

National Transportation Safety Board

Office of Research and Engineering

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CEN23FA412

ELECTRONIC DEVICE REPORT

Specialist's Factual Report

September 8, 2025

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A. ACCIDENT

Location: New Rockford, North Dakota
Date: September 19, 2023
Time: 1232 central daylight time (CDT)
Airplane: Air Tractor AT502B, private operator, N502B

B. ELECTRONIC DEVICE REPORT SPECIALIST

Specialist: Matthew Yandrick
Electrical Engineer – 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 device:

Recorder Manufacturer/Model: Satloc G4
Part Number: 806-1040-000# J
Recorder Serial Number: 1505-09171-LN1-042

1.0 Satloc G4 Device Description

The Satloc G4 is part of a system designed to control agricultural aerial spray operations based on user specified maps. The Satloc G4 can drive a cockpit mounted lightbar guidance system and a real-time graphic moving map display providing visual guidance to the pilot. The Satloc G4 is capable of real time wireless transmission of position and agricultural information to a cloud based data collection service in addition to recording similar information to an internal, eSata solid state disk drive.

1.1 Satloc G4 Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the Satloc G4 was in fair condition. An interior examination revealed the unit had thermal damage on the main board. The extent of the damage is shown in Figure 1.

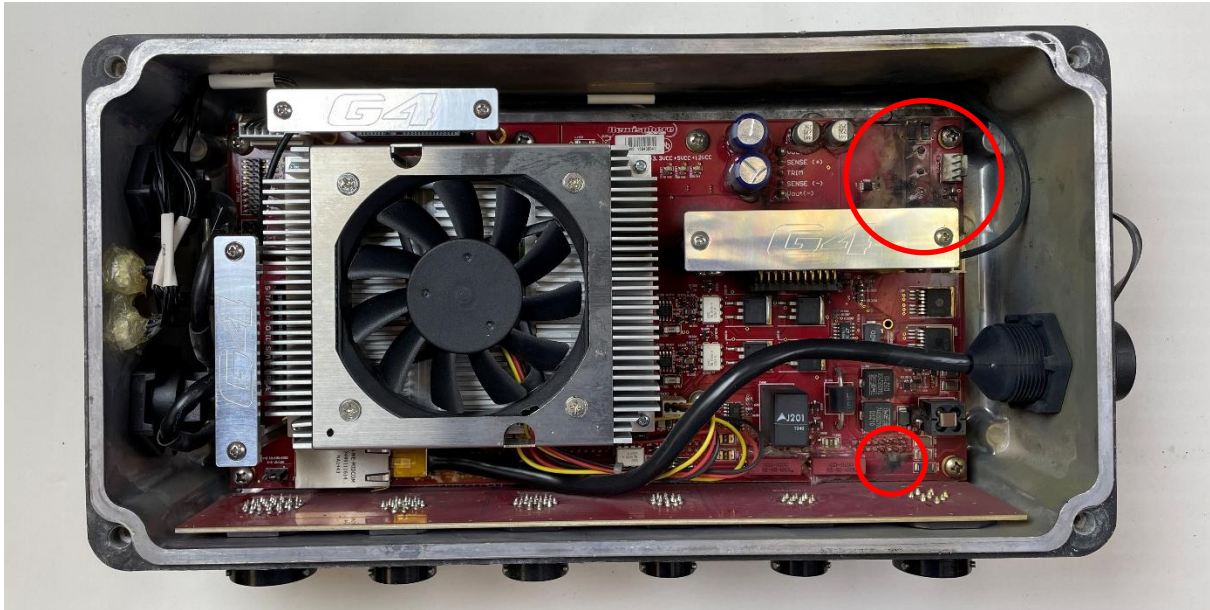


Figure 1. Interior photo of Satloc G4 showing thermal damage circled in red.

The solid state drive (SSD) memory modules were removed and shown in Figure 2. Both SSD modules appeared undamaged.



Figure 2. Photos of both SSDs.

The SSD identified as the module containing historical logs was read using laboratory equipment. These efforts were unsuccessful in detecting the SSD. Thermal imaging revealed a localized hot spot at the controller chip as shown in Figure 3.¹

¹ The SSD controller chip manages the flow of data between the host system and NAND flash memory.

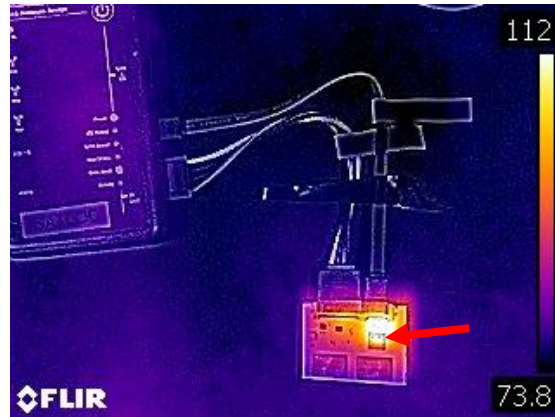


Figure 3. SSD thermal image showing a hot spot at the controller chip location.

The SSD is capable of storing data in four non-volatile memory (NVM) chips.² The four NVM chips and the controller chip on the accident SSD were identified and removed. A binary image was read for each NVM chip and yielded unusable data. The four NVM chips and controller chip were placed on a surrogate SSD board. These efforts were also unsuccessful in detecting the SSD. Additional testing also revealed placing the accident controller chip on the surrogate SSD board resulted in shorting the NVM operating voltage to ground.

Microscope imaging of the accident controller chip revealed localized overheating damage as shown in Figure 4. Therefore, no data pertinent to the accident were recovered.



Figure 4. Microscope images of the SSD controller chip (left image) and zoomed in area showing overheating damage (right image).

² Non-volatile memory is semiconductor memory that does not require external power for data retention.

Submitted by:

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