THE GLIDING FEDERATION OF AUSTRALIA

GFA AN 188

AIRWORTHINESS ADVICE NOTICE

TYPE AFFECTED:	Rotax 900 Series Engines
SUBJECT:	Miscellaneous airworthiness information.
BACKGROUND:	Aviation Investigation Final Report-Loss of Engine Power (Total) NTSB Accident No. ERA20LA341.
DEFECTS:	Overview: A Tecnam P92 Light Sports Aircraft (LSA) powered by a Rotax 912 ULS engine suffered an inflight engine failure caused by air introduced into the oil lubrication system. Air trapped in the hydraulic tappets can cause valve train overload which can lead to fatigue crack and breakage of the valve spring retainer.

Facts: Rotax 900 series engines are susceptible to in-flight catastrophic engine failures resulting from air being trapped in the hydraulic valve lifters. Many cases have occurred. Rotax gives the procedures to avoid and remove the air. It is discussed in the attached report.

Air can be introduced into the oil lubrication system through several means, including:

1. Uncoordinated and unloaded manoeuvres such as the maximum bank angle limitation of 40 degrees

2. Poorly or insufficiently vented hydraulic valve lifters

3. Lack of proper oil system air purging

4. Spinning the propeller in the reverse direction from normal rotation

5. Opening portions of the oil system during maintenance or servicing.

These are well known failure issues of these engines as detailed in the Service Bulletins. Please be aware, avoid actions that may entrain air in the oil, and bleed system as required.

The full NTSB report No. ERA20LA341 pages 1-14 are included below in this notice.

SIGNED: [signature] CHIEF TECHNICAL OFFICER	For and on behalf of: **THE GLIDING FEDERATION OF AUSTRALIA**

Aviation Investigation Final Report

Location:	Centerville, Maryland	**Accident Number:**	ERA20LA341
Date & Time:	September 28, 2020, 18:00 Local	**Registration:**	N562TU
Aircraft:	Tecnam P92	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

While in cruise flight at the conclusion of a flight lesson, the airplane suddenly began to vibrate severely. Despite the flight instructor's efforts, the Rotax 900 series engine eventually lost total power, and he performed a forced landing to a soybean field. During the landing, as the airplane slowed, the nose landing gear dug into the soft earth and separated, and the airplane nosed over.

Examination of the engine revealed that the No. 1 cylinder's exhaust valve spring retainer was broken, and the exhaust valve had fallen into the No. 1 combustion chamber, which resulted in the loss of power. This valve spring retainer failure was not the first one with a Rotax 900 series engine; in 2017, at the end of a cross country flight, an airplane powered with the same series engine experienced a total loss of engine power, and the pilot performed a forced landing during which the airplane sustained substantial damage. Examination of that engine revealed the presence of a broken valve spring retainer that had resulted in the loss of power. Additionally, it was discovered that the valve spring retainer displayed evidence of metal fatigue.

During 2019 and 2020, in addition to this accident, three more cases of broken valve spring retainers on the Rotax 900 engine series occurred in the United States. All the engines had differing hours of operation. Extensive metallurgical examination of the engine components from these four engines revealed that they met their specifications, and the fractured surfaces on the valve spring retainers revealed the presence of fatigue with pronounced vibration stripes, which was the same pattern observed on the valve spring retainer from the 2017 accident.

Review of the engine manufacturer's published guidance revealed that air could be introduced into the oil lubrication system through several means, including exceedance of the maximum bank angle limitation of 40°, poorly or insufficiently vented hydraulic valve tappets, lack of proper oil system purging, spinning the propeller in the reverse direction from normal rotation, or opening portions of the oil system during maintenance or servicing. Testing an exemplar engine with air introduced into the lubrication system revealed that with air trapped in the hydraulic tappets, it took about 6.5 minutes of engine operation at 2,538 rpm for air to be purged from the tappets allowing them to work as designed. This indicated that with air trapped in the hydraulic tappets, the valve train could be overloaded, which could lead to a fatigue crack and breakage of a valve spring retainer; this was likely the reason for the fatigue cracking of the valve spring retainers in the 2017 accident, in this accident, and in the other four 2019-2020 engine failures.

During this investigation, the engine manufacturer reviewed its records and found a total of 18 production engine failures due to broken valve spring retainers. The engines were installed on multiple types of aircraft with a large spread in operating hours from as low as 7 hours to as high as 1,936.6 hours. All the components examined met their specifications, and not all the engines were affected by service bulletins that had been issued due to deviations in the manufacturing process of the valve push-rod assembly, which could result in partial wear on the rocker arm ball socket and initiate rocker arm cracking leading to a malfunction of the valve train. These engine failures indicated that valve train failure could occur for reasons other than the push-rod manufacturing issue such as air being introduced into the lubrication system. Additionally, after the engine manufacturer's record review, an engine in an airplane that was produced in 2021, which should have had all changes included in Rotax guidance materials incorporated before it was placed into service, experienced a valve spring retainer failure, confirming that valve train failure could occur for reasons such as air being introduced into the lubrication system.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The fatigue failure of the No. 1 cylinder exhaust valve spring retainer due to air trapped in the lubrication system, which resulted in a total loss of engine power.

Findings

Aircraft	Recip eng cyl section - Failure
Aircraft	Recip eng cyl section - Fatigue/wear/corrosion

Factual Information

HISTORY OF FLIGHT

On September 28, 2020, about 1800 eastern daylight time, a Tecnam P92 airplane, N562TU, was substantially damaged when it was involved in an accident near Centerville, Maryland. The flight instructor and student pilot were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 instructional flight.

The airplane was being operated by Chesapeake Sport Pilot, a 14 *CFR* Part 91 flight school based at Bay Bridge Airport (W29), Stevensville, Maryland. According to the flight instructor, he and a student pilot were returning to W29 when the airplane suddenly began to vibrate severely. This was followed by a reduction in engine rpm from about 5,100 rpm to 4,500 rpm. Review of onboard recorded data indicated that the fuel pressure, cylinder head temperature, and oil temperature remained relatively steady until the loss of power occurred.

The flight instructor took over the flight controls from the student pilot and manipulated the throttle control to see if a different power setting would reduce the vibrations. Movement of the throttle control did not elicit a corresponding response from the engine. The flight instructor then ensured that the fuel valves were all on and turned on the electric fuel pump. There were no changes to the vibrations or power.

Assessing the situation as an impending engine failure, the flight instructor configured the airplane for best glide speed, turned towards the nearest field for a potential forced landing, and made a "Mayday" transmission. About 1 minute later, the engine lost total power. He attempted to restart the engine, but the engine would not crank when the starter was engaged, and all the avionics in the airplane shutdown. About 30 seconds later, all the displays came back on, and the flight instructor configured the airplane for landing and touched down uneventfully in the soybean field he had selected.

As the airplane slowed, the airplane's nose dropped to the ground, and the nose landing gear dug into the soft earth. The nose landing gear separated, and the airplane nosed over.

AIRPLANE INFORMATION

The strut-braced, high-wing, two-seat, airplane was made of sheet and tubular aluminum. The design complied with Federation Aeronautique Internationale microlight rules and Federal Aviation Administration (FAA) light sport aircraft rules.

It was equipped with an American Society for Testing and Materials compliant, 4-cylinder, horizontally-opposed, 100-horsepower, Rotax 912 ULS 2 engine. The engine used a single central camshaft with hydraulic tappets. The cylinder heads were liquid cooled, and the cylinders were ram air cooled. The oil system was a dry sump, forced lubrication system. The engine used a reduction gearbox to drive the two-bladed, fixed-pitch Sensenich propeller.

According to FAA and airplane maintenance records, the airplane was manufactured in 2017. The airplane's most recent condition inspection was completed on March 3, 2020. At the time of the inspection, the airplane had accrued about 1,081 hours of operation, and the engine had accrued about 734 hours of operation.

FLIGHT RECORDERS

The airplane was not equipped with a flight data recorder nor was it required to be under *CFR* Part 91. It was equipped with two Garmin G3X flight displays that recorded historical information at a variable rate of about 10 Hertz to internal non-volatile memory.

Review of the data revealed a noticeable gap in the data toward the end of the flight. This was indicative of the power interruption to the displays as described by the flight instructor and resulted in the displays writing the remaining flight data to a separate file. This process resulted in a gap in the recorded data.

WRECKAGE AND IMPACT INFORMATION

Postaccident examination revealed that the airplane had sustained substantial damage to the fuselage and both wings.

Examination of the engine, serial number (S/N) 9569181, revealed that there were no anomalies with the oil system and that there was oil throughout the engine. Aluminum debris and engine oil were found in the carburetor for Nos. 1 and 3 cylinders.

The No. 1 cylinder's exhaust valve spring retainer was broken, and the exhaust valve had fallen into the cylinder's combustion chamber. A buildup of metallic material was found in the No. 1 intake manifold. The stem of the No. 1 exhaust valve was in place; however, the head of the exhaust valve was no longer attached.

After removal of the No. 1 cylinder head, damage to the cylinder head, piston, and valves was discovered. The No. 1 exhaust valve head was found imbedded in the No. 1 intake valve. The No. 1 piston had a large hole in the crown of the piston; the No. 1 cylinder displayed damage; and the No. 1 connecting rod was bent and twisted.

Additionally, the No. 3 cylinder head was removed, and metallic material was found in the No. 3 combustion chamber. The No. 3 piston displayed damage, and the No. 3 cylinder was damaged and displayed multiple impact marks.

TESTS AND RESEARCH

Accident with N561TU

The National Transportation Safety Board (NTSB) first became aware of valve spring retainer fracturing issues with Rotax 900 series engines in 2017 due to an accident that occurred in Stevensville, Maryland, with another Tecnam P92 airplane, N561TU, that was also operated by Chesapeake Sport Pilot. (NTSB Case No. ERA17LA246). The airplane was powered by a Rotax 912 ULS2-01 engine, S/N 9569084. In this accident, the airplane experienced a total loss of engine power at the end of a cross country flight, and the pilot performed a forced landing during which the airplane sustained substantial damage.

The airplane had recently been purchased, and the engine had 13.2 hours total operating time. Review of onboard data indicated that the fuel pressure, cylinder head temperature, and oil temperature remained relatively steady until the loss of power occurred, which indicated that the engine failure likely did not involve the fuel system, cooling system, or lubrication system.

Examination of the engine revealed that there was no oil in the oil line between the oil thermostat and oil pump. The oil pump drive pin also displayed excessive wear in relation to the operating hours of the engine, and the magnetic plug was covered in metallic particles, although the oil filter was clean. Further examination of the engine revealed that the No. 1 cylinder was damaged, and evidence of bluing was present. The cylinder's exhaust valve spring retainer was fractured in half, and one half of the cotter was fractured. A small ridge could be felt on the exhaust valve spring retainer and galling (a rough surface) was visible on the exhaust valve bore in the cylinder head.

Examination of the fractured surface on the exhaust valve spring retainer revealed the presence of fatigue with pronounced vibration stripes when viewed with an electron microscope; however, the heat treatment corresponded to the target specifications, as did the statistical process control value. According to the NTSB's final report on the accident, the root cause of the failure could not be determined based on the available information.

Additional Valve Spring Retainer Fractures

In 2019 and 2020, another four valve spring retainer fractures occurred in the United States involving the following aircraft: N1PJ, N204BF (NTSB Case No. WPR20LA012), N117BF, and N562TU (this case).

Examinations of the damaged engines revealed:

- S/N 4421750 (N1PJ), intake valve failure, broken valve spring retainer cylinder No. 2
- S/N 9569290 (N204BF), intake valve failure, broken valve spring retainer, cylinder No. 2
- S/N 9569271 (N117BF), intake valve failure, broken valve spring retainer, cylinder No. 2
- S/N 9569181 (N562TU), exhaust valve failure, broken valve spring retainer, cylinder No .1

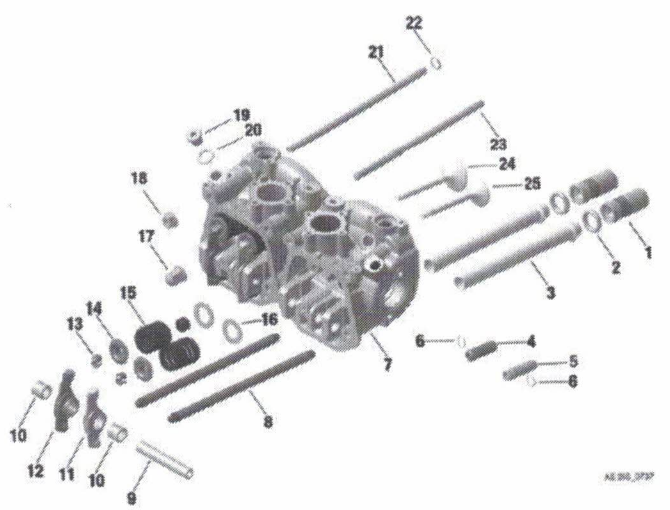
All the engines had differing hours of operation; however, all experienced a valve spring retainer failure during engine operation. At the request of the NTSB, numerous components from the four engines were shipped by Rotech Flight Safety to the Austrian Federal Safety Investigations Authority (BMK) for examination and testing at the engine manufacturer's factory in Gunskirchen, Austria. Extensive metallurgical examination of the intake and exhaust valves, valve spring retainers, valve springs, valve tappets, pushrod assemblies, pistons, cylinder heads, valve cotters, and camshafts was conducted. The results of the examinations were similar, to those from the examination of the engine components from the 2017 accident with N561TU. All of the parts met their specifications, and the fractured surfaces on the exhaust valve spring retainers revealed the presence of fatigue with pronounced vibration stripes.

Review of Published Guidance

Review of Rotax 900 series operators manuals indicated that the dry sump lubrication system would provide sufficient lubrication up to a maximum bank angle of 40°. The engines were also limited to a maximum of 5 seconds of operation at -0.5 G.

A limited review revealed that about 463 aircraft models used Rotax 900 series engines. These included plans-built aircraft, kit aircraft, and certificated manufactured aircraft. Review of published guidance materials from some of these manufacturers revealed however that the Rotax engine bank angle and G limitations were not published in the flight manuals or pilot's operating handbooks, and in many cases, the maximum published bank angle limitation for the aircraft was 60°, which exceeded the Rotax published limitation.

Review of the Rotax 912 Heavy Maintenance Manual 72-00-00, Edition 1, Revision 4, page 69, revealed that wear of "the valve spring support can indicate a malfunction of the valve train as a result of badly or insufficiently vented hydraulic valve tappets." Figure 1 shows the components of the engine valvetrain.



1	Hydraulic valve tappet	2	O-ring 16x5	3	Oil return tube	4	Valve guide
5	Inlet valve guide	6	Retaining ring A12	7	Cylinder head	8	Valve push-rod assy.
9	Rocker arm shaft	10	Bushing	11	Rocker arm right	12	Rocker arm left
13	Valve cotter	14	Valve spring retainer	15	Valve spring	16	Shim 16/27.9/1
17	Collar cap nut M8	18	Hex. nut M8	19	Plug screw M12x1.5	20	Sealing ring A12
21	Stud M8x200	22	O-ring 10.82x1.78	23	Stud M8x186	24	Intake valve 38 mm
25	Exhaust valve 32 mm						

Figure 1. Illustration of components of the engine valvetrain.

Review of Rotax Service Instruction SI-916 i B-003 / SI-915 i-003R1 / SI-912 i-004R2 / SI-912-018R3 / SI-914-020R3, issued on November 4, 2020, revealed that it provided instructions on purging of lubrication systems for Rotax 900 series engines. The reason listed for the service instruction was:

Rotax was informed of a limited number of engine failures in the field resulting from a lack of proper oil purging after the engine had been first installed and / or the engine had been re-worked." This Service Instruction should help to make sure that the engines do not suffer such engine failure in the field. As air can be trapped in the valve tappets and cause valve train failure it is very important to complete these instructions in their entirety.

The compliance section of the service instructions stated, in part:

These inspections have to be performed

- *before first engine run,*
- *after re-installation (e.g. after overhaul),*
- *after lubrication system opened and drained during maintenance work (e.g. removal of oil pump, oil cooler or suction line).*

NOTE: Not affected are the removal and replacement of components that do not drain the oil pressure galleries.

WARNING: Non-compliance with these instructions could result in engine damages, personal injuries or death.

Review of Rotax Service Bulletin SB-912 i-008 R1 / SB-912-070 R1 / SB-914-052 R1, issued on October 12, 2017, revealed that in section 3.1.3, the second step of the procedure instructed the person performing the work to "turn crankshaft so that the respective piston is exactly on ignition top dead center," but the direction of rotation of the crankshaft was not defined or specified.

Rotax Service Instruction SI-04-1997 R3, issued in September 2002 (cancelled and superseded by SI-912-018 / SI-914-020), issued on January 23 stated that the following as the reason it was published:

ROTAX was informed of a limited number of engine failures in the field resulting to a lack of proper oil venting after the engine had been first installed, after the engine had been re-worked and/or have had the prop spun in reverse direction allowing air to be ingested into the valve train. This Service Instruction should help to make sure that the engines do not suffer such engine failures in the field.

The compliance section of SI-04-1997-R3 stated:

These inspections have to be performed

- *before first engine run,*
- *after re-installation (e.g., after overhaul),*
- *after lubrication system opened or drained during maintenance work (e.g., removal of oil pump, oil cooler or suction line) or*
- *after unintentional turning of engine in the wrong direction of rotation.*

The Rotax 912 Operators Manual, Edition 4 / Rev. 0, page 3-5, November 01/2016, stated:

NOTE
Propeller shouldn't be turned excessively reverse the normal direction of engine rotation.
Remove bayonet cap, turn the propeller slowly by hand in direction of engine rotation several times to pump oil from the engine into the oil tank.

The Rotax 912 Operators Manual did not refer to a purging of the oil system as was described in Service Instruction SI-916 i B-003 / SI-915 i-003R1 / SI-912 i-004R2 / SI-912-018R3 / SI-914-020R3.

In summary, review of the published guidance documents indicated that air could possibly enter the oil system in the following ways and lead to valve train failure:

1. By exceeding the maximum bank angle of 40°
2. By poorly or insufficiently vented hydraulic valve tappets
3. By lack of proper oil system purging
4. By spinning the propeller in the reverse direction from normal rotation
5. By opening portions of the oil system during maintenance or servicing.

Engine Test Run

As a result of the review of published guidance, during the examinations that occurred at BRP Rotax, a Rotax 914 engine was test run to determine how long it would take for intentionally trapped air to vent from the hydraulic valve tappets. During this test run, it took about 6.5 minutes at 2,538 rpm for the trapped air to vent and all hydraulic tappets to work as designed.

ADDITIONAL INFORMATION

At the request of the NTSB, BRP Rotax reviewed its records and advised that they had identified a total of 18 production engine failures due to broken valve spring retainers for 900 series engines produced between February 2015 and February 2019 . The failures occurred with engines installed on multiple types of aircraft, and the failures occurred over a large spread in operating hours from as low as 7 hours to as high as 1,936.6 hours. All components examined at the Rotax factory met their specifications. Not all the engines were affected by or complied with Service Bulletin SB-912 i-008 R1 / SB-912-070-R1 / SB-914-052 R1, which was originally issued due to deviations in the manufacturing process of the valve push-rod assembly that could result in partial wear on the rocker arm ball socket. This wear could lead to rocker arm cracking / fracture and subsequent malfunction of the valve train.

Icon Airplane Valve Spring Retainer Failure

On August 10, 2021, the NTSB was notified of another valve spring retainer failure on a Rotax 912S engine (S/N 7705135) that was installed in an Icon A5 airplane, N639BA. The engine was manufactured in 2021 and should have had all changes that were addressed in previous Rotax guidance materials complied with before being placed into service.

The airplane was in cruise flight at a power setting of about 5,350 rpm when the pilot felt the engine vibrating. The exhaust gas temperature (EGT) for cylinder No. 1 began to steeply drop, and the engine rpm dropped to 4,820 rpm without throttle reduction by the pilot. About 2 seconds later, the EGTs for cylinders Nos. 2 and 4 began to drop. Shortly thereafter, the engine lost total power. The pilot then tried twice to restart the engine without success. The pilot made an uneventful forced landing.

Postincident examination revealed that the No. 1 cylinder exhaust valve spring retainer was broken in half. Half of the valve spring retainer was discovered in the rocker box cover, and the other half was found jammed between the cylinder head and the exhaust rocker arm. The No.1 exhaust valve was found severed, and the No.1 piston was impact-damaged.

Corrective Actions

As a result of these occurrences, to increase safety, these organizations took the following actions:

BRP Rotax

- Revised Service Bulletin SB-912 i-008 R1 / SB-912-070 R1 / SB-914-052 R1 to include a specific venting procedure for the oil system. (Now SB-912 i-008 R2 / SB-912-070 R2 / SB-914-052 R2.)
- Revised Service Instruction SI-915 i-003 / SI-912 i-004R1 / SI-912-018R2 / SI-914-020R2 to help preclude lack of proper oil purging after an engine had been first installed and/or an engine had been re-worked, and to help to prevent engine failures in the field, as air could be trapped in the valve tappets and cause valve train failure. (Now SI-916 i B-003 / SI-915 i-003R1 / SI-912 i-004R2 / SI-912-018R3 / SI-914-020R3.)

- All future instructions for continued airworthiness (service bulletins, service instructions, and alert service bulletins) will provide direct references to instructions found in other documents that pertain to the required procedures.
- Notified their distributers of the publication of Service Instruction SI-916 i B-003 / SI-915 i-003R1 / SI-912 i-004R2 / SI-912-018R3 / SI-914-020R3 and encouraged them to inform their customers proactively and to encourage original equipment manufacturers (OEMs) to also distribute the information relating to air in the lubrication system in documents issued by the OEM to significantly improve the chance to reach the end customer with the information. They also asked that their distributors ensure that all OEMs in their regions understand the importance of the revised service instructions, check their relevant instructions for continued airworthiness (ICAs) for possible checks and required changes, and have their aircraft customers, operators, and maintenance technicians made aware and informed about it. Additionally, they further asked their distributers to transmit the relevant ICAs to all their service centers, OEMs, retail sellers, flying schools, flying clubs, authorities, and press, for accomplishment or information.
- Developed new valve spring retainers with improved materials to make them more resistant to breakage if they are exposed to significantly higher stress loads due to insufficient purging/venting of the lubrication system.

Rotech Flight Safety

- Distributed Service Bulletin SB-912 i-008R2 / SB-912-070R2 / SB-914-052R2 on the Rotax-owner website, advising that the new revisions included instructions on purging the oil system after the work was completed. A video clarifying purging of the lubrication system was also included.
- Distributed Service Instruction SI-916 i-003R1 / SI-915 i-003R2 / SI-912 i-004R3 / SI-912-018R4 / SI-914-020R4 on the Rotax-owner website to provide further guidance for the lubrication system with respect to purging and venting and to avoid air in the lubrication system. They also advised that the service instruction should help to avoid engine failures in the field, as air can be trapped in the valve tappets and cause valve train failure, and it is very important to complete these instructions in their entirety.

Icon Aircraft

Issued Service Letter SL-081221-A to provide awareness that air entering the engine lubrication system could lead to potential failure of valvetrain components and that following the correct procedures when performing any installation, maintenance, repair, and overhaul activities on the engine has been shown to minimize the occurrence of this situation. Additionally, the service letter advised that certain uncoordinated or unloaded flight maneuvers should be avoided as they can lead to air entering the lubrication system and that one such incident in an Ion A5 resulted in loss of engine power inflight and an emergency landing.

History of Flight

Enroute-cruise	Loss of engine power (partial)
Enroute-cruise	Loss of engine power (total) (Defining event)
Landing	Off-field or emergency landing
Landing-landing roll	Landing gear collapse
Landing-landing roll	Nose over/nose down

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	40,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter; Powered-lift	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane; Helicopter; Powered-lift	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Helicopter; Instrument airplane; Powered-lift	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	September 25, 2020
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 23, 2020
Flight Time:	2118 hours (Total, all aircraft), 19 hours (Total, this make and model)		

Student pilot Information

Certificate:	Student	**Age:**	64,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 20 hours (Total, all aircraft), 20 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Tecnam	**Registration:**	N562TU
Model/Series:	P92	**Aircraft Category:**	Airplane
Year of Manufacture:	2017	**Amateur Built:**	
Airworthiness Certificate:	Special light-sport (Special)	**Serial Number:**	1562
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	March 3, 2020 Condition	**Certified Max Gross Wt.:**	1213 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1080.9 Hrs as of last inspection	**Engine Manufacturer:**	Rotax
ELT:	Installed	**Engine Model/Series:**	912 ULS 2
Registered Owner:		**Rated Power:**	100 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KW29,17 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	17:55 Local	**Direction from Accident Site:**	240°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.87 inches Hg	**Temperature/Dew Point:**	25°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Stevensville, MD (W29)	**Type of Flight Plan Filed:**	None
Destination:	Centerville, MD	**Type of Clearance:**	None
Departure Time:	16:48 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	39.050014,-76.151108(est)

Administrative Information

Investigator In Charge (IIC):	Gunther, Todd		
Additional Participating Persons:	Steven O'Rourke; FAA -FSDO ; Baltimore, MD Bernhard Kobylik; BMK; Vienna Jordan Paskevich; Rotech Flight Safety; Vernon Marco Gabutti; ANSV; Rome		
Original Publish Date:	November 4, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=102076		