

National Transportation Safety Board

Office of Research and Engineering

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CEN23LA165

COCKPIT DISPLAY

Specialist's Factual Report

September 20, 2023

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A. ACCIDENT

Location: Kingsford, Michigan
Date: April 13, 2023
Time: 1241 EDT
Airplane: Pipistrel Sinus LSA, N413EK

B. COCKPIT DISPLAY SPECIALIST

Specialist Charles Cates
Mechanical Engineer/Recorder Specialist
National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A recorded flight data group was not convened. The NTSB Vehicle Recorder Division received the following cockpit display device capable of recording flight data:

Recorder Manufacturer/Model: Dynon Skyview SV-HDX1100
Part Number: SV-HDX1100
Recorder Serial Number: 13878

1.0 Dynon Skyview SV-HDX1100 Description

The Dynon SV-HDX1100 is a 10.6" widescreen display with touchscreen interface suitable for mounting in the cockpit of various small aircraft. Its capabilities include engine monitoring, synthetic vision, moving map, traffic, airport diagrams, autopilot control, and radio integration.

The display receives input from multiple modules for flight instrumentation including modules for air data/attitude/heading (ADHARS), engine monitoring (EMS), Global Positioning System (GPS), transponder, radios, intercoms, and weather data.

Data is recorded on a Serial-ATA based Disk on Module (DOM) mounted to the main board. The DOM contains a user-configurable log file that can record between 2-150 hours of data at sampling rates ranging from 0.1-16 Hz. There is also an alert log file that is recorded whenever the device triggers any kind of alert and a "Black Box" recent flight data log file which contains the most recent 15 minutes of flight recorded at 16 Hz.

1.1 Recorder Condition

The as-received condition of the device is shown in figure 1. The device appeared to be undamaged but would not boot successfully when powered. The device was disassembled, and the internal DOM device was read out normally using the NTSB's digital forensics tools. Figure 2 shows the DOM removed from the recorder.



Figure 1. Dynon HDX-1100, as received at the Vehicle Recorder Laboratory.



Figure 2. Memory module removed from the recorder.

1.2 Recording Description

The operator had the User Log function set to record at a 16 Hz rate and begin recording at device power on. The recording contained nine power cycles recorded on the day of the accident including about 1 hour and 18 minutes of engine run time across five engine starts. There were two engine starts in the final power cycle, with the accident engine run being the final one of the recording. That power cycle lasted for about 7 minutes, and the accident engine run was about 3 and a half minutes.

1.3 Time Correlation

The Dynon Skyview records in elapsed seconds from unit power on and it records Universal Coordinated Time (UTC) GPS time as a parameter. The difference between the accident time zone, eastern daylight time (EDT), and UTC is -4 hours, or 14,400 seconds. An offset is applied to display the data with the local time zone. Therefore, for the rest of this report, all times are referenced as EDT.

D. FIGURES AND TABULAR DATA

Figure 3 contains engine data recorded during the final power cycle of the device from April 13, 2023. All the parameters listed in table 1 are plotted.

The corresponding tabular data used to create figure 3 are provided in electronic comma separated value (CSV) format as attachment 1 to this report.

Submitted by:

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Mechanical Engineer/Recorder Specialist

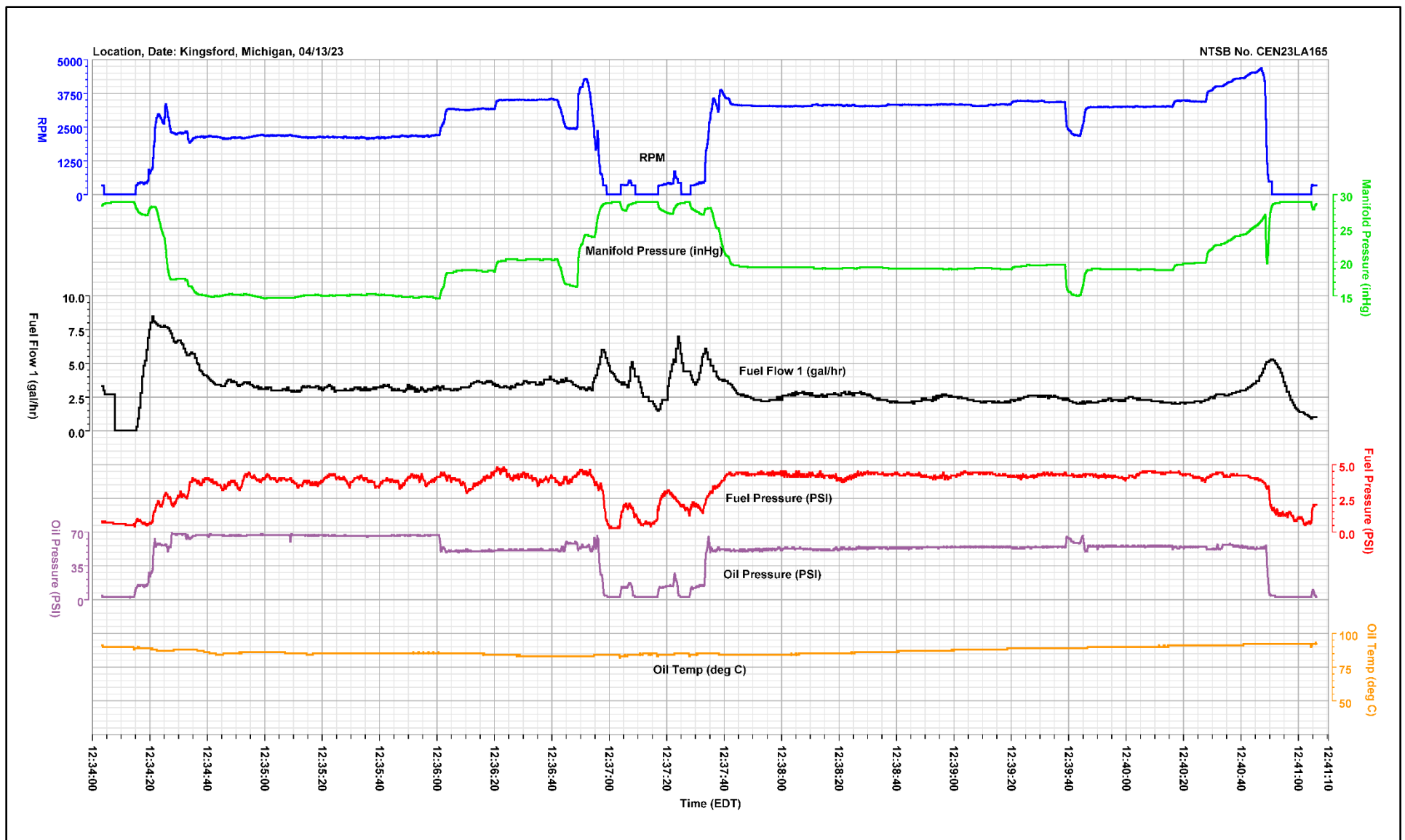


Figure 3. Engine parameters recorded during final power cycle of Dynon.

APPENDIX A. VERIFIED AND PROVIDED PARAMETERS

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

Table 1. Verified and provided recorded parameters

Plot/Table Labels	Parameter Names	Units
1. Fuel Flow 1	Fuel Flow	gal/hr
2. Fuel Pressure	Fuel Pressure	psi
3. Manifold Pressure	Intake Manifold Pressure	inHg
4. Oil Pressure	Engine Oil Pressure	Psi
5. Oil Temp	Engine Oil Temperature	deg C
6. RPM	Engine RPM	rpm

Table 2. Unit abbreviations

Unit Abbreviations	Descriptions
deg C	degrees Celsius
gal	gallons
hr	hour
inHg	inches of Mercury
psi	pounds per square inch
rpm	revolutions per minute