

# S-21 Progress Report 23

10-9-2018

## Titan Powered S-21's

Assembly of two Titan 340 powered planes is progressing rapidly. We expect to be flying one by last week of November or mid December. Issues such as changes to the induction system have impacted the cowling tooling. A new carbon fiber cowling should be arriving any day. The new airbox has reduced cooling drag and increased cooling efficiency.



## Comparing the Rotax 915 Powered S-21 to the Titans...

We are building a Rotax 915 powered Outbound and will be following up with performance comparisons to the Titan 340. Pricing of this engine comes out to be about the same as the Titan 340 or the Titan 370. Speaking of the 370, we were asked to make our best comparison to the 915. Below is what we came up with. After flying Ronnie Smith's S-7S with the 915, I must say I was impressed with how smooth, quiet, and light the plane felt. I cranked up the pitch to the point of max MAP and cruised at 125 MPH in an S-7S with 26" tires. That is both a testimony to the airframe and the engine.

	S-21 with 370 CS prop	S-21 with 915 and CS prop
EW	985	920
Beginning HP	195 HP	142 HP
fuel for same endurance of 5 hours	45	31
weight of fuel	270 (9 GPH)	186 (6 GPH)
Common payload	400	400
Gross	1700	1506
Power to weight at sea level	8.71	10.6
Power to weight at 2500'	9.10 (186.22 HP)	10.6
Power to weight at 5000'	11.3 (16.75 HP)	10.6
	S-21 with 340 fixed pitch prop	S-21 with 915 and CS prop
EW	955	920
Beginning HP	180 HP	142 HP
fuel for 5 hours	40	31
weight of fuel	255 (8.5 GPH)	186 (6.2 GPH)
Common payload	400	400
Gross	1610	1564.4
Power to weight at sea level	8.86 (180 HP)	11.0
Power to weight at 2500'	9.30 (172 HP)	11.0
Power to weight at 5000'	10.5 (153 HP)	11.0
Power to weight at 6000'	10.9 (147.6 HP)	11.0

What is interesting in making these comparisons:

- Note the 370 is at the same power-to-weight as the 915 at a 1000' feet lower than the 340.
- This chart takes into account the actual payload being the same, thus giving a more apples to apples comparison.
- An on-par power-to-weight ratio occurs well below the altitude of the on-par altitude for horse power.
- Density altitude impacts all airports, not just mountain locations, and is often 4800' at Hays (field elevation is 2000') in the summer. On a "cool" fall day in Hays at 70 degrees the DA is 3200'. On a 75 degree day our DA would be 4300.

The bottom line is, the cross-over point is much lower when you consider DA, fuel load and equal payload. The other bottom-line is torque, and the Titan engines have plenty. Until we can actually compare all combinations in real time, we cannot 100% predict the outcome, but it is fun to crunch the numbers and see how close we come!

51% Approved

The S-21 kit made 51%, and is on the list. You can now build without having to take hundreds of photos of you holding tools, and showing sub assemblies. But do this anyway, because it is nice to have a baby book of your planes progress to completion. And just in case your DAR is one of those who does not give a hoot if it is 51% or not!

## Kit and Manual Improvements

The feed-back has been helpful in improving the kit and instructions. We have sent out an improved manual. We clarified text, added figures, started a photo cache on-line, and posted a how-to video on the wing. The Outbound is an easy assembly project, but we must say, the manual was not the easiest to follow. We hope you enjoy the improvements, and please keep the feed-back coming, as we will also continue to evolve the process through our constant assembly of factory ready to-fly-planes.

## Plexi-Glass Windshield Install

The S-21 features a molded plexi-glass windshield. It and the cowling are the last parts needed to fully flesh out the finishing kits. This week are in the process of proofing the install and creating the tech support.

Thank you and stay tuned! RJS

