

RANS S-21 Outbound

Progress Report

18

Re-Vamped Order Form

We will be posting some changes to the order form for the S-21. There is no impact on pricing, just some shifting of items into the fuselage kit from the finishing kit.

Specific Titan Engine: Variety is the spice of life, except when it comes to trying to support aircraft engines! The specific configuration we are supporting with the complete install kits is as follows. The spec includes fuel injection, automobile style spark plugs and electronic ignition. The biggest items that will impact the install kit is what type of mount and accessory case. If you are not ordering a Titan 340, make sure those match the spec in order to get the most out of our install kit. Model: IOX-40-B4E3T4

1. Lightened fixed pitch hollow main
2. Dynafocal Type 1 mount crankcase with thrust washers
3. AI Accy. hsg with no mag gears (dual light speed)
4. Parallel cylinders, AEL75413 pistons
5. NIC3 plated barrel tapered fins, venturi intake seat
6. 14mm spark plug hole
7. AF15473 Tempest Diaphragm type fuel pump-High press (fi)
8. EX360-1K Precision Silver Hawk FI, O/X-340, 360, kit
9. LSE- 1.334-Dual Plasma III: 4 cyl. DC Mini Sensor, Dual
10. AL12-E160/B Plane Power 60 Amp alt.
11. 149-NL Lightweight Starter, Sky-Tec
12. AEL141-2 Hot Sump Magnesium Tapered Bore kit

Mechanical or full time electric Fuel Pump required : Notice on the above engine build there is a fuel pump. Our fuel system includes a header tank. There will be two sizes, 2.75 gallons and 6.7 gallons. The larger one will be recommended for the Titan or similar engines. Having a header tank system greatly reduces fuel system complexity. It does require that the engine you choose uses a fuel pump, either electric or mechanical. The advantage over the gravity feed is more useable fuel and more reliable fuel delivery. In the case of the Titan 340, depending on power setting, this could mean another hour of flight after the top tanks are on

empty. A low fuel warning light and sensor will be provided with the engine install kit for the Titan. Think of the header tank fuel as insurance of always landing with at least a half hour reserve, always having enough fuel to make a steep decent even with low top side fuel, and if you got in a real bind, having up to an hour extra fuel (at low power settings) .

Basic Engine Install Kit

For those who like to customize engine installs we are adding to the order sheet a basic engine install kit. It will include: Engine mount for Type 1 Dynafocal, cowling, and spinner. The cowling may come in the choice of fiberglass or carbon. Pricing will be posted on the order form.

Full Production Underway

With the completion of the static load and drop testing we have begun production of the complete S-21 kits. Actual shipping dates for the first kits are still aimed for the end of March.

Jury Struts or Not?

During the flight testing of the 141 wing on our Raven, we never experienced any issues at any speed or weight in over 150 hours. The S-20 with 141 wings were flown up to 1500lb gross weight and 170 MPH in dive tests. We put these same wings on our S-21. Not a new set of wings/struts, but removed them from our S-20 and put them on our S-21. We were pretty sure we knew the performance and behavior of this wing and strut combo.

However...flight test of the S-21 revealed vibration in the left lift strut. The engine prop combo in our S-21 has a little more vibration than our Raven. We thought it may be isolated to a rough running engine/prop combo. We attached a trip lip to keep airflow attached and went about the flight test. The strut shake would come and go at different RPMs, speeds, and weights. And at certain times the right strut would shake, and not the left, and sometimes both. We tried several different props and the strut shake was better with some than with others. After trying several props, we thought the common denominator had to be the rough engine.

Then we flew the Titan powered raven with a 141 wing and experienced strut shake once again. After lots of testing we believe the issue is flow separation of the lift struts under certain conditions. We tried various aerodynamic ideas, such as placing a ridge of weather seal in the shape of a 1/4" bulb right before the camber. This seems to work, however it will take a

large amount of R&D before we are confident this method prevents strut shake at any condition. We also do not believe builders will like to apply and maintain such a measure. Instead, we installed a rough and dirty jury strut. If the jury strut becomes the final solution, we will supply a much slicker version. The jury strut is a 100% fix. So far we cannot measure any impact on speed.

A strut shake may sound a bit ominous, however most lift struts have a good chance of experiencing separated flow. If you have ever flown a high wing strut braced plane in the rain you will notice water drops sometimes stagnate or even flow backwards on the aft section. This is because struts, although streamlined, are often fairly thick to be strong enough for the compression loads. Flow separation of the strut is usually a non- event unless you happen to hit a harmonic, as we have in two out of three planes.

The good news is you can add any solution we have considered to a finished S-21 wing so there is no reason to delay on building your wing kit. We will keep you posted as the final decisions are made.

Stay tuned, more news soon! RJS