

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN22FA433

N499AG - AIRFRAME AND ENGINE EXAMINATION REPORT

February 8, 2023

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A. ACCIDENT

Location: Yankton, South Dakota
Date: September 27, 2022
Time: 1030 Central Time
Gyroplane: N499AG, Airgyro AG915 Spartan

B. N499AG - AIRFRAME AND ENGINE EXAMINATION REPORT

IIC	Mike Hodges National Transportation Safety Board Aurora, Colorado
Engineer	Nancy McAtee, Fire and Explosion Engineer National Transportation Safety Board Washington, District of Columbia
Technical Advisor	Jordan Paskevich, Chief Accident Investigator Rotax Aircraft Engines Vernon, British Columbia, Canada

C. DETAILS OF THE EXAMINATION

1.0 Accident Site

During the onsite examination Mike Hodges (NTSB, investigator-in-charge) and Todd Obritsch (FAA airworthiness inspector), and various members from the Yankton County Sherriff's Department were present on September 28, 2022.

The gyrocopter came to rest on private property in a flat grass field. The gyrocopter was destroyed from a postimpact fire and the impact sequence. The gyrocopter was constructed mainly out of composite materials.

The gyrocopter initial impacted terrain on 151 degrees heading (initial impact point). The wreckage came to rest (final impact point) on a heading of 248 degrees. To the left of the initial impact a 1.5 foot by 6.5 foot main rotor blade strike was observed in the dirt, with white paint transfer marks in the dirt.

From the initial impact pint to the final impact point, the wreckage traveled 48 feet and 6 inches. The location of the main rotor system (forward of the final impact point) was 142 feet.

There was one person onboard, and he sustained fatal injuries. There were no ground injuries. There were no signs of an obstacle being impacted such as a tree, tower, wires, building, etc.

There were no propeller strikes observed on the dirt. A postimpact fire ensued and the wreckage was destroyed. No signs of snarge were observed in the wreckage.

The cockpit was destroyed. The only cockpit reading available were for the fuel pumps (gated switch) and both were in the on position.

The fuel system was destroyed. No residual fuel samples were obtained from the wreckage.

The seats and seatbelts were destroyed. The type of restraint system installed or used by the pilot could not be determined.

4 round weights were found in the wreckage. Each weight weighed 10 pounds, for a total of 40 pounds of weights recovered.

The airframe flight controls were destroyed. Due to the impact and thermal damage, flight control continuity could not be determined.

The landing gear (tricycle format) was found attached to the airframe. The landing gear sustained thermal damage.

All major structural airframe components could not be accounted for due to the thermal damage.

The two main rotor blades were accounted for but sustained impact damage. The main rotor head, with main rotor blade remnants was found forward of the main wreckage location. The main rotor head was able to be rotated by hand with no binding or resistance.

A liquid consistent with oil was found splattered all over the remaining empennage pieces (that were not consumed by the postimpact fire). The liquid felt like an oil consistency, and it was brown in color. The direction of the liquid travel was rearward, in relation to the empennage design.

An ELT was not observed in the wreckage.

The airframe data plate was not observed.

The engine case appeared intact. The engine sustained fire damage throughout it.

The rocker arm covers were partially melted and all sustained fire damage.

The engine induction system and turbocharger system both had thermal damage.

The engine accessories appeared to be damaged from the impact.

The oil and fuel lines sustained fire engine.

Cockpit to engine control continuity could not be observed due to the damage sustained.

The magneto harness and ignition leads all sustained thermal damage.

The exhaust system sustained impact and thermal damage.

No fuel sample was able to be obtained from the engine.

The oil filter remained attached.

Oil was observed leaking from the sump section of the engine.

The engine data plate was not observed.

The Rotax ASI reported to the NTSB IIC that the gyrocopter might have an engine electronic control unit (ECU) installed. An exemplar photograph of an ECU was provided to the NTSB IIC. An ECU was not observed in the wreckage.

The composite wood propeller was destroyed from the impact sequence and the postimpact fire.

The propeller remains were found attached to the engine.

Propeller operation signatures could not be obtained due to the damage sustained.

The NTSB and FAA attempted to rotate the propeller remains by hand to no avail.

The team walked about 0.5 miles all around the accident site and found various pieces of composite material.

The pilot was removed from the wreckage before the NTSB IIC arrived.

There were no onboard recording devices observed.

There were no maintenance or pilot records observed in the wreckage.

The wreckage was recovered from the accident site for future examination work.

2.0 Airframe Examination (Airgyro AG915 Spartan, serial number MC.L.21.P.I.G.15.AA.008.L)

The NTSB IIC and Nancy McAtee traveled to Whisler Aviation in Seward, Nebraska, to examine the airframe on February 7, 2023. Refer to the Fire and Explosion engineer examination report for additional information on the airframe and engine.

An ESMIS and an unknown avionic device (both had fire damage) were retained and were submitted to the NTSB Materials Laboratory for further examination.

3.0 Engine Examination (Rotax 915-1S-3A, serial number 913375)

The NTSB IIC and Jordan Paskevich traveled to Whisler Aviation in Seward, Nebraska, to examine the engine on February 7, 2023. The engine was moved on top of a table for the examination. The engine was removed from the wood storage crate.

The engine had sustained damage from the postimpact fire. The case was accessories all sustained fire and impact damage.

The engine data plate was destroyed.

The crankshaft could not be rotated by hand.

Except for one spark plug (top 4) that was encased with molten aluminum, all spark plugs exhibited normal signatures per the Champion Aerospace Check-A-Plug chart. The plug caps and plug wires were consumed by the fire.

The ignition system was consumed by the fire.

The fuel lines were consumed by the fire.

The fuel pressure regulator was consumed by the fire.

The fuel filter was separated from the wreckage, however, was it damaged from the fire.

The fuel pump was separated from the gyroplane and was still contained within the stainless-steel housing, however, was damaged from the fire

The fuel pumps could not be function tested due its condition.

The oil lines were partially consumed by the post impact fire.

The oil cooler was not breached and still contained oil that was drained into a container was retained for further examination.

The oil pump was found loose (the bolts were not tight) however it was determined the bolts became loose due to the heat the oil pump was subjected to from the fire. No anomalies seen with the oil pump. Oil was found contained within the cavity behind the oil pump.

The magnetic plug was removed and examined. No anomalies noted.

The governor pressure feed line banjo bolt was found finger tight and appeared to have been leaking oil. This bolt required a specific torque setting. There was no evidence of torque stripe paint on this bolt.

The valve covers were removed. The rocker arms, rocker shafts, pushrods, valve springs and top of the valves were examined with no anomalies noted.

The cylinder heads were removed and examined with no anomalies noted.

The cylinders were removed, and the piston were examined with no anomalies noted.

Most of the coolant system was consumed by the fire. Some of the coolant lines at the bottom of the cylinders were still present.

The air filter was damaged from the fire.

The exhaust system was appeared in an intact condition; however, components of the turbocharger were fire a damaged.

No electronic recording devices were found for the engine.

4.0 Propeller Examination (Autogyro HTC, serial number 535178)

The NTSB IIC traveled to Whisler Aviation in Seward, Nebraska, to examine the propeller on February 7, 2023.

The propeller was found attached to the crankshaft. The various composite blades were found destroyed.

A propeller governor was not installed.

5.0 Maintenance Records

The historical FAA registration and airworthiness records (none were listed) were obtained from the FAA website.

The maintenance records were obtained from the pilot's truck during the initial accident launch, and they were examined and documented.

The pilot's son (Connor Rehm) reported on September 28, 2022, to the NTSB IIC, that he will look for the gyrocopter build log and if he finds it; he will submit it to the NTSB.

Submitted by:

Michael J. Hodges
Investigator-In-Charge