2-14-17 Outbound Progress Report

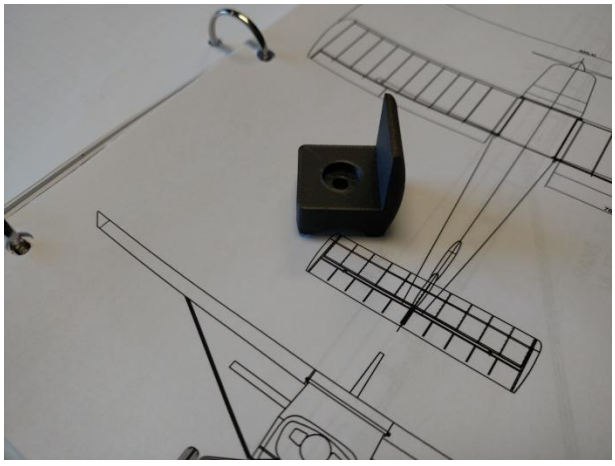
Fuel System Options

The prototype Outbound and the first production run will feature a 32 gallon fuel system. There has been concern that 32 gallons is not enough for a hungry engine, like the Titan 340. We do believe you can extend your range considerably running at 50% power, where you would see maybe as little as 5.5 GPH. Cruise speed should be between 120 and 130 MPH at that power setting. The net range at this fuel burn would be 664 miles, minus the half hour reserve. At 8 GPH and 155 MPH the range would be 542 miles, minus reserve. The space where the 13 gallon tank resides will allow a direct replacement with 20 gallon tanks. This will create up to 45 gallons total depending on header tank size. The 45 gallon system will bump those range numbers to 960 and 794 miles respectively. Time aloft at 8 GPH goes from 4 to 5.6 hours. Both numbers are typical of general aviation planes. The case of extended range beyond this is for deep back country work. No doubt, we are looking at an even greater capacity. One design study goes as much as 64 gallons, but requires significant differences in the wing structure, added cost, weight and time. 4 to 5.6 hours of flight time makes for a very serviceable plane, that will accommodate most buyers of the S-21 Outbound. The more experienced pilots who do a lot of cross country will seldom exceed a 4 hour flight, more like 3 to 3.5 hours average.

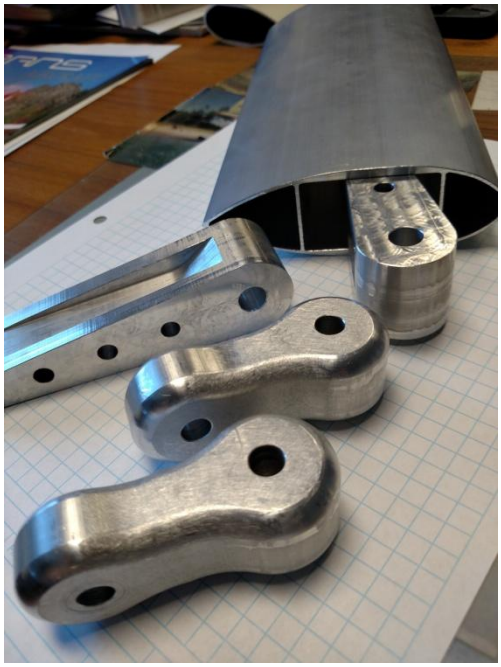
We plan to have the 20 gallon tank available later in the year. If you have pre-ordered an Outbound we will send information on cost and delivery impact about going to the larger fuel system. From our experience with up-grading tank size in other models, it is very likely removing the root rib will allow a tank change out.

3-D Printed Parts

3-D printing is maturing slowly. The size, speed, resolution and material selection are the limiting factors preventing a landslide adaptation in our industry. However, there are current printers that have just crept over the payback line. We are flight testing parts made on a 3-D printer. And as with any new technology we are fast learning dozens of other applications. You can expect some of the parts in your Outbound kit to be 3-D printed. As for a full fuselage or wing, that will be a bit later…



Beefy Strut Fittings
The higher gross weight and load limit margins designed into the Outbound has resulted is some nice looking up-scaled components. Here are the fittings that are used to attach the lift struts to the fuselage. We pull tested the whole circuit of fittings to limit and ultimate load, partly to double check our numbers, but also because it really reassures the test pilot.



Tailcone Turtle Deck Skins
Layout and fit-up of the tail cone skins is about complete. As we install these parts, the stoutness of the tail cone becomes more apparent. Many are still curious about how the tailcone and cage connect. On the back of the steel cage are over 30 tabs and flanges that receive the longerons and skins. The skins overlap and also tie into receiver strips that are attached to many smaller tabs welded to the fuselage. This network of attach points creates a very even and well distributed load transfer to the cage. The bottom line is, if you tear the tailcone off of an Outbound it was not a hard landing, it was an airframe totaling crash.

Surround Yourself

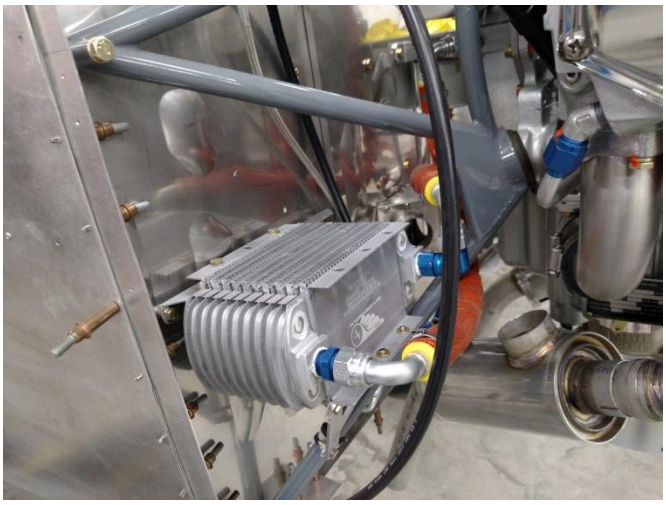
A lot of thought goes into aircraft design. And safety is something we like to design into a model. We are big believers is surrounding the pilot and passenger with a crashworthy structure. This can be achieved in many ways. In the S-19 there is a high number of channels, stringers, and varying skin thickness to affect a “crash tub” that will retain shape in the event of an uncontrolled adverse impact. In the humble little Coyote ultralight, there is a network of aluminum tubes that also retain cabin shape. In the Coyote II , Raven and Courier we use welded steel tubing cages that surround you with protection. This is a proven system that not only provides safety, but building ease. Going the extra mile to build in safety may not impress everyone, but in the end it does benefit all.

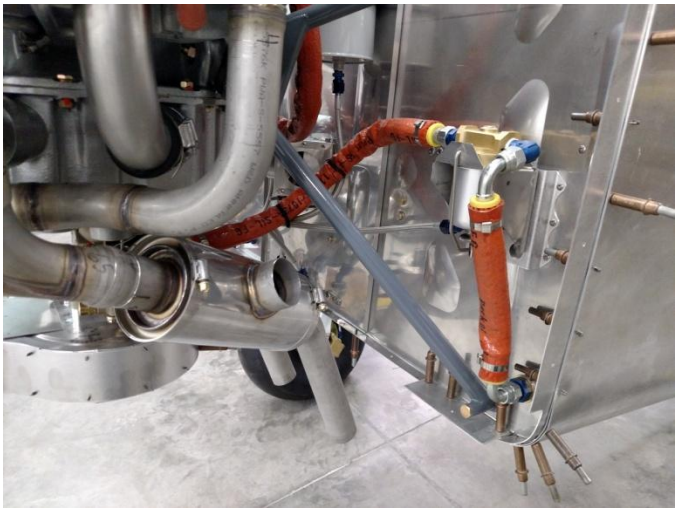
Heavy Duty Landing Gear

The landing gear on the Outbound appear to be the same as the Raven, but closer inspection will reveal a thickness difference. A boost in thickness from .875” to 1” increases the leg strength to handle the 1800lb gross.

Titan 340 Engine Install

We are building a Raven with the Titan 340 engine. This install directly transfers to the S-21 Outbound, part for part. We should have this plane flying before Sun And Fun, and if test time is flown off, it will be there.





Next Up Wing Assembly and Test Flight

We are completing the last bits of parts and tooling for the production wings. One set will be flight tested and another wing will be static load tested, to final check the system and know the extent of our structural margins. I look forward to reporting on the flying properties of the new wing. We plan on shipping wing kits as soon as flight tests are completed. The time frame for this is in March to April. ***Maybe*** we will fly a Raven with Outbound wings to Sun and Fun, but please do not hold us to that promise. Thanks for tuning in, until next time stay safe, have fun and enjoy the flight! More to follow RJS