

RANS S-21 Progress Report 25

Flying the Titan Powered S-21

Flight testing of the Titan 340 powered S-21 has begun, in between the interesting Kansas February weather. One day it is 57 degrees, the next 15 degrees. The way this plane flies is a total joy. The light roll and great yaw stability make coordinated turns almost automatic. Crosswinds are actually fun with that extra mass up front keeping things well organized. Ground handling is excellent, again due to the big engine. Prop blast is helping turns with less need for brakes. Overall, it is the kind of plane you really look forward to flying. I know I am biased, but have a lot of designs to compare the S-21 to and it is becoming a fast favorite of mine. Here are some initial numbers. Keep in mind we have many tests to perform so more data will follow soon.



Indicated Airspeed Calibration Test:

Execute the calibration test by flying three headings, 120 degrees apart, holding heading, IAS, RPM, and Altitude steady for each leg at least 30 seconds. Total and divide by 3. The test is done at several power settings and gross weights, but here is a typical slice performed at 1650 Gross weight

HDG.....	IAS.....	TAS.....	GS.....	ALT.....	RPM.....	GPH.....
120.....	134.....	140.....	120.....	3740.....	2360.....	8.5
360.....	134.....	140.....	162.....	3740.....	2360.....	8.5
240.....	134.....	140.....	132.....	3740.....	2360.....	8.5

GS: $120+162+132=414/3=138$ (138 is 3% higher than IAS and is within tolerance)

How Fast?

Several WOT test are conducted through a range of CG and gross weights, here are a couple of runs:

2650 RPM IAS 153 MPH, TAS 158 MPH at 3500' ASL CG AFT

2640 RPM IAS 152 MPH, TAS 157 MPH at 3500' ASL CG FWD

We are still tweaking things, like prop pitch, and H-stab incidence. So far we are within the predicted performance. No doubt we will find a few more MPH. Having a 138 MPH economy cruise is very telling of the potential of the airframe. There have been a few curious about wheel panting the S-21. That should be a net gain of 8 MPH if done with the right pants. We have looked at using the set up off the S-19, but the wheel size is 5" and the axles would have to be custom to match the pattern on the landing gear. Just dropping down 800x6 might yield a few more MPH, and still retain a portion of the rough field mission. The great thing about EAB is the fun builders can have exploring these options.



Take Off and Landing Distance:

Take off distance is not official, due to weather not offering any calm conditions. We will put out the runway markers and get some solid numbers at gross weight. From flying it at and over gross the distances are pretty brief. I have no problem using our 1200' strip, and have already passed the Runway16 test at Hays. This is where I try to make the turn off of RNY16 at M1 after touching down on the edge of the black top. That section of black top is 150'. This is with single caliper brakes and once we install the duals that impromptu test will be a breeze to pass. I rolled past M1 only about 25' even with strong

crosswinds. The take-off and landing distances should run very close to predicted.

Differences:

There are several differences between our prototype and the production kits. The result is a very pleasant noise level in the cabin. The throaty rumble of the Titan actually measures the same decibels as the Rotax, surprisingly enough. However, as you increase in speed the wind noise will increase but, thanks to the thicker windshield that seems to be nicely abated. The added stringers and thicker belly skin over the prototype has totally eliminated the in-flight sheet metal rumble we hear in the prototype. Even taxiing on rough surfaces produces less of a reminder you are in an all-metal plane.

1. Plexi-glass windshield appears to squelch engine noise.
2. Rudder cable system is direct connecting and has a return pulley; this has eased up the forces making steering lighter. This is also due to the heavier engine, which means less tailwheel weight.
3. .020" belly skins instead of .016"
4. More belly stringers.

Taxi Test Impressions:

As I taxi tested our latest demo plane these features combined to make it a very pleasant experience. With the Titan 340 it has a very nicely balanced feel, easy to turn with the new rudder cable system and no doubt this will also benefit the 912, 914, and 915 versions. The single caliper brakes were OK. After break-in they are able to pass the WOT hold test on a sod runway. For better modulation and braking power most may want to option the dual calipers as this will enhance short field performance both take off and landing. Another nice thing about the ground handling is it stays tail low even hard on the brakes, low on fuel, no baggage and only my butt on board. It was very solid and smooth, and oddly quiet.

Increasing Production

We are now up and running with another CNC router table and soon a second press operation will be on line. These two additions should impact our lead times in about 2 months. The outcome will be some orders will be delivered either closer to the schedule or ahead of schedule. Ultimately we would like to see the lead time for full kits less than 8 weeks. That is an aggressive goal, as demand is still high. We are very thankful for that and it is full steam ahead to meet the challenge.

Assembly Alert

Please note in the parts manual the rudder stop is shown upside down. If installed as per the drawing it will be too low to engage against the rudder horn. Please bolt in place with the holes to the lower edge. Thank you for your attention to this matter.

Stay tuned! RJS

