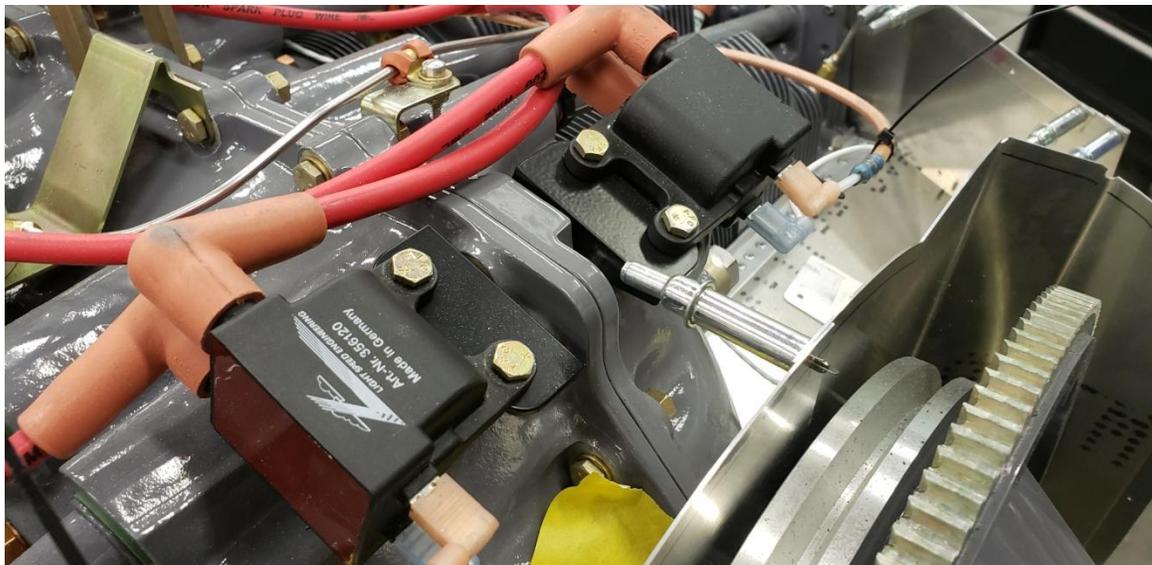


Outbound Progress Report 33

New Ignition Module Mounts for 340

Because of cowling contact with the ignition modules we have designed new module mounts. These are being sent to all builders who have received Titan install kits and will be included in the any new shipments.



Outbounds are taking to the air!

The fast build nature of the S-21 is proving out in the growing number of completed planes. Performance numbers are coming in on target and build times are not excessive even with modifications. Some of the builder mods include constant speed props, larger engines, and VG's. We will continue to post build photos and videos as we refine the completion process.

| Owner/Builder | Engine | Landing Gear Configuration |
|---------------|--------------|----------------------------|
| M.P. | Rotax 915 | TW |
| R. H. | Titan 340 | TR |
| G. L. | Lycoming 360 | TW |
| B. G. | Lycoming 360 | TW |
| B. S. | Rotax 915 | TW |
| J. K. | Titan 340 | TW |
| B. N.* | Rotax 915 | TR |
| J. B. * | Rotax 915ULS | TW |
| J. K. * | Titan 340 | TW |
| J.K.* | Titan 340 | TW |
| RANS Demo* | Rotax 912ULS | TR/TW |
| RANS Demo* | Titan 340 | TW |

*Factory built

More on Rigging the Outbound

A few builders have reported left roll on first flights. Measurement of root wing incidence of each wing shows as much as .2 degrees variation. Typically the right wing is at a slightly higher angle.

Two planes that reported rolling to the left had bigger engines and constant speed props. This affects the amount of asymmetrical airflow of the airframe. Bump trim tabs and adjusting the wing incidence at the root resolved the roll issue.

The trend is if you have a lot of power, and a clockwise rotation to the prop, the higher energy air over the right wing induces left roll. We do not see the impact on the Rotax 912ULS, but did with the 915. An important note: measuring with hardware store electronic protractors can give inaccurate results. They can be off as much as .5 degree. Also, how one measures wing incidence will cause wide variations. It must be measured from the TOP SIDE. See photos.



We just completed a Titan powered S-21 that only needed a little rudder trim. It measured a .2 degree higher angle of attack at the root of the right wing. For rigging ease we are machining the rear spars and fitting to include three holes to allow up and down setting of the aft spar. This can be done with your current fittings, but you will have to drill the holes; there is enough material in the original fittings to allow for extra holes. If you need to make this adjustment, move the rear spar up or down until the original hole is no longer visible. This will result in a lift or drop of .25".

Remember the number one rule in rigging is to only change one thing at a time!

3-D Printed Adjustable Bump Trim

We prefer the bump trim over traditional tabs. The beauty of a bump trim is once it is set it stays set. We have developed an adjustable version of this concept. It features a slide out element to allow convenient adjustment during rigging test flights. It is attached to the control surface of choice via 3M VHB. We molded in a slight depression for the VHB for a neat install. By moving the adjustable element in or out of the main body more or less trim is affected. Once you have the plane flying ball centered, hands off, a second strip of VHB is used to permanently affix the extendable element.



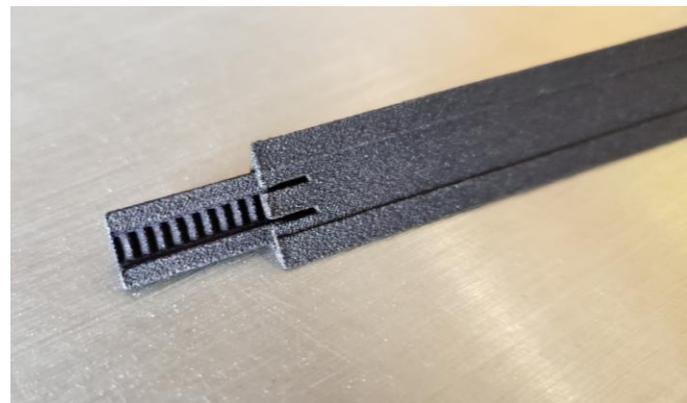
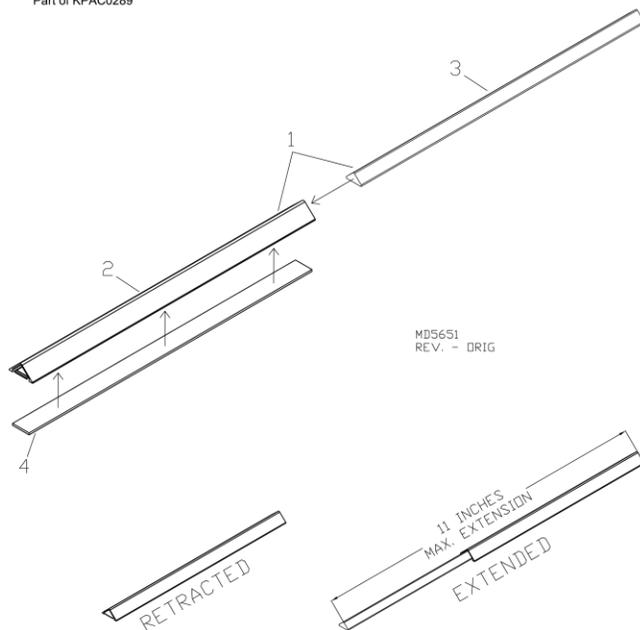
RANS S-21 OUTBOUND

PAGE 002-04

OPTIONS - BUMP TRIM KIT - RUDDER AND AILERON KAAC0112

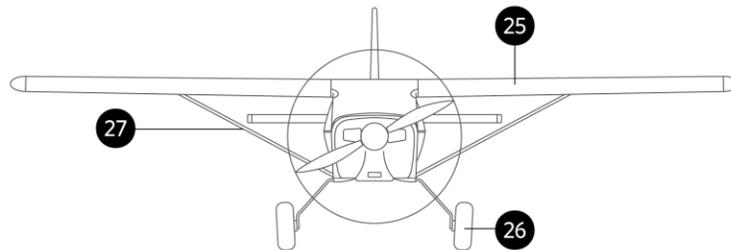
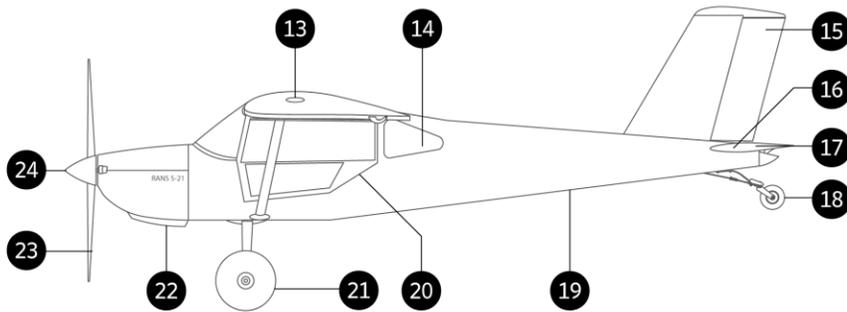
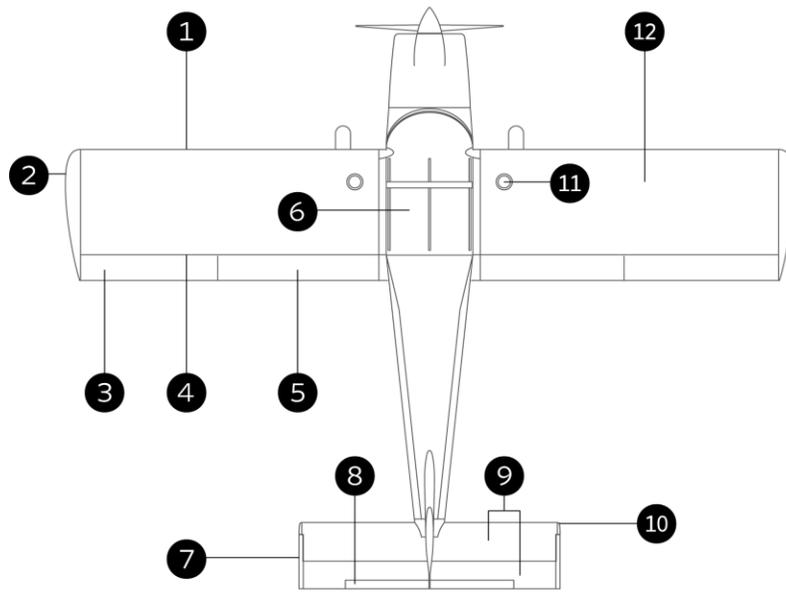
| # | DESCRIPTION | PART NUMBER | QUANTITY |
|----|------------------------------|-------------|----------|
| 1. | Bump Trim * | KPAC0289 | 2 |
| 2. | Bump Trim Housing *, ** | KPAC0289-1 | 0 |
| 3. | Bump Trim Slide *, ** | KPAC0289-2 | 0 |
| 4. | 1/4" VHB Double Sided Tape * | KSAC0080 | 22 in |

* Included in KAAC0112 Kit
** Part of KPAC0289



9/11/2018
REV. - ORIG

Outbound Feature Details



- 1.** Extruded "D" spar provides the leading edge shape with "I" beam spar. Comes machined and ready to assemble.
- 2.** ABS molded wing tips mount flush to the wing with hidden fasteners.
- 3.** Aero servo ailerons are light and responsive.
- 4.** Extruded "Z" rear spar comes machined and ready for assembly.
- 5.** Slotted flaps provide a 10 MPH reduction in stall speed.
- 6.** Skylight provides excellent visibility, especially in turns.
- 7.** Elevator counter balance uses lead shot sealed with epoxy for an easy hazard-free assembly.
- 8.** Elevator trim tab provides neutral stick pressure at any airspeed and flap setting.
- 9.** High aspect elevator and horizontal stabilizer are low drag and effective at below stall speed. Tail can lift early in the take-off roll for improved control and visibility.
- 10.** ABS elevator tips are easy to fit and finish.
- 11.** Flush fuel caps connect to 21.5 gal polyethylene molded tanks, for a total of 50 gal (when optioned with the larger header tank). The only pro-seal used is between the wing skin and fill neck edges, greatly reducing cost and effort.
- 12.** One-piece top and bottom wing skins fit flush onto the leading edge spars making for a very clean wing profile.
- 13.** Molded into the ABS wing tips are mounting areas for wing tip strobes.
- 14.** Rear windows expand the visibility scan.
- 15.** Large rudder area provides excellent cross wind control.
- 16.** Adjustable incidence angle allows for fine tuning trim speed for various engines.
- 17.** High aspect ratio elevator and horizontal stabilizer provide pitch authority at well below stall speed.
- 18.** Steerable and full-swivel tailwheel with 8" pneumatic tire.
- 19.** The flat bottom and hard chine of the tailcone aids in yaw stability, in addition to being easy to build.
- 20.** Large doors swing up to open on gas struts and curve out to provide extra cabin space.
- 21.** The aluminum leaf spring landing gear legs have a natural low rebound. Made of 7075-T6 and machined with a brake line groove, they are low drag and one per side, versus a one-piece. The advantages are adjustable toe and camber and in the event of damage, only one gear leg would need possible replacement. The stock wheels are 6" with dual caliper brakes (when optioned), rolling on 1.25" diameter angles.
- 22.** Carbon fiber cowling.
- 23.** Carbon fiber ground adjustable prop
- 24.** Carbon fiber spinner comes trimmed and nut plated, ready for paint.
- 25.** One-piece top and bottom wing skins for smooth airfoil.
- 26.** 22" Tundra tires are stock.
- 27.** Lift struts come CNC machined.

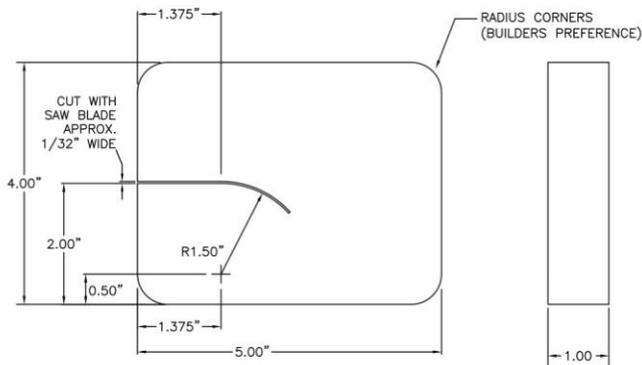
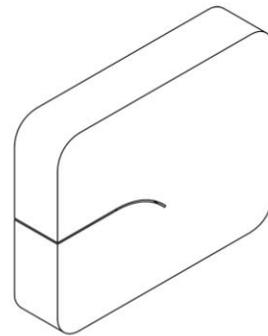
Smooth Wings

We have created a handmade tool that is easy to fabricate in your shop that is used to form a slight curve in the leading edges of the top and lower wing skins wing skins. The result is a smoother transition over the previous method using the edge rolling tool.

Fly safe, have fun and stay tuned! RJS



Fabricate the Leading Edge Forming Tool from 1" Nylon or similar material. Clamp the leading edge of the Top Skin, top side UP, to a table with 2-3/4" extending forward of the table edge. Draw the Forming Tool down the leading edge of the skin. Make sure the skin is fully inserted into the tool. This will roll a slight edge, toward the spar, on the skin to prevent pillowing. Repeat for the Bottom Skin, but make sure the lower side is UP.



09/11/2018

RANS S-21 OUTBOUND
WING SKIN LEADING EDGE FORMING TOOL

MD5650
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