

This was the maiden flight of the aircraft which was going to be a lap around the pattern and a landing followed by a thorough inspection but something went wrong after getting airborne. The following information is provided to help illustrate that a methodical approach to first flight was attempted. This is written by Terry's son, Tony Bolstad. The S-9 is the third airplane that Terry has built and was his third "first flight".

The aircraft received its airworthiness certificate on July 1, 2017. In the week leading up to the airworthiness inspection many hours were spent by Terry, his brother John and I in final assembly of the wings, controls connection and adjusting and checking of control throw ranges, connecting fuel lines, etc.. The control numbers are recorded in the builders log. All aileron and elevator deflection numbers met or exceeded the design figures for upward and downward deflection. The rudder had slightly less deflection than specified as the rudder runs into the elevator or the fully retracted stop bolt a couple of degrees early. The position of the stop bolt is fixed by the factory.

From the last week of June and through the middle of July multiple static engine runs were performed and the prop pitch adjusted multiple times from 12 degrees on down in order to achieve the desired static RPM. Eventually the prop pitch was down to about 6 degrees which seemed to be at the lower end of what was recommended by other users and by Warp Drive. Terry had rebuilt the engine himself and was starting to wonder if something wasn't setup correctly on the engine but after much research and discussion a decision was made to send in the prop to have it converted from a square tip configuration to a taper tip configuration which would allow a higher pitch angle without bogging down the engine. This work was performed by Warp Drive (prop manufacturer). After return of the prop near the end of July the pitch was reset to 10 degrees and the static test was rerun. The desired static RPM of 6200 was still not quite achieved so the prop pitch was adjusted again to about 7.5 degrees and the static RPM of 6200 was achieved. The prop pitch and RPM were both within the desired range. Throughout the engine break in and subsequent static tests the engine was running extremely smoothly and all of the temperatures were operating at the lower end of the range. (which seemed good to us for a new engine - run a bit rich initially).

Slow speed and then higher speed taxi tests revealed some sloppiness in the tail wheel configuration and adjustments were made to reduce slop and better align the center of the tail wheel with the longitudinal axis. The higher speed taxi tests were used to fine tune the brakes and get the pilot used to a tail wheel configuration again. (many years since flying a tail wheel airplane). On August 3rd Terry flew his Challenger I around the pattern multiple times doing a couple of landing/taxi backs and a couple of touch and goes. The wind was a bit gusty out of the north and temperatures were climbing to about 85 in the mid morning so the flight of the S-9 was delayed another day.

On the morning of August 4th everything seemed to be good. Clear skies, very, very light wind out of the south so runway 21 could be used (preferable as there are large fields available to the south for ditching if problems develop on take off). The plane was loaded with about 6 gallons of gas in each wing tank plus the 1/2 gallon in the header tank. We also decided to fly without the canopy on for the initial flights. This is an approved flight condition by Rans so we don't think it

should have affected flight characteristics. Thorough pre-flight and control checks were confirmed. Radio communication was confirmed and the ground crew assisted in visually confirming that the elevator trim tab was set to neutral (it was initially in a pitch up position). After the standard 8 minute warm up (timed by pilot and ground crew) the plane was taxied out to runway 21 and a high speed taxi test was done to warm up the pilot and confirm everything was good. Full power was applied for about 3 to 5 seconds and pilot reported the plane just starting to get light at about 55 mph. Plane was slowed and taxied back for takeoff.

In retrospect this should have been a red flag for us. Stall speed is listed at 41 mph so it seems that it should have been getting light well before 55. The plane is recommended to be flown off the ground in a 3 point attitude rather than by raising the tail due to limited prop clearance so that may be a contributing factor to not feeling light at lower speeds.

Pilot announced his departure and applied full power. It seemed to accelerate well and to be staying on centerline (hard to tell for sure on grass strip and being well off to the side but it looked good). Liftoff seemed to be delayed a bith though, and occurred about 300' to 400' down the runway. Very soon (~2 seconds) after lift off the plane was observed going to a fairly nose high attitude (~15 to maybe 20 degrees) after rising to about 50'. I called on the radio at that point "It looks like you're pitching a little high". Somewhere around 100' to 200' altitude, at less than half the distance down the runway the airplane was observed by my uncle descending in about a 20 degree or so angle. It disappeared from view over the rise in the middle of the runway. We jumped in the car and raced to the other end of the runway. As we cleared the hump the plane was observed in a wings level position, on the ground on the very right hand edge of the runway, about 3/4 of the way down the strip. As we got closer we could see that both gear legs were folded under the plane (still attached) and one prop blade was observed about 10' behind the tail. While doing a quick check of the pilot we confirmed that there was no fuel leakage. The pilot was conscious but very dazed. His head had impacted the instrument panel glare shield and then on the rebound impacted the top of the turtle deck behind his head. He was bleeding quite a bit from the back of the head and from abrasions on his neck (from the shoulder strap) and from his left arm where it hit either the throttle lever or part of the fuselage. After a careful assessment of injuries the pilot climbed out with minor assistance and was transported by personal car to the hospital about 20 minutes away.

During the car ride the pilot made a comment about "it wasn't responding" and "I couldn't get the nose down" and that he had it at full power. We asked if the engine lost power and he said no. One of the neighbors who ran out to help mentioned that he thought he heard the engine cut out but wasn't sure if that was at landing or in the air.

Terry stayed conscious but fairly quiet throughout the car ride even with repeated questions to confirm he was doing ok. About 30 minutes or so after arrival at the emergency room a CT scan was performed and a sub-dural hematoma of the brain on the left frontal lobe was identified and the neurosurgeon on call said he needed to go in to surgery right away. He was in surgery for about two hours and was reported out of surgery at 1358. (I remember the time as it popped up on the status board at the hospital). Terry was able to speak a bit after coming out of surgery on Friday and a bit on Saturday but since then his ability to talk has decreased. The doc says its normal and should come back eventually. As of August 14th he is in the Northwest Rehab

Facility in Post Falls, ID and is able to get around with a walker but is still pretty weak and can barely get out "yes" or "no".

6120 SAFETY RECS

- use a "fish scale" to determine amount of thrust being produced in the static run. We were able to get to the desired static RPM but maybe the prop pitch was too low and we weren't getting the thrust needed.
- get current in a plane that is much more similar to the type getting ready to be flown. Dad's a very good pilot with lots of experience in lots of different types of planes (F-102, A-1 Skyraider, KC-135, T-33, T-37, T-38, Cubs, Super Cubs, Champs, Standard Pacer, Tri-Pacer, C-150, C-170 and some others) but it's been a very long time since tailwheel and low/mid wing airplane time. All of the last four years has been spent in a high wing, slow airplane that climbs at very steep angle at Vy. He read all of the POH info available and tips on the plane and we had discussed the V speeds and plan for the first flight but it didn't work out.
- have the chase car with first aid kit at the ready on the side of the runway. We spent a minute or so finding keys, piling in to the car, driving out to the runway then down to the crash site. And then had to use my T-shirt to stop bleeding.
- have a ground coach live on the radio to call out problems in a more forceful manner. I'm still kicking myself for not yelling "nose down! - airspeed! - airspeed!")
- get the ASI checked and calibrated then confirm against GPS speed during taxi tests. We had the ASI checked post crash and it was within a couple of mph but we didn't know that before first flight. (calibration sheet is included in the Google Photos album):
<https://goo.gl/photos/GUTwxH1dsEtmS1nKA>
- do a couple of "crow hops". We've read comments both ways on this but it seems that if you're planning on it and can get to 10' up then back down you can confirm a few more things before getting very high.
- load less fuel in the plane to lighten the initial load and move the CG a bit more forward