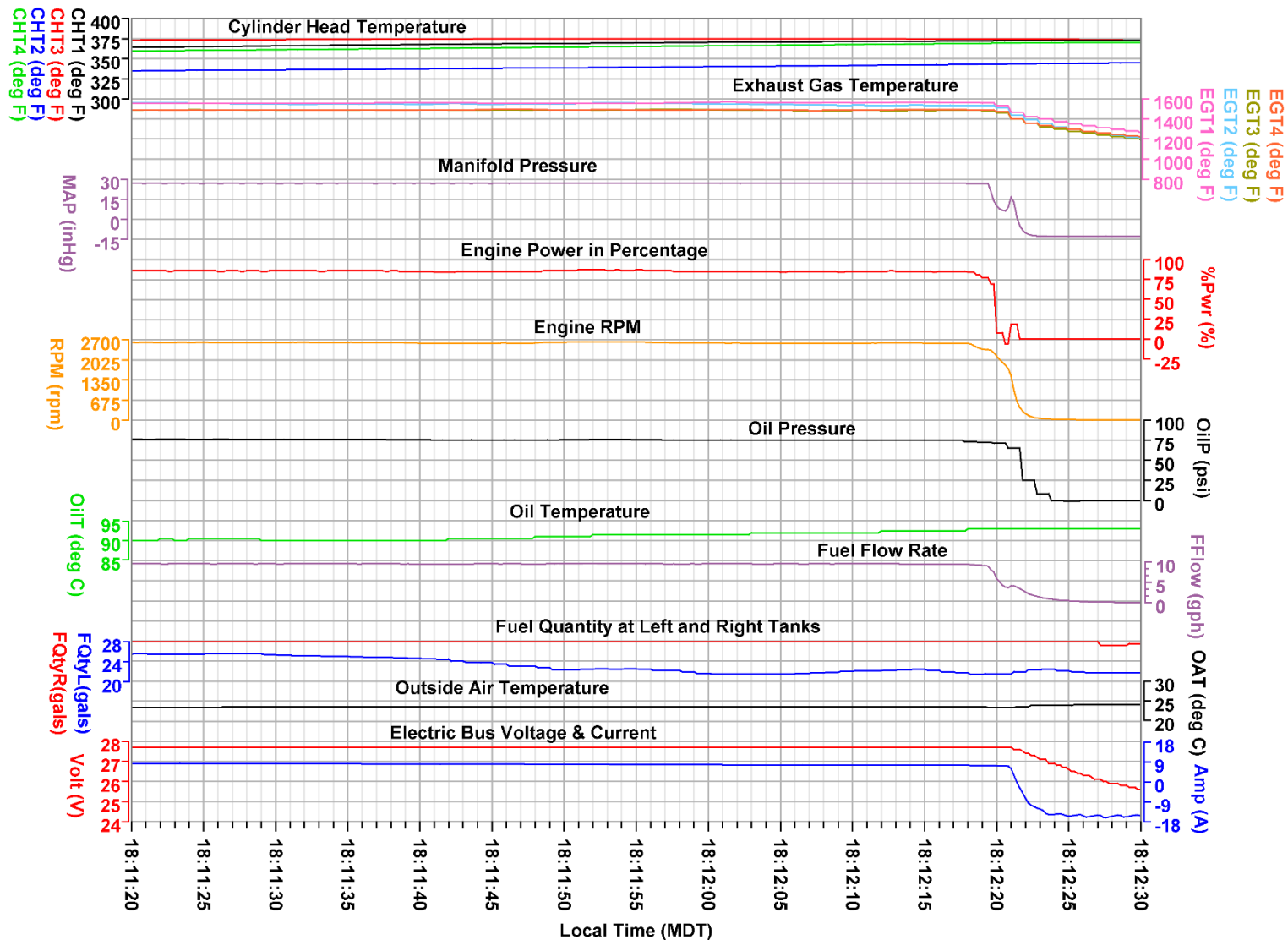


Figure 6. Plot of engine parameters of the accident flight from 18:11:20 MDT to the end.



Figure 7. Google Earth overlay of the entire accident flight.

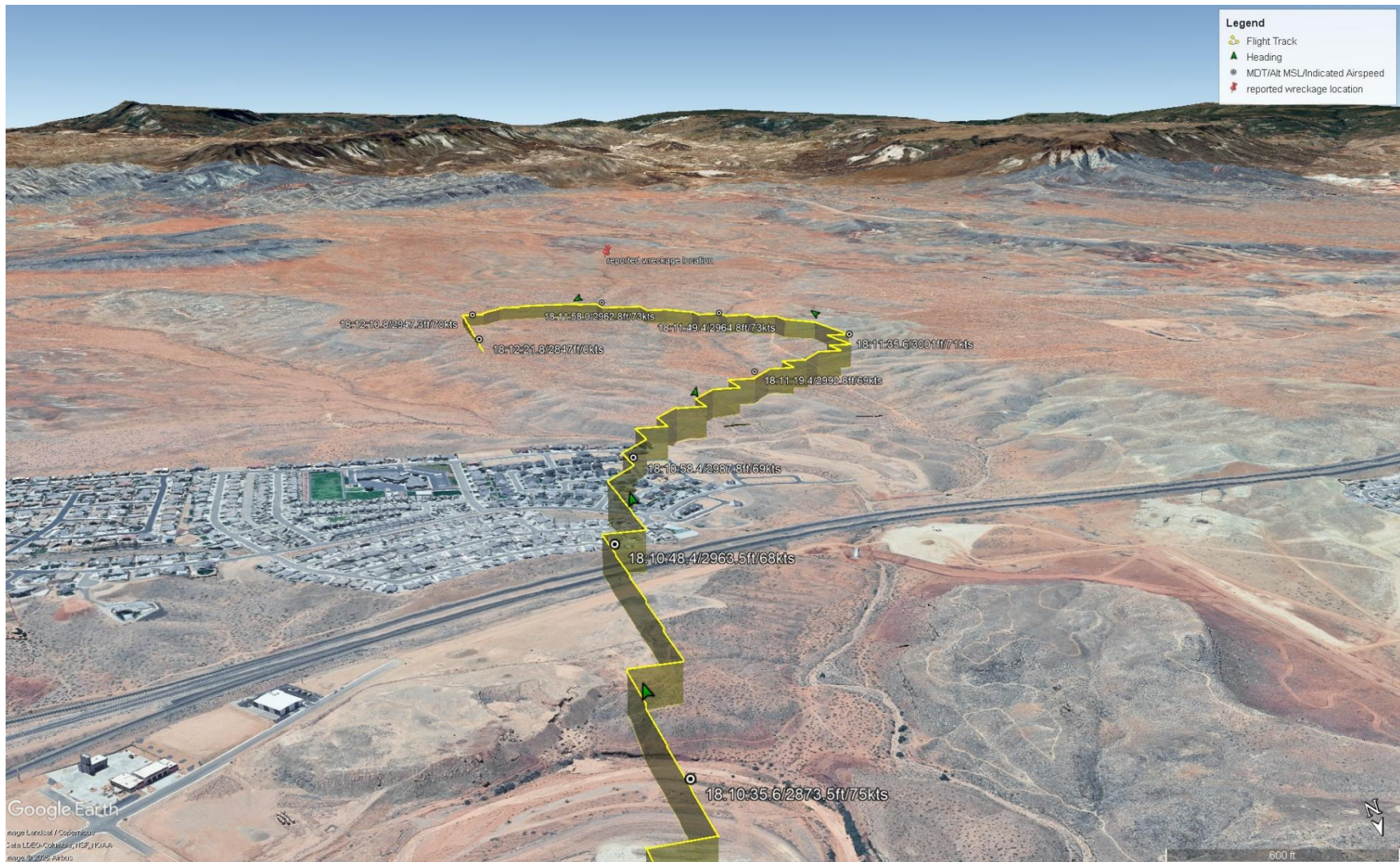


Figure 8. Google Earth overlay showing the end of the accident flight.