

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

October 2, 2020

Recoverable Data Module

Specialist's Factual Report by Michael Portman

1. EVENT

Location: Tyler, TX
Date: November 22, 2019
Aircraft: Cirrus SR22
Registration: N969JM
Operator: Martin Aviation LLC
NTSB Number: CEN20LA020

On November 22, 2019, about 1338 central standard time (CST), a Cirrus SR22 airplane, N969JM, sustained substantial damage during an impact with terrain following the deployment of the Cirrus Aircraft Parachute System (CAPS). The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight when the accident occurred. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan had been filed and activated.

2. DETAILS OF INVESTIGATION

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

Device: Heads Up Technologies RDM
Device Serial Number: Unknown

2.1. Heads Up Technologies RDM Device Description

The Heads Up Technologies recoverable data module (RDM) is a crash-hardened data storage unit installed in the tail of some Cirrus aircraft. The unit records flight, engine, and autopilot parameters. Data is logged once per second and stored internally on a CF card installed inside the crash-hardened enclosure. When the storage limit of the memory device is reached, the oldest recording is deleted.

2.1.1. Heads Up Technologies RDM Data Recovery

Data extracted from the RDM were sent to the Vehicle Recorders Laboratory via electronic file transfer.

2.1.2. Heads Up Technologies RDM Data Description

The file contained approximately 14 hours and 23 minutes of data. The accident flight was the last flight of the recording and its duration was approximately 20 minutes.

2.2. Time Correlation

Correlation of the RDM data from elapsed to the event local time, CST, was established by using the recorded UTC hour, UTC Minute, and UTC Second and then applying an additional six hours offset to change UTC to CST.¹

2.3. RDM Plots and Corresponding Tabular Data

Figures 1 through 4 contain RDM data recorded during the event on November 22, 2019. All the parameters listed in table A-1 are plotted except Latitude, Longitude, UTC Hour, UTC Minute, and UTC Second.

Figure 1 shows an overview of basic parameters for the entire flight.

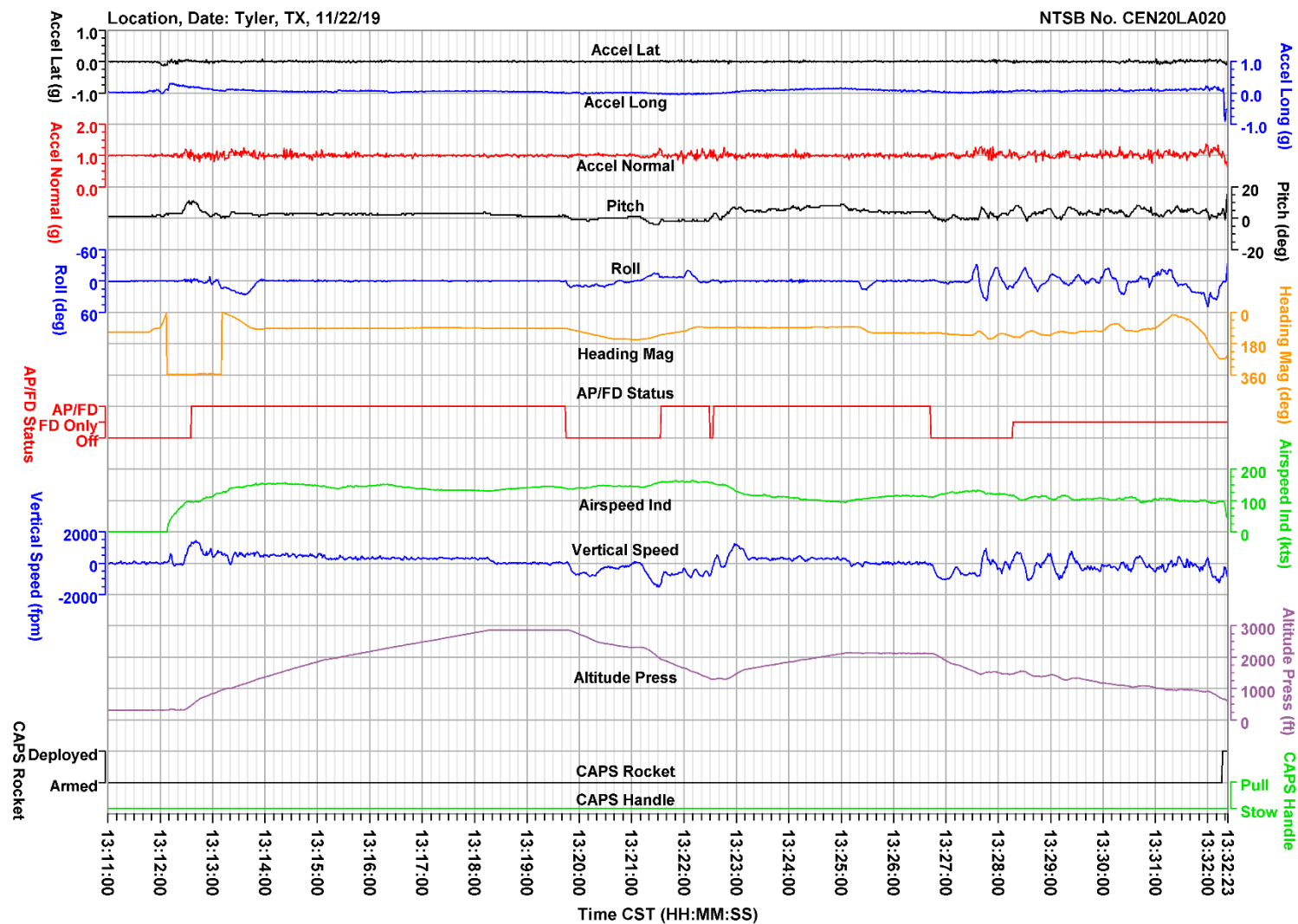
Figure 2 shows select engine related parameters for the entire flight.

These figures 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 3 shows a graphical overlay generated using Google Earth for the event flight, and figure 4 shows a detail view of the end of the 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 corresponding tabular data used to create figures 1 through 4, including Latitude, Longitude, UTC Hour, UTC Minute, and UTC Second, are provided in electronic comma separated value (*.csv) format as attachment 1 to this report.

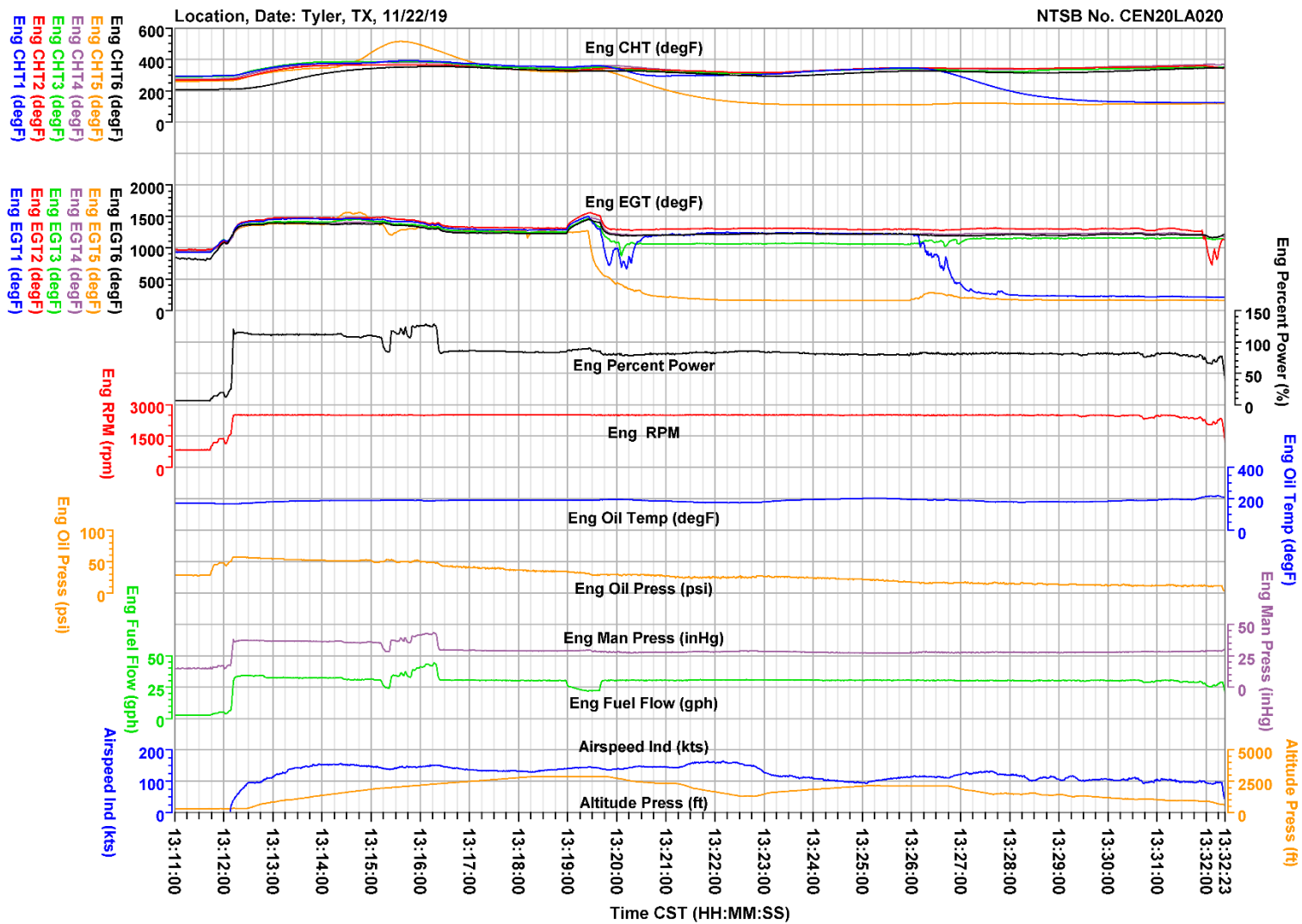
¹ UTC is Coordinated Universal Time which is also known as Greenwich Mean Time (GMT).



Martin Aviation LLC, Cirrus SR22, N969JM

National Transportation Safety Board

Figure 1. Overview of Basic Parameters for the Entire Flight.



Martin Aviation LLC, Cirrus SR22, N969JM

National Transportation Safety Board

Figure 2. Overview of Select Engine Parameters for the Entire Flight.

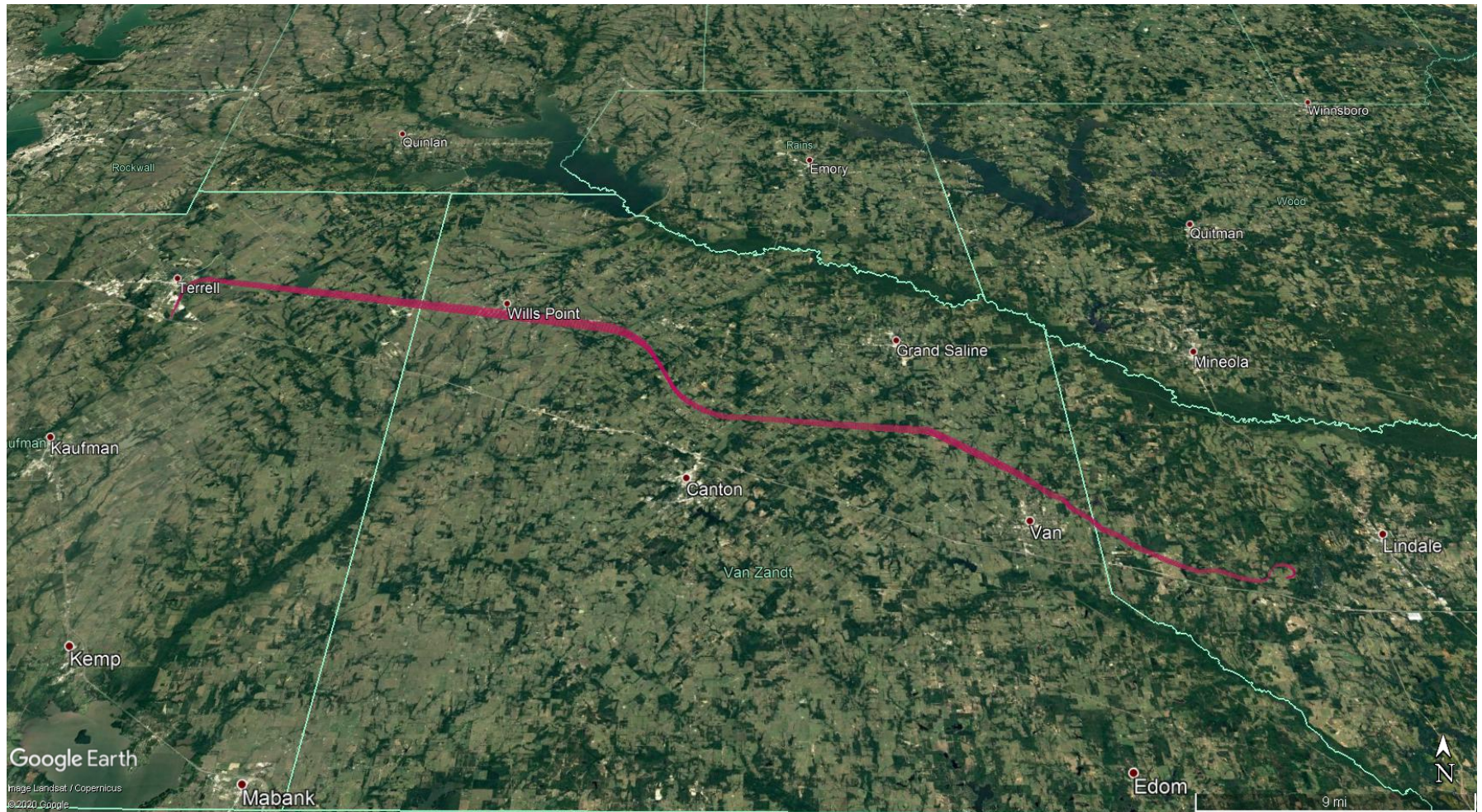


Figure 3. Google Earth Overlay of the Event Flight.



Figure 4. Google Earth Overlay of the End Portion of the Event Flight.

APPENDIX A

This appendix describes the parameters provided and verified in this report. Table A-1 lists the plot/table labels, parameter names, and units. Additionally, table A-2 describes the unit abbreviations used in this report.

Table A-1. Verified and provided RDM parameters.

Plot/Table Labels	Parameter Names	Units
Accel Lat	Lateral Acceleration	g
Accel Long	Longitudinal Acceleration	g
Accel Normal	Normal Acceleration	g
Airspeed Ind	Indicated Airspeed	kts
Altitude Press	Pressure Altitude	ft
CAPS Handle	Cirrus Aircraft Parachute System (CAPS) Handle Pulled	
CAPS Rocket	CAPS Rocket Fired	
AP/FD Status	Autopilot/Flight Director Status	
Eng CHT#1-6	Engine Cylinder Head Temperature	degF
Eng EGT#1-6	Engine Exhaust Gas Temperature	degF
Eng Fuel Flow	Engine Fuel Flow	gph
Eng Man Press	Engine Manifold Pressure	inHg
Eng Oil Press	Engine Oil Pressure	psi
Eng Oil Temp	Engine Oil Temperature	degF
Eng Percent Power	Engine Percent Power	%
Eng RPM	Engine RPM	rpm
Heading Mag	Magnetic Heading	deg
Latitude	Latitude Position	deg
Longitude	Longitude Position	deg
Pitch	Pitch Angle	deg
Roll	Roll Angle	deg
UTC Hour	UTC Time Hours	hrs
UTC Minute	UTC Time Minutes	min
UTC Second	UTC Time Seconds	sec
Vertical Speed	Vertical Speed	fpm

NOTE: This RDM records pressure altitude, which is based on a standard altimeter setting of 29.92 inches of mercury (in Hg). The pressure altitude information presented in the RDM plots and in the electronic data has not been corrected for the local altimeter setting at the time of the event.

NOTE: Parameters with a blank unit description in table A-1 are discretes. A discrete is typically a 1-bit parameter that is either a 0 state or a 1 state where each state is uniquely defined for each parameter.

Table A-2. Unit abbreviations.

Unit Abbreviations	Descriptions
deg	degrees
degF	degrees Fahrenheit
fpm	feet per minute
ft	feet
g	acceleration (g's)
gph	gallons per hour
inHg	inches of mercury
kts	knots
psi	pounds per square inch

Unit Abbreviations	Descriptions
rpm	rotations per minute
hrs	hours
min	minutes
sec	seconds