



ERA21LA071 Examination Summary

Date of accident: December 12, 2020
Location of accident: San Mateo, FL
Aircraft registration: N11TG
Aircraft type and S/N: Silverlight AR1, S/N 0041
Engine type and S/N: Rotax 914UL, S/N 9577246
NTSB number: ERA21LA071
Date of Report: February 24th 2021

Wreckage Examination Location:

Examination carried out at: Florida Air Recovery – the gyroplane was stored inside after recovery.

Date of examination: February 24, 2021

Persons in attendance

- Todd Gunther (NTSB - AS-ERA)
- Jordan Paskevich (Rotech Flight Safety)

ENGINE

- Rotax Engine Model Number: 914UL - S/N 9577246

Overview

On December 12, 2020, about 1525 eastern daylight time, an experimental amateur-built American Ranger-1 gyroplane, N11TG, was substantially damaged when it was involved in an accident near San Mateo, Florida. The private pilot was fatally injured. The gyroplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.



Figure 1. Gyroplane at recovery facility.

Airframe

Model: Silverlight AR1
Serial Number: S/N 0041

- The airframe consisted of two parts, a welded steel frame and a fiberglass fairing. The steel frame displayed minimal damage. The fiberglass streamlined fairing, displayed

several cracks, crush and compression damage in several areas, and the windshield had partially separated from its mounting location.

- The pitot tube was clear.
- Throttle cable continuity was established.

Rotor System

- Examination of the cyclic control indicated cyclic control system continuity. Manipulation of the cyclic resulted in motion from the cyclic through the push pull rods to the breaks in the system and from the breaks in the system to the rotor head.
- Examination of the rotor brake system revealed that the cable was attached to the rotor brake handle in the cockpit and led from the handle to a break in the cable which displayed evidence of tensile overload at a stop nut, which had extra cable tie wrapped in a loop. The ferrule on the cable, was not seated on the control arm for the rotor brake.
- Examination of the pre-rotor system revealed no anomalies with the system. The drive shafts for the pre-rotor were intact from the engine to the gearbox at the base of the rotor mast, and from the gearbox to a universal joint, and from the universal joint, to the vertical driveshaft which was bent, and fractured. The shaft continued from the fracture to a universal joint on its upper end, which was connected to the pre-rotor.
- The hub bar was bent in an upward direction. Both blade roots were securely attached to the hub bar.
- The flapping cage was intact and the bolt that attached it to the rotor hub was intact. The nut was also in place and the safety locking pin was in place.
- Both droop stops were bent in a downward direction.



Figure 2. View of the droop stops for the main rotor blades.

- The rotor blades displayed evidence of chordwise scratching.



Figure 3. View of chordwise scratching on main rotor blade.

- One rotor blade was intact and was bent downward about 8'11" from the main rotor hub.
- The other rotor blade was cut completely through the rotor blade about 4'8" from the main rotor hub, just above the propeller, and displayed a bend about 5'6" inboard from the tip that appeared to be from a tree strike and contained wood embedded in the rotor blade.

Tail Surfaces

- The tail surfaces were found separated from the tail boom. Examination of the system indicated that the rudder control continuity was confirmed. The rudder was movable and control continuity was confirmed from the rudder pedals to the breaks in the system, and from the breaks in the system to the rudder panel.

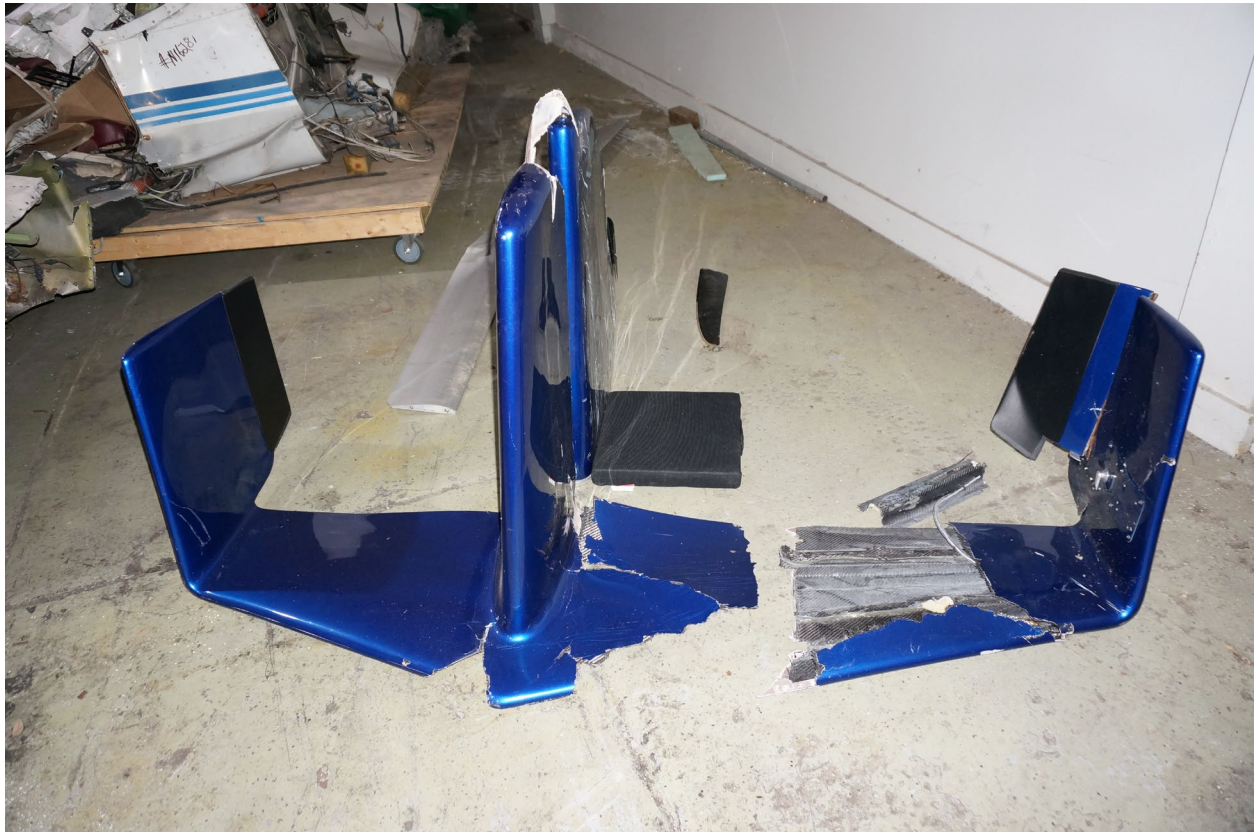


Figure 4. View of gyroplane empennage.

Engine Examination

- Engine in good physical condition.
- One of the 3 propeller blades was broken about 11” outboard of the blade root.
- The other two propeller blades remained attached to the hub and undamaged.



Figure 5. View of propeller.

- 1/3 Carburetor float bowl appeared wet with fuel (externally).
- Removed the TCU for further testing (S/N 1842070028) (P/N 966 741).



Figure 6. Right side of engine.



Figure 7. Left side of engine.

Spark Plugs & Spark plug Caps

- Removed and inspected all spark plugs. No anomalies noted.

Ignition System

- Operational during engine test run

Fuel System

- Electric fuel pumps were turned on and operational.
- Fuel filter had aluminum shavings contained within.

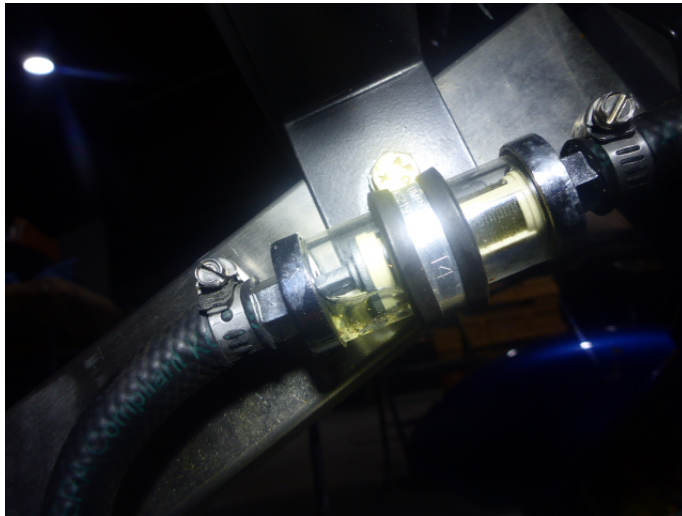


Figure 8. View of metal shavings in fuel filter.

- Right (2/4) Carburetor float bowl had a brown, crusty substance on the bottom and the fuel contained evidence of water when tested with water finding paste – Floats weighed 6.4 Grams

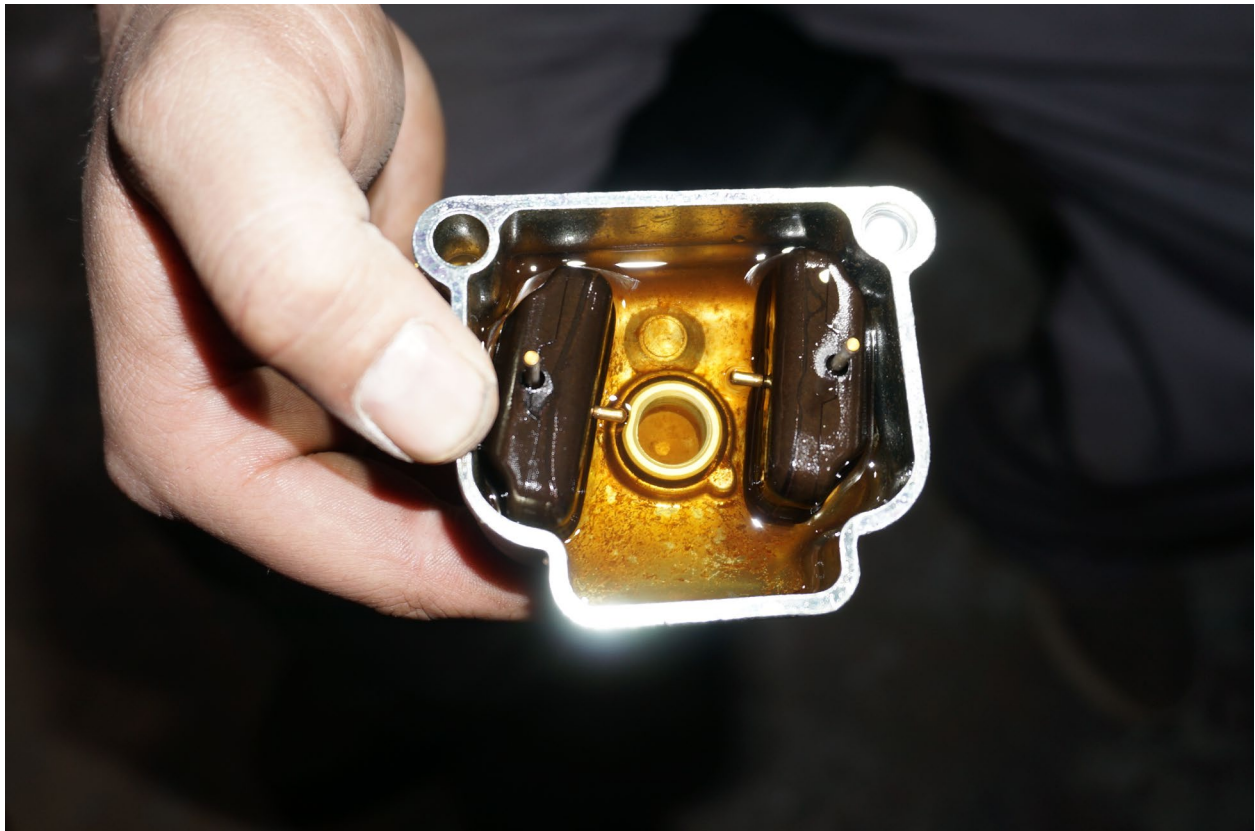


Figure 9. View of yellow fuel and crusty substance in the fuel.

- Left (1/3) Carburetor float bowl was clean. No issues found – Floats weighed 6.1 Grams
- Fuel sample was taken from the fuel tank sump, the lowest point in the system. The fuel was yellow in color and absent of water when tested with water finding paste.

Fuel supply including fuel pump

- Operational during engine test run.
- Fuel lines from fuel pump were leaking when pumps were turned on. Fuel line clamps had to be replaced with worm clamps to stop the leaks during the engine test run.

Lubrication system

- No anomalies noted. Oil was returned to oil tank by rotating propeller. Oil level checked and was below limit on dip stick.

Cylinder and cylinder head

- No anomalies noted.

Cooling system

- No anomalies noted. Coolant was still contained within the coolant system.

Air Filter system

- Dirty with grey pleats

Exhaust system

- No anomalies noted.

Gearbox

- Rotated by hand and no unusual noises heard. No anomalies noted.

Crankcase and crankshaft

- Rotated by hand and tested during engine test run. No anomalies noted.

Engine Run

- The engine operated when it started and used the fuel that was contained in the fuel tank. It ran up to full RPM and was shutdown.
- The propeller blade needed to be removed to facilitate the engine run.

- There was wood buried in the blade.