

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division
Washington, D.C. 20594

July 30, 2020

Cockpit Display – Recorded Flight Data

Specialist's Factual Report
By Michael Portman

1. EVENT SUMMARY

Location: Upland, CA
Date: November 7, 2019
Aircraft: Cirrus SR22
Registration: N220MT
Operator: Private
NTSB Number: WPR20FA019

On November 7, 2019, about 1100 Pacific standard time, a Cirrus SR22 airplane, N220MT impacted terrain while on the approach to the Cable Airport (CCB), Upland, California. The private pilot was fatally injured, and the airplane was destroyed. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed, and no flight plan was filed. The flight originated from Zamperini Field Airport (TOA), Torrance, California, at an unknown time.

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 Manufacturer/Model:	Avidyne PFD
Serial Number:	Unknown

Device Manufacturer/Model:	Avidyne DFC-90 Autopilot Module
Serial Number:	Unknown

3.1. Avidyne PFD Device Description

The PFD unit includes a solid-state Air Data and Attitude Heading Reference System (ADAHRS) and displays aircraft parameter data including altitude, airspeed, attitude,

vertical speed, and heading. The PFD unit has external pitot/static inputs for altitude, airspeed, and vertical speed information. Each PFD contains two flash memory devices mounted on a riser card. The flash memory stores information the PFD unit uses to generate the various PFD displays. Additionally, the PFD has a data logging function, which is used by the manufacturer for maintenance and diagnostics. Maintenance and diagnostic information recording consists of system information, event data, and flight data.

The PFD samples and stores several data streams in a sequential fashion; when the recording limit of the PFD is reached, the oldest record is dropped, and a new record is added. Data from the Attitude/Heading Reference System (AHRS) is recorded at a rate of 5 Hz. Air data information such as pressure altitude, indicated airspeed, and vertical speed are recorded at 1 Hz. Global Positioning System (GPS) and navigation display and setting data are recorded at a rate of 0.25 Hz, and information about pilot settings of heading, altitude, and vertical speed references are recorded when changes are made.

3.1.1. Device Condition

Upon arrival at the Vehicle Recorder Laboratory, an examination revealed the unit had sustained extensive thermal damage. The extent of the damage is shown in Figure 1.



Figure 1. Photo of damaged PFD.

3.1.2. Data Description

This device is capable of storing data in non-volatile memory (NVM)¹. The extent of the damage precluded normal recovery procedures and additional attempts were unsuccessful in yielding usable data. Therefore, no data pertinent to the event were recovered.

3.2. Avidyne DFC-90 Autopilot Module Description

The Avidyne DFC-90 is an attitude-based flight control system that contains Envelope Protection and Envelope Alerting. Each DFC-90 contains an SD card in a small orange case that records attitudes, attitude rates, and many flight control system related parameters. The data on the DFC-90 is stored sequentially in three sampling rate fidelities in the Common Data Format (CDF) convention.

3.2.1. Device Condition

Upon arrival at the Vehicle Recorder Laboratory, an examination revealed the recovered SD card and case had sustained extensive thermal damage. The extent of the damage is shown in Figure 2.



Figure 2. Photo of damaged DFC-90 memory module.

3.2.2. Data Description

This device is capable of storing data in NVM. The extent of the damage precluded normal recovery procedures and additional attempts were unsuccessful in yielding usable data. Therefore, no data pertinent to the event were recovered.

¹ Non-volatile memory is semiconductor memory that does not require external power for data retention.