

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23FA299

INVESTIGATION MATERIALS SUPPLEMENT

ACCIDENT

Location: Van Nuys, California
Date: 08/02/2023
Time: 1036 Pacific daylight time
Airplane: Czech Sportcruiser

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National Transportation Safety Board
Portland, Oregon

HISTORY OF FLIGHT

On August 02, 2023, about 1036, a Czech Sport Aircraft SportCruiser, N384SC, was substantially damaged when it was involved in an accident in Van Nuys, California. The flight instructor and student pilot were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 instructional flight.

A review of Automatic Dependent Surveillance – Broadcast (ADS-B) flight tracking data revealed that the airplane departed runway 16L about 1021:33. The airplane made a left traffic pattern and performed a touch-and-go practice takeoff and landing at 1027:39. The airplane made another left traffic pattern following a similar flight path as the first path (see Figure 1 below). The airplane touched down about 1033:57 and then became airborne about 1,700 feet down the runway, in nearly place as the previous takeoff. Thereafter there is a gap in data for about 14 seconds and the next hit reappears at taxiway “K,” with a groundspeed reduction from 60 to 50 kts. The flight path continues at that speed and the altitude slowly increases.

At 1035:09 the airplane turns left onto the crosswind leg of the traffic pattern at an altitude of about 315 feet above ground level (agl). The airplane then turns onto the downwind leg and there is a 15 second gap in data, and the hit reappears at 1035:42. At that point, the airplane shows a speed of 71 kts at an altitude of 430 feet agl, the highest the airplane reaches during this segment of the flight. The airplane turned left toward the airport and the altitude continued to decrease. When reaching about 830 feet from runway, at about 1036:12, the airplane banked slightly right to align parallel the runway. About 22 seconds later, when the airplane was abeam the runway numbers 16L, it was at an airspeed of about 55 kts and banked left while at an altitude about 195 feet agl. The last hit was at 1036:39 and located 255 feet east-northeast of the accident site; it showed an altitude of 170 feet agl.

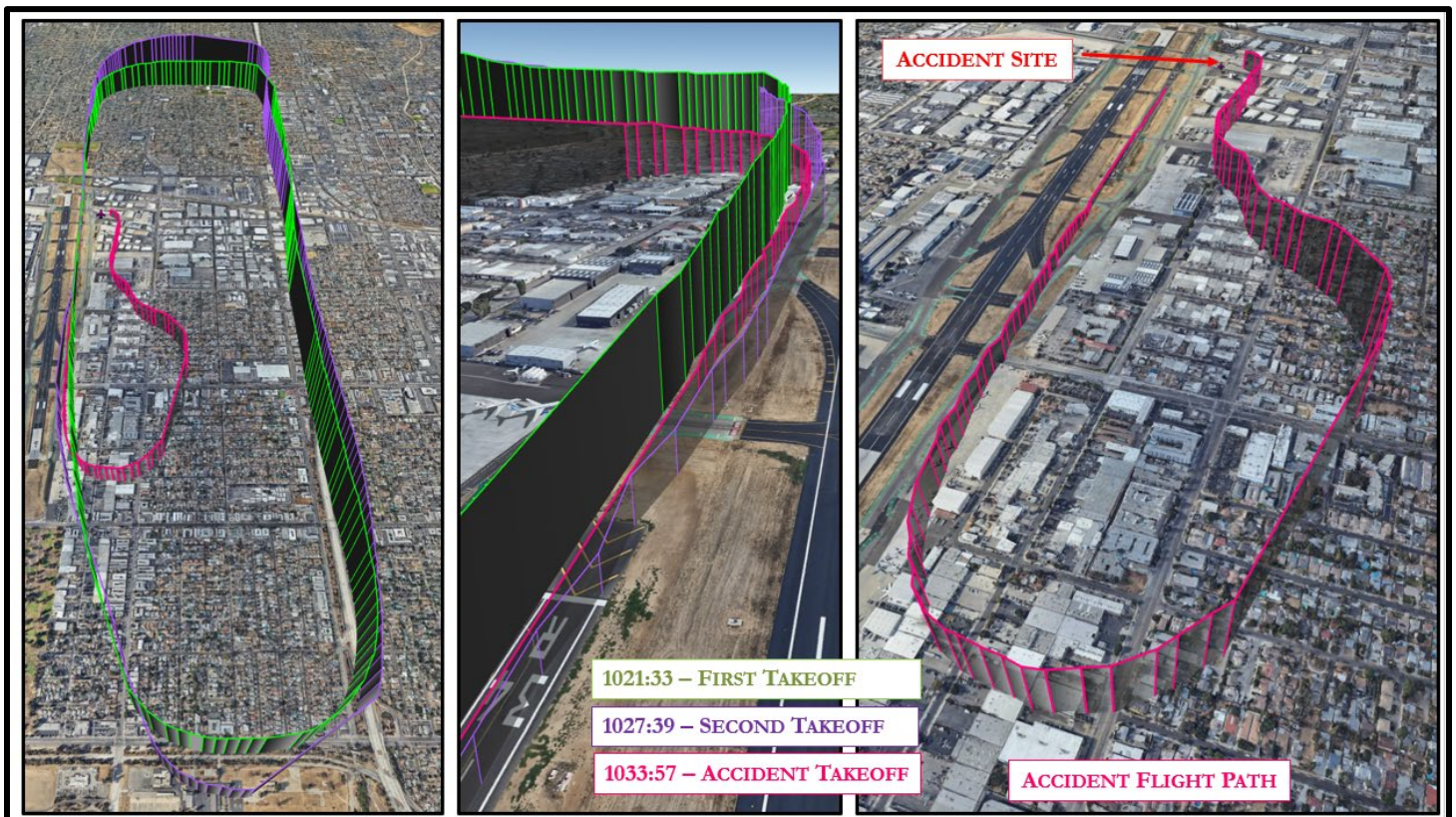


Figure 1: Flight Path

Numerous security cameras captured the airplane prior to impact. A review of the footage revealed that the footage revealed that after the airplane turned onto the downwind leg of the traffic pattern for runway 16L, it continued on a level altitude for about 10 seconds. At approximately 1135:42 the airplane made a 360° turn

during which the altitude fluctuated, climbing at the end. The airplane then monetarily flew toward the runway, dipping in altitude, and continued on to parallel the runway. At 1036:35 the airplane banked to the left which continued to get steeper and the nose dropped lower as the turn steepened. The airplane impacted in a near vertical attitude.

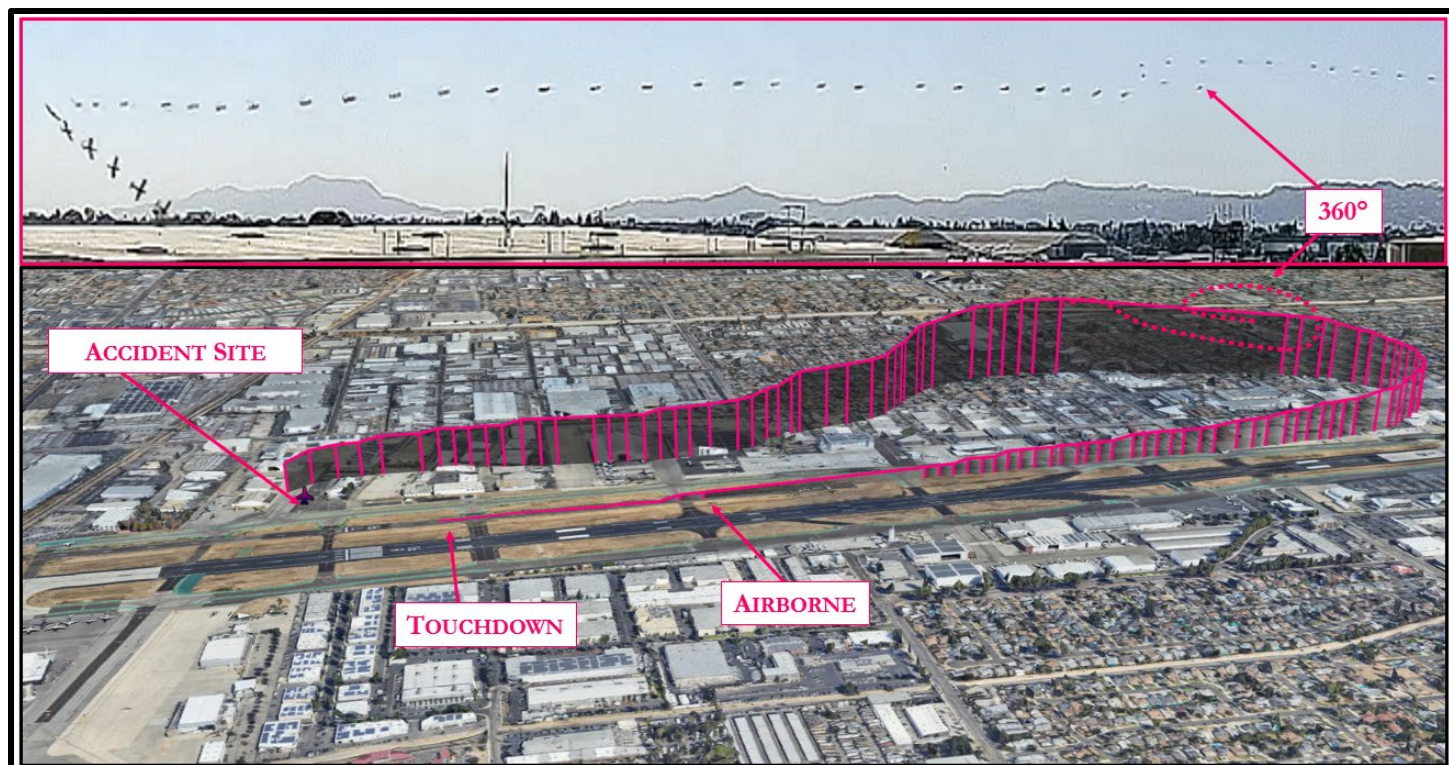


Figure 2: Flight Path and Composite of Video

The pilot was in communication with the Van Nuys Air Traffic Control during the flight. The times the audio transmissions were made could not immediately be verified. The student pilot was making the transmissions for the beginning portion of the flight. On the third takeoff, the flight instructor reported to the controller “we are having some power loss.” The controller asked if they required assistance. The instructor stated “priority landing,” which he repeated several times because the controller could presumably could not understand the communications. Approximately 30 seconds following the transmission indicating a “power loss,” the controller issued a clearance for the airplane to land on runway 34R. This runway corresponds to the departure runway, albeit in the opposite direction.

The controller asked again if the pilot required assistance and the instructor replied “negative, we are landing right now.” Approximately one minute following the transmission indicating a “power loss,” the controller issued a clearance that the airplane could land on any runway. About 10 seconds later, the controller asked what was the nature of their emergency, to which the instructor responded “we are having exhaust gas temperature issues.”

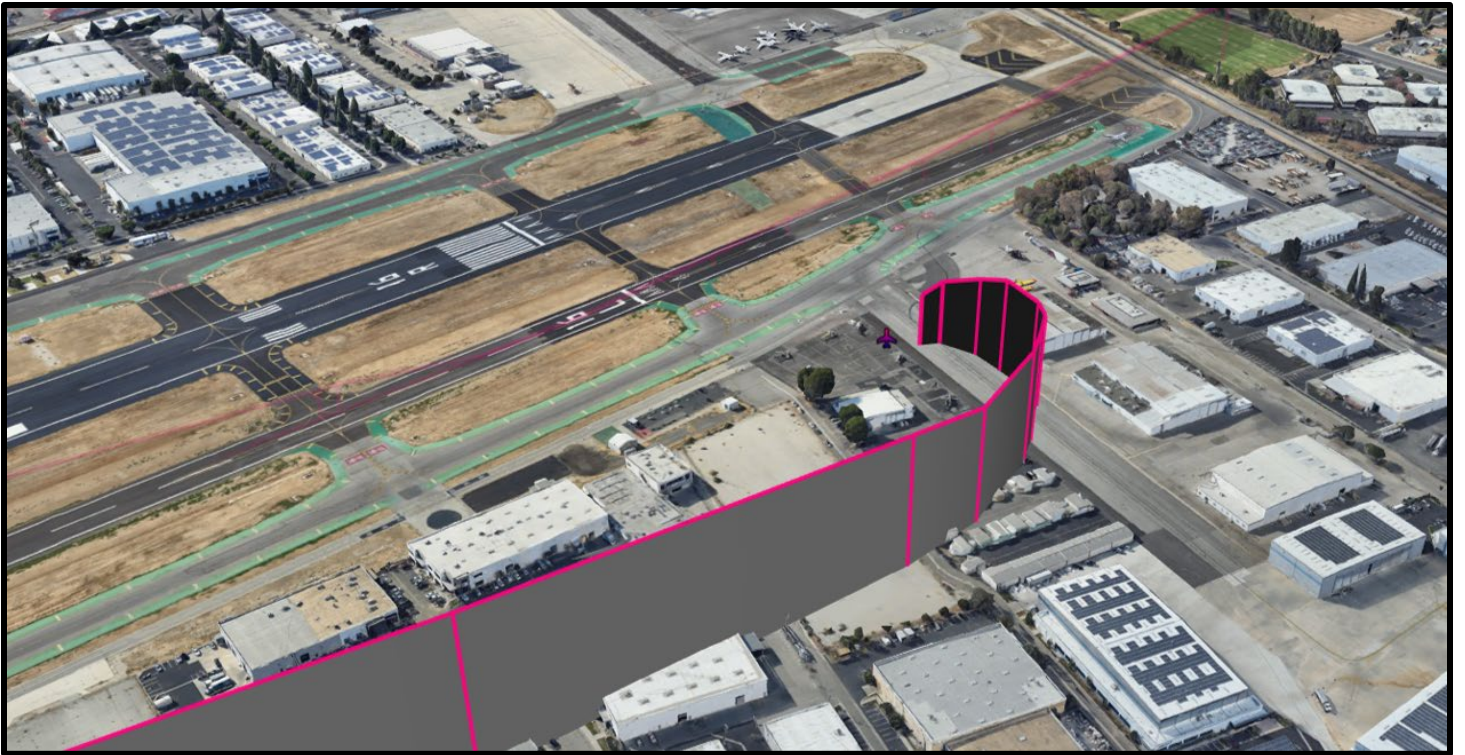


Figure 3: End of Flight Path



Figure 4: Composite of Video Footage

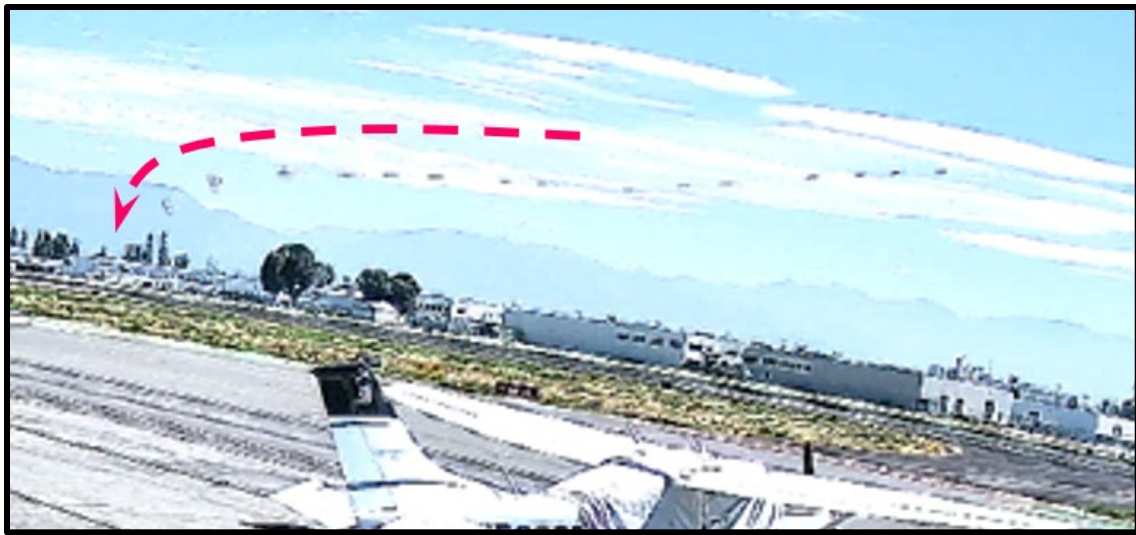


Figure 5: Composite of Video Footage #2



Figure 6: Photo from Security Photo

A Cessna 172 performed a touch-and-go practice takeoff and landing on runway 16L around the time of the accident. The Cessna touched down about 1035:40 and the controller gave instructions to “go-around” after the accident airplane requested a priority landing.

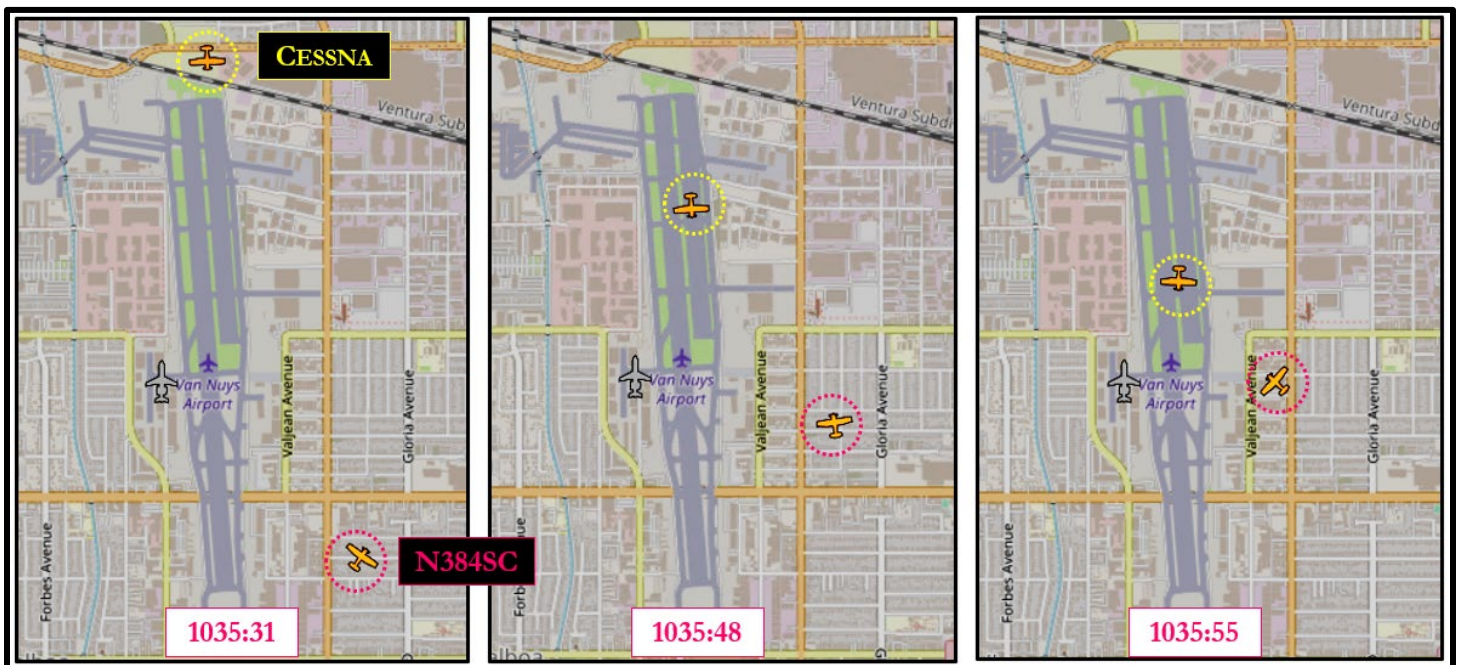


Figure 7: Traffic in the Pattern Part 1 (provided by A-DSB)

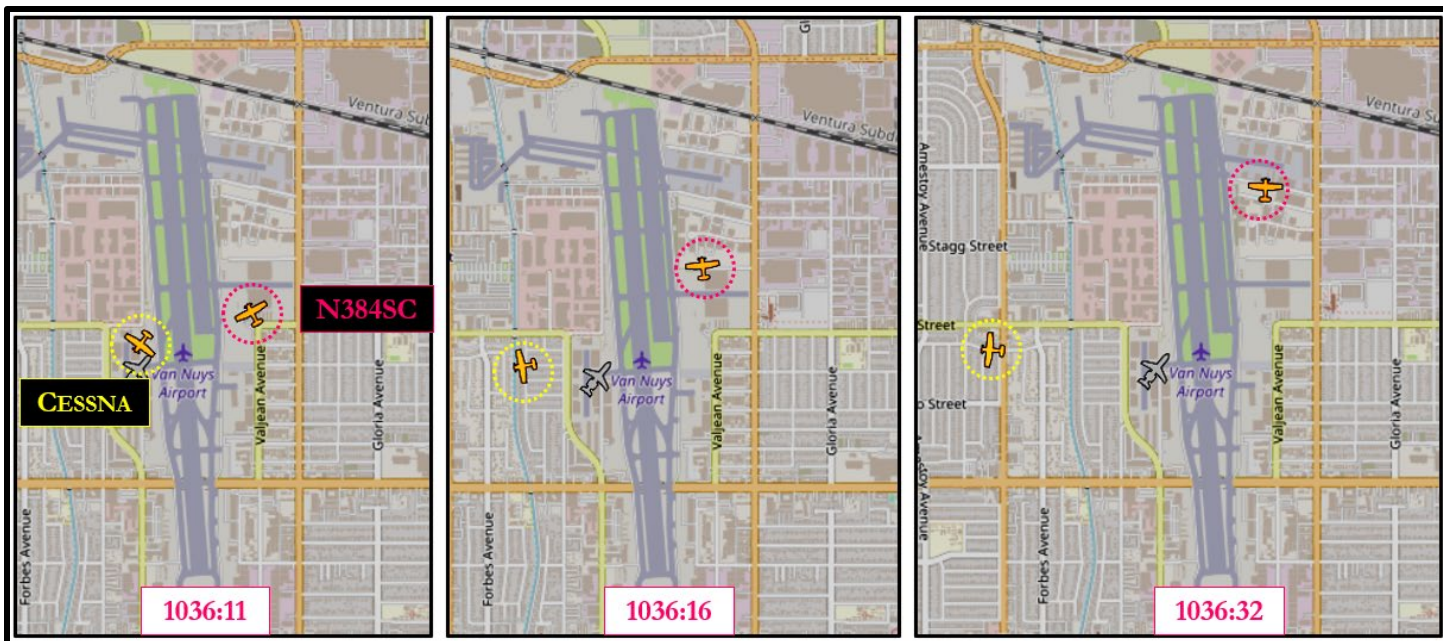


Figure 8: Traffic in the Pattern Part 2 (provided by A-DSB)

AIRPLANE INFORMATION

The airplane was equipped with a Dynon Skyview system and one Dynon SV-D1000 screen, both of which were burned beyond the possibility of recovering any non-volatile memory. The Dynon alert system provides non-flightpath alerts through a flashing Alert Notification Indicator. This indicator flashes red for warnings, yellow for cautions, and gray for messages. When an alert is triggered, an aural voice will announce either "WARNING," "CAUTION," or "MESSAGE" depending on the alert type.



Figure 9: Dynon Screen

To acknowledge and view alerts, the pilot must press the corresponding WARNING, CAUTION, or MESSAGE button, which opens the Alert Notification Window. Opening this window acknowledges the alert and stops the indicator from flashing. The indicator will always reflect the highest alert level that is currently active. Acknowledged and unacknowledged messages are visually distinct. Unacknowledged messages display with a red background and white text, while acknowledged messages appear with a black background and red text.

In the event of an Exhaust Gas Temperature (EGT) warning, the system is designed to alert the pilot audibly in the headset with the phrase "EXHAUST GAS TEMPERATURE" if the EGT temperature enters the red zone. However, this only occurs if audio warnings have been activated in the setup menu.

In response to questions about default settings for EGT high/low values and temperature spread, the representative clarified that these settings are user-configurable. The ranges for various sensors, including EGT, should be set according to the engine manufacturer's specifications. The default settings are not automatically applied based on engine model entry alone; they need to be configured by the user or manufacturer.

The representative added that, while they can provide guidance on how to set these ranges, the aircraft manufacturer is likely to have more specific information. In most cases, manufacturers create a configuration file for new aircraft to streamline the setup process. The representative suggested that if the aircraft manufacturer could provide this file, Dynon could review it to determine how the warnings were configured for this particular aircraft.

The maximum exhaust gas temperature (EGT) for the Rotax 912ULS engine is 880°C (1616°F). Rotax does not publish specific guidance regarding minimum, normal, or EGT split values; instead, the airframe manufacturer establishes the instrument limits, including the caution (yellow) and warning (red) thresholds. The exhaust gas temperature (EGT) range for the engine is as follows: nominal temperature is 1,472°F, maximum continuous temperature is 1,562°F, and the maximum takeoff limit is 1,616°F.

At idle power (approximately 2000 RPM), the EGT for cylinders Nos. 1 and 2 is typically slightly lower than that of cylinders Nos. 3 and 4. This is due to the asymmetrical intake manifold design. The longer runners on cylinders Nos. 1 and 2 produce a richer fuel mixture, while the shorter runners on cylinders Nos. 3 and 4 result in a leaner mixture. As engine RPM increases to between 2500 and 5800, the fuel mixture becomes more balanced across all cylinders, and EGT readings tend to equalize.

During cruise, EGT values typically fall within a range of 1250°F to 1450°F, with averages often in the 1300s. Although several factors can affect these temperatures, the spread between cylinders generally does not exceed 125°F. Under normal conditions, the EGT spread is typically between 15°F and 100°F, depending on throttle setting and other operational variables.

Dynon instruments may issue a "spread" alert if the temperature difference between cylinders becomes excessive, which may indicate a malfunction such as a faulty EGT probe.

The manufacturer sets the EGT ranges for the following:

ALARM	SELF-CLEAR
MAXIMUM GRAPHICAL DISPLAY	1832 °F
MINIMUM GRAPHICAL DISPLAY	572 °F
RANGE 1	
ENABLE	YES
COLOR	YELLOW
TOP	572 °F
BOTTOM	-13 °F
RANGE 2	
ENABLE	YES
COLOR	GREEN
TOP	1562 °F
BOTTOM	572 °F
RANGE 3	
ENABLE	YES
COLOR	YELLOW
TOP	1616 °F
BOTTOM	1562 °F
RANGE 4	
ENABLE	YES
COLOR	RED
TOP	1832 °F
BOTTOM	1616 °F
RANGE 5	
ENABLE	NO
COLOR	BLACK
TOP	32 °F
BOTTOM	32 °F

According to the airplane's flight manual, using the pilots' weights and an estimated bank angle of 20°, the stall speed at the time of the accident was around 53 kts.

2.2 Stalling speeds at maximum takeoff weight

Wing flaps position: - retracted (0°)
- takeoff (12°)
- landing (30°)

Conditions: Weight: MTOW Engine: idle	Wing flaps pos.	Stall speeds		Altitude loss at recovery <i>ft</i>
		<i>KIAS</i>	<i>KCAS</i>	
Wing level stall	0°	37	42	290
	12°	35	40	
	30°	31	37	
Coordinated turn 30° bank	0°	38	43	270
	12°	37	42	
	30°	30	36	

Figure 10: Stall Speed from Pilot's Operating Handbook

WRECKAGE AND IMPACT

The accident site was located about 425 feet from the edge of runway 16L at the following coordinates: 34.215743, -118.488153. The wreckage was found all within the same vicinity on a heading of 300°. The furthest wreckage was part of the rocket from the BRS system. There were small plexiglass shards in front of the main wreckage. There was no evidence of soot or oil.



Figure 11: Airport Environment

The wreckage was consumed by fire. The wings and tail remained attached. The propeller was in front of the wreckage and there was a divot in the concrete pad consist with that being the first impact. The fuselage body was bent down at the empennage (adjacent to the step) with the tail resting on the surface. One propeller blade came loose from the hub and had light scratches on the leading edge. The other two remained attached. The rocket had been deployed and was found ahead of the wreckage.

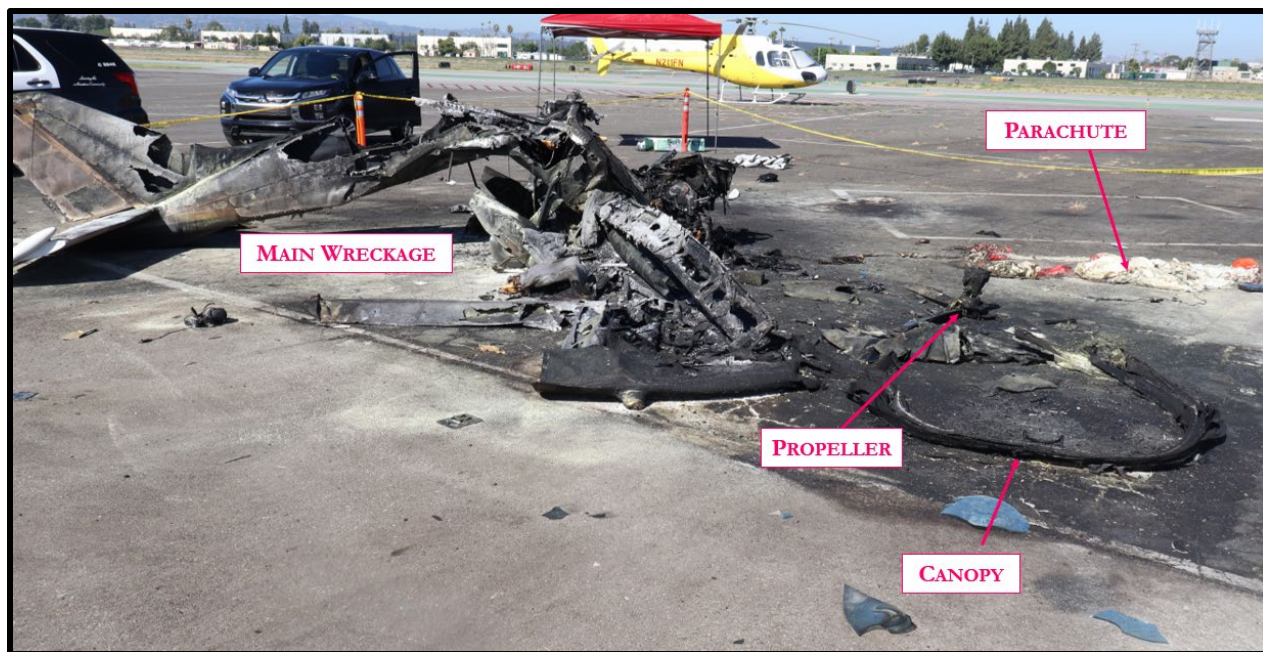


Figure 12: Main Wreckage

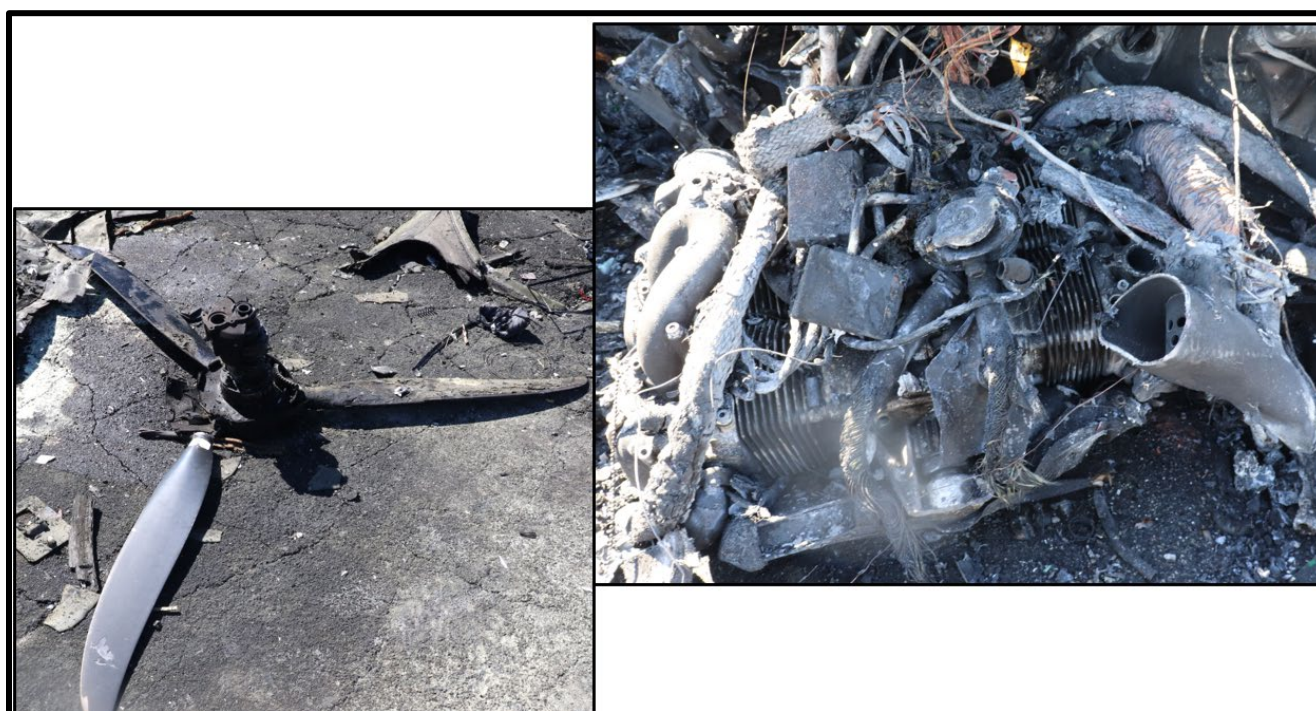


Figure 13: Propeller and Engine at Accident Site

AIRFRAME

The fuselage came to rest upright and the lower wings remained attached at the wing roots. With the wings still attached. The airframe has sustained substantial fire damage. The flap position could not be ascertained due to the thermal damage.

Cockpit:

The fuel pump was on.

The choke was in the full forward “off” position.

The throttle was in the full forward “max” position.

The BRS handle base was in the housing.

The emergency locator transmitter (ELT) was installed in the airplane and was activated.

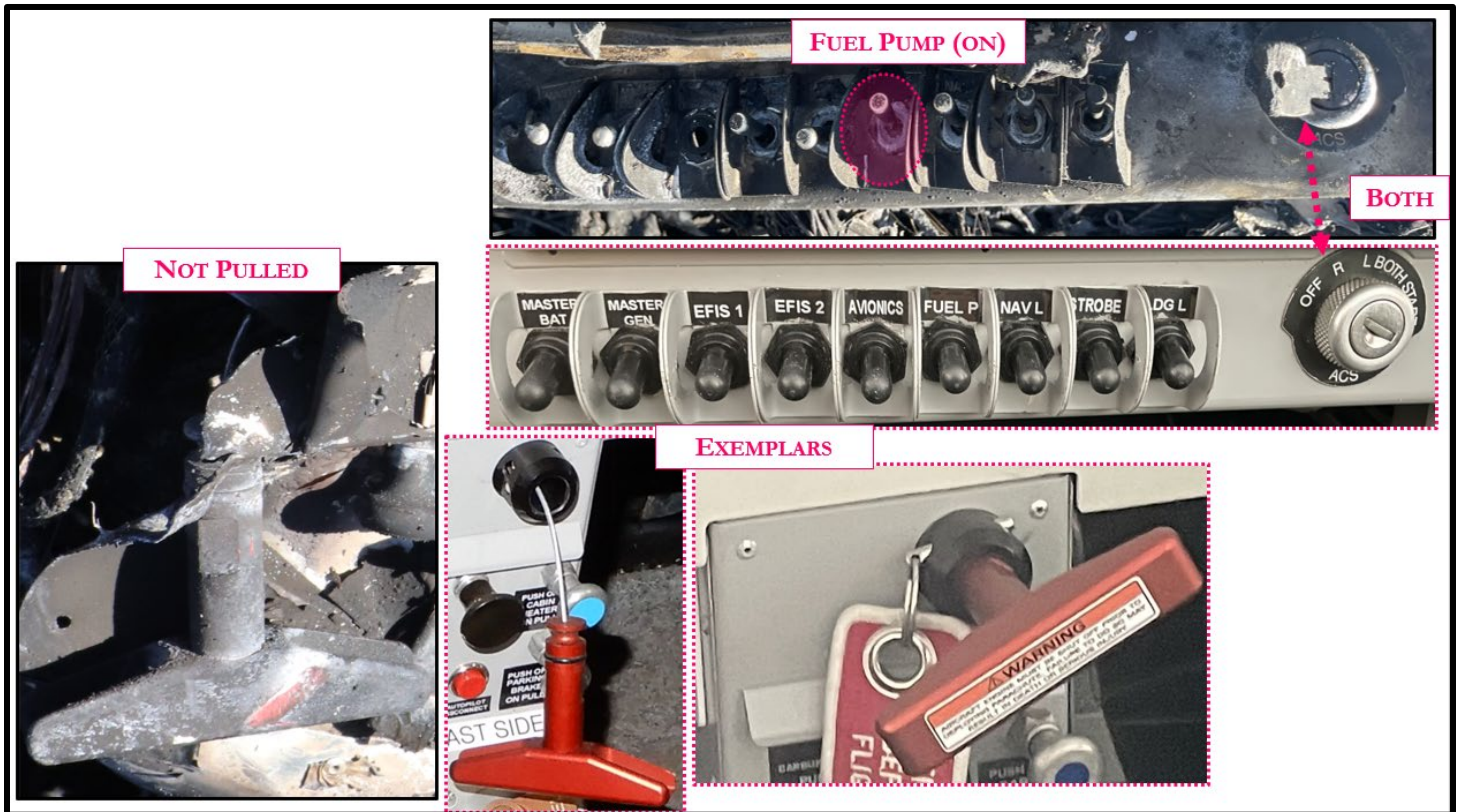


Figure 14: Cockpit Parachute Handle and Fuel Pump Switch

FUEL SYSTEM

Fuel is stored in two 15 gallon fuel tanks located in the leading edge of each wing. The fuel flows from the tanks through strainers to a selector valve mounted on the center console. It then passes through the firewall to a gascolator (mounted on the engine-side of the lower firewall) and electrical fuel pump (mounted midway on the engine-side of the firewall). There is a bypass line around the electric fuel pump with a check valve. The fuel then flows to the engine-driven pump (splined off the front of the front engine gear). The fuel is then routed to 4-way divider and through a transducer to a t-diverter, where fuel is directed to: a fuel pressure sensor (on the upper firewall); a fuel return line (to the left wing); and to a jetted carburetor.

EXAMINATION

The fuel tanks were consumed by fire. The ports on the fuel tanks were visible and the fuel caps remained affixed in their respective filler-necks. There were partially burned fuel lines to the fuel selector. The fuel selector was positioned on the “LEFT” selection. The fuel selector was free to rotate and there was no evidence of mechanical malfunction. The bottom part of the gascolator was located and the burned electric fuel pump. The fuel pump had melted debris in the orifice going through the pump. The transducer was located and the orifice appeared free of debris. The plastic rotor could not be heard moving when air was blown through the inlet, presumably because it had melted.



Figure 15: Fuel System Components

ENGINE

The engine, a Rotax 912ULS-2 (s/n 6782973), 100-horsepower engine, was installed on the airplane at the time of the build.

An external examination of the engine revealed that the crankcase had fractures in numerous areas around the casing, with the many accessories broken from their mounting flanges. The engine sustained thermal damage and numerous fuel and oil lines were completely consumed. The ignition system was consumed by fire prohibiting testing. The firefighters reported using fire suppressant and water to extinguish the fire.

Investigators removed and examined the top spark plugs. The spark plug electrodes in normal condition and all appeared similar in shape. The color of the ceramic was yellow, with the Nos. 3 appearing darker than the others. The threads were white.

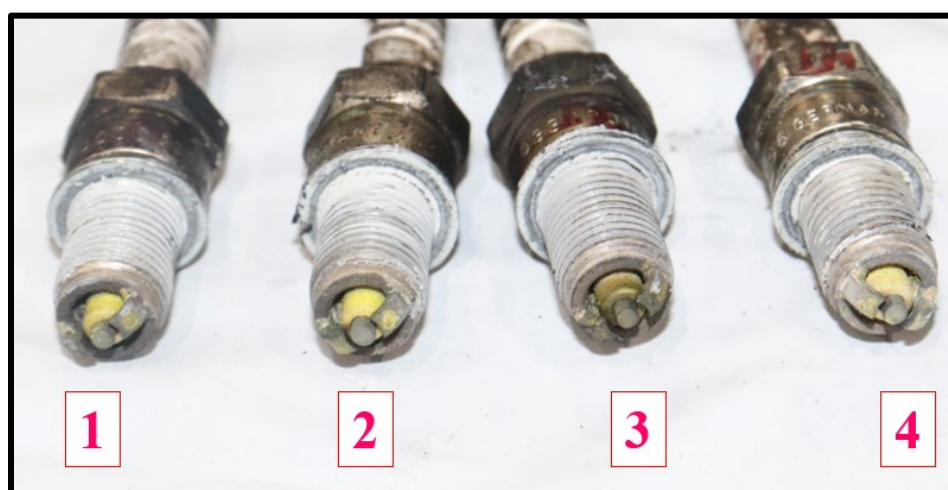


Figure 16: Upper Spark Plugs

Investigators were unable to establish continuity of the valve and gear train because there was not the tooling to turn the crankshaft. A thin coating of oil was observed at all four rocker box areas. The rocker arms, springs, spring retainers, and keepers were all in place with no evidence of failure.

The intake manifold pipes were removed and found dark and sooty with burnt bubbled material inside (most severe on the No.3 cylinder. All the exhaust ports (exiting the cylinder were coated on the inside with a thick white material. The back of the exhaust valves and stems were yellow.

A lighted borescope was used to look inside the combustion chambers and the internal case. There was no evidence of valve to piston face contact observed. The camshaft lobes did not appear rounded and no material deformation was observed on the lobes.

The magnetic chip detector was exposed on the magnetic side from the crack in the case. The oil pump was removed and disassembled. The gearotor pump rotors were intact and moved freely. There was light scoring on the front housing.

The water pump impeller housing was removed. The impeller would not rotate; there was no scoring on the housing.

The valve covers were removed from the cylinder heads, and the rocker arms, valve springs, and pushrods were examined. No anomalies were observed with these components. The cylinder heads were then removed and inspected. All intake and exhaust valves were intact and in good condition. A yellow-tinged lead buildup was observed on the cylinder heads and valves, consistent with operation using 100LL Avgas. The rocker arm shafts moved freely with finger pressure, indicating no evidence of overheating. No anomalies were noted. The cylinders were removed and examined. All were in good condition, with bores showing a proper cross-hatching pattern. No evidence of overheating, lack of lubrication, scoring, or seizure was observed. No anomalies were noted.

The No. 1 and No. 2 pistons were positioned just below top dead center and were accessible for removal. The No. 3 and No. 4 pistons were positioned slightly above bottom dead center and remained inside the crankcase due to the immovable crankshaft and blocked wrist pins. All pistons were in good condition and displayed a yellow-tinged lead buildup consistent with the use of 100LL Avgas. The piston rings moved freely within their ring lands. No anomalies were noted.

The crankcase sustained significant damage from impact and post-impact fire. A large hole was observed in the area forward of the No. 2 cylinder, and the upper section containing the reduction gearbox was broken off and not available for inspection.

The crankshaft could not be rotated due to impact and fire damage. Visual examination through the piston bore revealed no broken components or signs of heat damage from lack of lubrication. The crankshaft could not be removed because the No. 3 and No. 4 pistons blocked the case from being split. The camshaft could not be rotated due to damage. Inspection through the piston and lifter bores revealed no heat damage or broken components. The cam lobes were in good condition. The camshaft could not be removed because the No. 3 and No. 4 pistons blocked the case from being split.

The hydraulic lifters were removed and examined. All were in good condition with no pitting, scoring, or unusual markings on the contact surfaces.

PROPELLER

The composite Sensenich 3B0R5R68C was a three-blade propeller.

RECORDS

The maintenance records were provided by the owner.

The last maintenance, recorded as being completed on July 30, 2023, was a 100-hour inspection at a tachometer time of 925.0 hours. The fuel pump switch was replaced at that time after the mechanic could not get the pump to operate and trouble shot the switch. The engine was built in October 2014 and started regular operation in 2018.

A complete review of the logbooks revealed that there was no maintenance on the engine conducted between January 2021 and February 2023.

The engine logbook from January 2021 listed the following maintenance, in pertinent part:

January 19, 2021 (Hobbs – no tach- 565): carburetor floats were replaced in compliance with a Service Bulletin.

February 03, 2023 (tach 541.7): 100-hour inspection

March 30, 2023 (tach 592.7): oil change and left EGT sensor replaced

April 12, 2023 (tach 637.8): 100-hour inspection

May 03, 2023 (tach 683.1): oil change and right EGT sensor replaced

May 19, 2023 (tach 729.6): 100-hour inspection

June 15, 2023 (tach 775.6): oil change

July 03, 2023 (tach 824.5): 100-hour inspection and replaced all spark plugs

July 14, 2023 (tach 872.6): oil change

July 30, 2023 (tach 925.0): 100-hour inspection and replaced all spark plugs

The operator was using Zerex coolant.¹

CARBURETOR

The engine was equipped with two Bing carburetors. The BING constant depression carburetor type 64-3 is a cross-draft butterfly valve carburetor with variable venturi, double float system arranged centrally below the venturi, and a rotary disc valve type starting carburetor. Its particular feature is the carburetor piston, which is suspended on a rubber diaphragm and protrudes into the venturi. It adjusts the smallest cross-section ("air funnel") of the venturi depending on the vacuum as influenced by actuation of the throttle valve and the carburetor piston moves accordingly.

The vacuum in the venturi acts on the top side of the diaphragm via the bore in the carburetor piston and attempts to lift the piston against its own weight and the spring. The reference pressure prevailing between air filter and carburetor (e.g. ambient air pressure) is applied to the bottom side of the diaphragm via bore. The bore diameter determines the piston damping.

On its way from the chamber to the venturi, the fuel passes through the main jet, the mixing tube and the needle jet and in the diffuser tube is pre-mixed with air which is brought in from the air filter via the air duct and the atomizer in an annular flow around the needle jet. This air flow assists the atomizing process and favors fuel

¹ Zerex Asian Vehicle Blue Antifreeze/Coolant is proven to maximize engine life in vehicles made by Asian auto manufacturers such as Acura, Honda, Infiniti, Nissan and others which specify a blue formula that's silicate and borate-free with HOAT (Hybrid Organic Acid Technology). Specially formulated with a phosphate additive, Zerex is made for your car and protects better than industry standards against corrosion, leaking, deposits as well as freezing and boiling – the four main causes of cooling system failure, which is the leading cause of engine breakdown. Our HOAT formula includes a special phosphate additive that protects from corrosion, scale and rust, so radiators, water pumps and other metal cooling system parts (including aluminum) stay clean and your antifreeze flows and functions properly. Zerex Asian Vehicle Blue Antifreeze/Coolant contains no silicates, borates, 2-EHA, amines or nitrites. So whether you're topping off your radiator or doing a complete system flush, trust Zerex Asian Vehicle Blue Antifreeze/Coolant. Made for your car. Made by Valvoline.

The jet needle, which is responsible for part load, is kept in the defined position by the retaining clip. During idling and low-load operation of the engine, the throttle valve is closed to such an extent that the airflow underneath the carburetor piston no longer forms a sufficient vacuum. The supply of fuel to the intake air is then effected via the idling system, which consists of the idle jet and the idling air jet.

INSERT DIAPHRAGM

Step	Procedure
1	Install diaphragm with retaining ring onto the carburetor piston with four combined screws M4x12.
	NOTE The index tabs on the diaphragm must fit into the indentation of the carburetor piston.
2	Install the carburetor piston assy. into the carburetor housing.
	NOTE The position is determined via the index tabs of the diaphragm.

NOTICE

While installing the chamber top be careful not to turn the carburetor piston assy. out of position.

Examination

The No. 1/3 carburetor was found with its piston slide misaligned when viewed through the venturi. The half-moon curve at the bottom of the slide was not aligned with the bore of the carburetor.

The carburetor top was removed, and the piston slide was extracted from the housing. The diaphragm's index tabs were not aligned with the corresponding slots in the carburetor top, indicating an incorrect assembly. According to a Rotax representative, this misalignment is known to cause vibrations (rough running engine), high magneto drops, and would likely affect the overall performance of the engine. The main jet was unobstructed.

The No. 2/4 carburetor piston slide was more misalignment than the No. 1/3 when viewed through the venturi. After removal of the carburetor top, the piston slide was extracted. The diaphragm had been consumed in the post-impact fire, preventing confirmation of proper alignment between the index tabs and housing slots. A Rotax representative stated that this type of misalignment likely would have affected engine performance. The main jet was unobstructed.

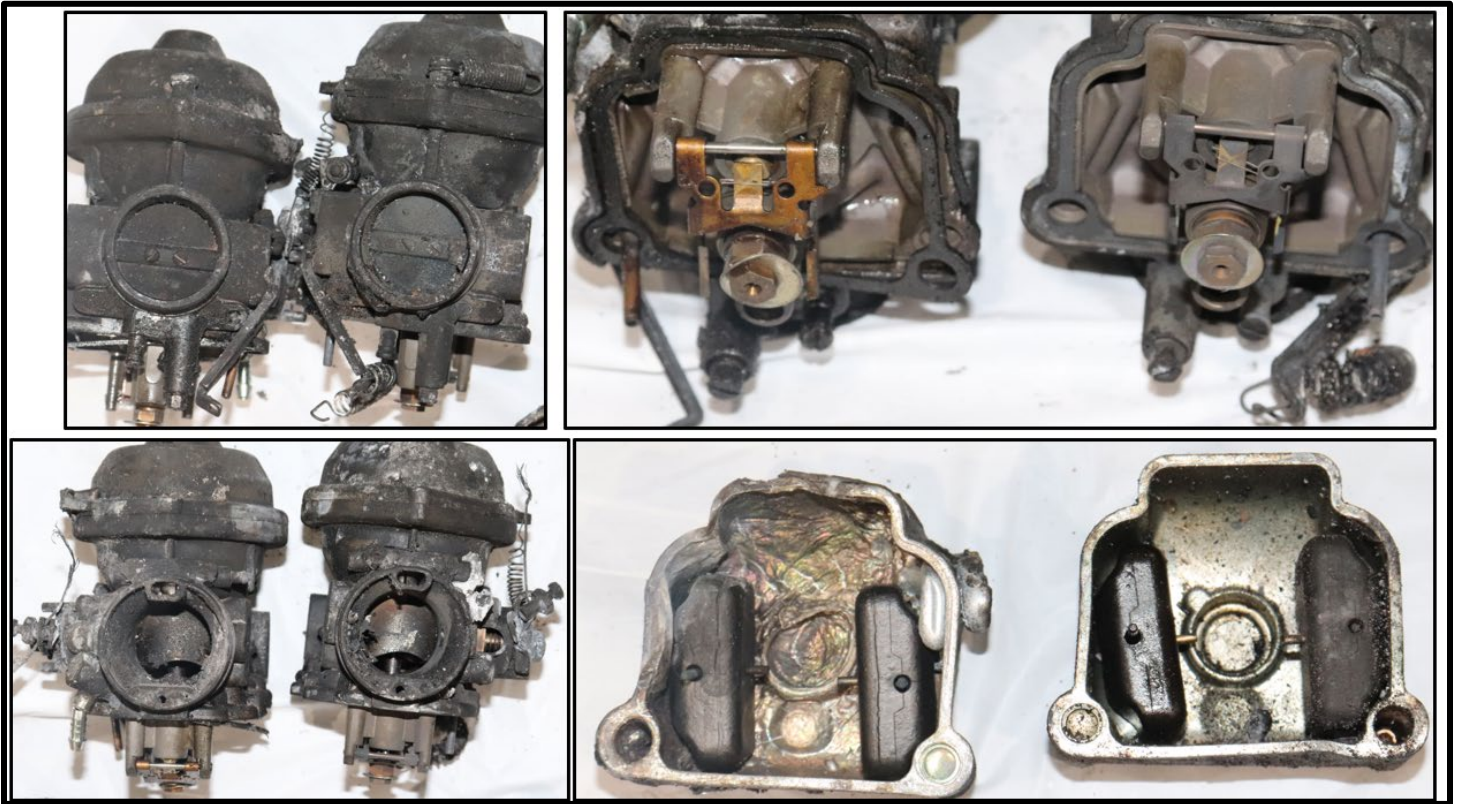


Figure 18: Carburetors



Figure 19: Carburetor Piston Slides

FUELING RECORDS

The fueling records were provided from the fuel facility the operator would have the pilot refuel. On the day of the accident at 1008:15 the pilots added 10 gallons of 100LL.

Date	Units
8/1/2023 7:11:02 AM	18.8800
8/1/2023 4:29:37 PM	15.0000
8/2/2023 10:08:15 AM	10.0000

PERSONNEL INFORMATION

RIGHT-SEATED PILOT

RONAK (RON) PRAKASH KANDACHIA

Certificate(COMMERCIAL PILOT ASEL, AMEL, INSTRUMENT; FLIGHT INSTRUCTOR), was a 28-year-old male. This pilot reported civil flight experience that included 650 total and 50 hours in last six months as of exam dated 5/26/2023. This pilot was 73 inches tall and weighed 169 lbs. at the time of the last exam. This pilot was issued a First Class Medical Certificate without limitation.

LEFT-SEATED PILOT

ROBERT SPENCER

Pilot Certificate: student pilot application submitted 7/25/2023 but had not yet been processed at the time of the accident, was a 24-year-old male. This pilot reported civil flight experience that included 30 total and 30 hours in last six months as of exam dated 10/19/2020 (age 21 years at time of exam". This pilot was 73 inches tall and weighed 196 lbs. at the time of the last exam. This pilot was issued a First Class Medical Certificate without limitation.