

# National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA281

## **AIRFRAME AND ENGINE EXAMINATION SUMMARY**

Factual Report

October 22, 2024

## Table of Contents

|                                    |   |
|------------------------------------|---|
| A. ACCIDENT .....                  | 3 |
| B. EXAMINATION PARTICIPANTS .....  | 3 |
| C. SUMMARY .....                   | 3 |
| D. DETAILS OF THE EXAMINATION..... | 3 |
| 2.0 AIRFRAME EXAMINATION .....     | 3 |
| 3.0 ENGINE EXAMINATION .....       | 5 |

## **A. ACCIDENT**

Location: Grants-Milan Municipal, Grants, NM  
Date: 08/15/2024  
Time: 1335 MDT  
1935 UTC  
Airplane: N272JT Harmony LSA

## **B. AIRFRAME AND ENGINE EXAMINATION SUMMARY PARTICIPANTS**

NTSB-IIC                      Albert Nixon  
                                     NTSB, AS-WPR  
                                     Phoenix, Arizona

Chief Accident Investigator   Jordan Paskevich  
                                         Rotax Aircraft Engines  
                                         Vernon B.C., Canada

## **C. SUMMARY**

Examination of the airplane wreckage was conducted on Oct 22, 2024, at a hanger at the Grants-Milan Municipal Airport (GNT), Grants, New Mexico. No evidence of preimpact mechanical failures or malfunctions that would have precluded normal operation were noted during the examination of the airplane wreckage.

## **D. DETAILS OF THE EXAMINATION**

### **1.0 Airframe Examination**

The airplane was stored in the hanger, with the left gear strut that had separated, supported by some wood blocks. Because the wood block support was lower than the right main landing gear, the airplane was positioned in about 15° of left bank.

The left wing was relatively intact; some minor imperfections were noted on the top of the wing. The left flap and aileron were attached. The left aileron trim was about in the neutral position. The right wing sustained leading edge damage about mid span and on the outboard portion. The right flap and aileron were attached. The bottom portion of the right flap was separated and the trailing edge of the flap where it attached to the fuselage sustained crushing damage. The flaps were retracted.

The fuel tanks were intact and not breached. A small amount of fuel was present in the tanks. When drained, there was about 2.0 gallons of fuel in the left tank and 6 gallons in the right tank. The fuel was blue in color and was clear of contaminants.

Both fuel caps were installed and upon examination, no anomalies were noted. Using Compressed air, the fuel vent in each tank was determined to be free of obstructions.

Flight control continuity was confirmed from the control sticks to the ailerons, elevator and rudder. All trim tabs were near neutral.



**Photograph 1: Airplane as viewed from the right side.**

The fuel shut off valve was in the OFF position. All circuit breakers were in. The flap lever was in the retracted position.

About half the left landing gear strut with the wheel attached separated. The right landing gear strut and wheel, and nosewheel were still attached.

The empennage was intact. The rudder, vertical stabilizer and horizontal stabilators appeared to be relatively intact.

The canopy was intact and operated appropriately.

The following instruments were observed. The throttle was in the full throttle position and frozen in movement.

Data from the ECU was downloaded and the engine data was accessed.

### 3.0 Exterior Engine Site Examination

The Rotax 912iS2 engine was attached to the fuselage and was intact. The engine cowling was removed, and no external damage was noted. The top sparkplugs were removed and examined. All the sparkplug electrodes showed normal like new conditions and were light grey in color, when compared to the Champion Check-A-Plug chart. The engine was manually rotated through the propeller, and thumb compression was established at each cylinder, and appropriate valve movement was noted.



**Photograph 2: Left side view of the engine during examination.**

The Warp Drive three propeller blades were attached and intact with no damage noted. The spinner was attached and intact.

The fuel pumps were attached and were intact. Each pump was examined and operational tested and no anomalies were noted. When the fuel inlet line was disconnected from the inlet fuel rail and placed in a container, the fuel selector was positioned to the right fuel tank and the fuel pumps activated. After a few seconds, the fuel pumps began drawing fuel from the right fuel tank. Both fuel pumps were

individually tested to confirm their function. The fuel selector was then positioned to the left fuel tank, and fuel could not be drawn from the left fuel tank, and the fuel pumps cavitated.

The fuel tank venting system was examined by blowing air through the vent port. No obstructions or blockages were noted.

The fuel selector was found in the OFF position.

The propeller shaft was manually rotated, and continuity of the crankshaft and camshaft were confirmed and good thumb compression noted.

The oil quantity was checked and within the normal operating level.

The engine ECU was intact.

The gear box was in good condition and no anomalies were noted.

The fuel and oil lines to the engine were secure and intact. The main fuel line to the engine was loosened and no fuel was present. The fuel injectors were intact.

The gasolator was examined and revealed only a small amount of residue fuel.

The cooling system was intact and showed no signs of being breached. The coolant radiator was examined and no anomalies were noted. The expansion tank was opened, and the coolant level was appropriate.

The exhaust system was intact and examination revealed no anomalies.

An engine run could not be accomplished safely because of the condition of the airplane and its location inside the hangar. It was deemed unsafe and carried a risk to further damage the airplane.

The examination of the engine revealed no evidence of pre-impact mechanical anomalies or malfunctions that would have precluded normal operation.

ECU Data Download:

The engine data was extracted from the ECU using the BUDs program.

The ECU engine graph data indicated that the engine RPM dropped and fluctuated shortly after takeoff, while the throttle position remained at 100%, confirming that the engine experienced a loss of power.

The ECU recorded the engine startup at a timestamp of 67:18:34.400 and the total loss of engine power at 67:23:38.500. This reflects a total elapsed time of 5 minutes and 4 seconds from engine startup to the complete loss of engine power.

The ECU engine graph data shows that after 5 minutes and 7 seconds following the total loss of engine power, the engine was re-started for 31 seconds before it was shut down again.

A review of the following engine parameters was conducted to determine the cause of the engine power loss. Engine Speed, EGT Cylinder 1, 2, 3, 4, Metered Air/Fuel Ratio Target, Linearized Throttle Position, Transient Enrichment, EGT Lambda Target, Calculated Fuel Flow, and Fuel Injection Mass for Each Cylinder.

#### Engine Speed:

The engine speed is relatively stable initially but begins to fluctuate toward the end of the data. It shows a noticeable drop in the final data points, consistent with a decline in power output.

#### EGT Cylinder 1, 2, 3, 4:

Exhaust Gas Temperatures (EGTs) for all four cylinders exhibit slight variations initially but become more divergent toward the last data points. Certain cylinders show a decline in EGTs in the final data points consistent with differences in combustion behavior across cylinders.

#### Metered Air/Fuel Ratio Target:

The "Metered Air/Fuel Ratio Target" remains consistent across all data points. No visible changes or fluctuations are observed in this parameter, consistent with a steady control signal.

#### Linearized Throttle Position:

The "Linearized Throttle Position" is consistently high and steady throughout the dataset, indicating a sustained command for engine power. There were no significant changes or fluctuations in throttle position.

#### Transient Enrichment:

The "Transient Enrichment" value remains constant across the dataset with no fluctuations. This parameter does not reflect any adjustment during the observed period.

#### EGT Lambda Target:

The "EGT Lambda Target" is steady and consistent throughout the dataset, consistent with a constant control signal for the desired air-fuel ratio. No visible deviations or trends are observed in this parameter.

#### Calculated Fuel Flow:

The "Calculated Fuel Flow" shows consistent values initially but begins to exhibit a gradual decline in the final data points. This decline reflects a reduction in the flow rate toward the end of the dataset.

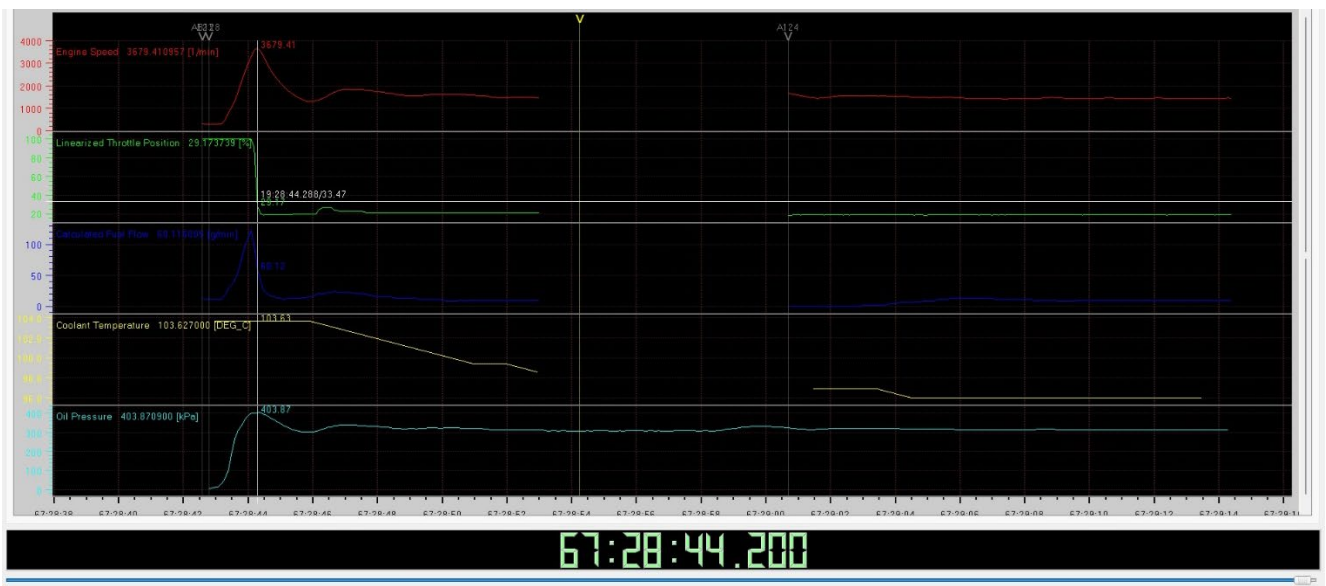
#### Fuel Injection Mass for Each Cylinder:

The fuel injection mass for all cylinders remains consistent early in the dataset but begins to diverge in the later points. A reduction in injection mass is observed across all cylinders toward the end of the data, with some cylinders showing lower values than others.

Overall, after reviewing the engine data, the declining fuel flow and reduction in fuel injection mass point preceded other engine parameters changes, consistent with fuel starvation.



**Figure 3: Accident flight Engine Speed, Linearized Throttle Position, and Calculated Fuel Flow parameters.**



**Figure 4: Second Engine Start Parameters.**

Submitted by:

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