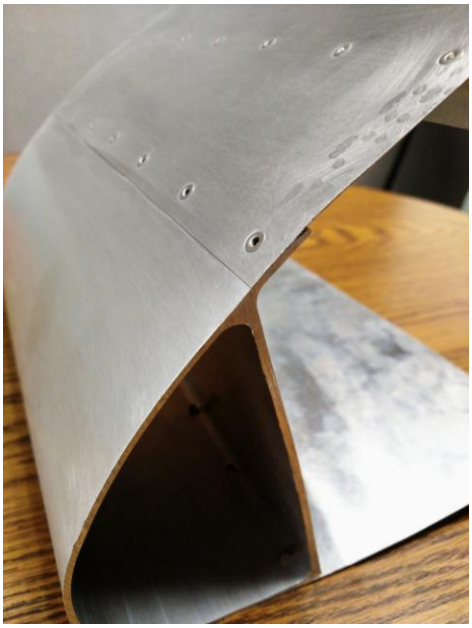
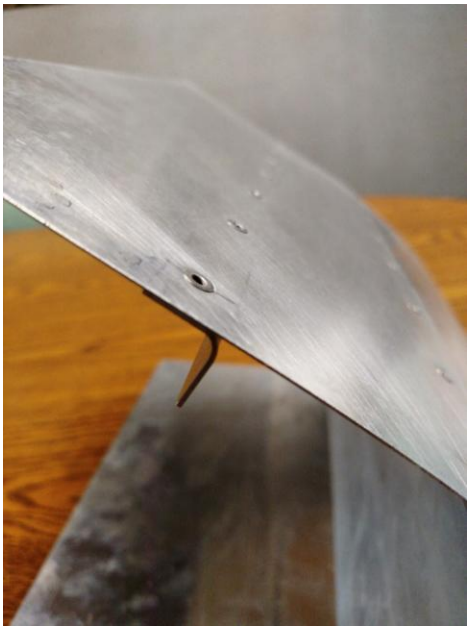
S-21 Outbound Progress Report 10-14-16

Wing Skins and Flush Rivets

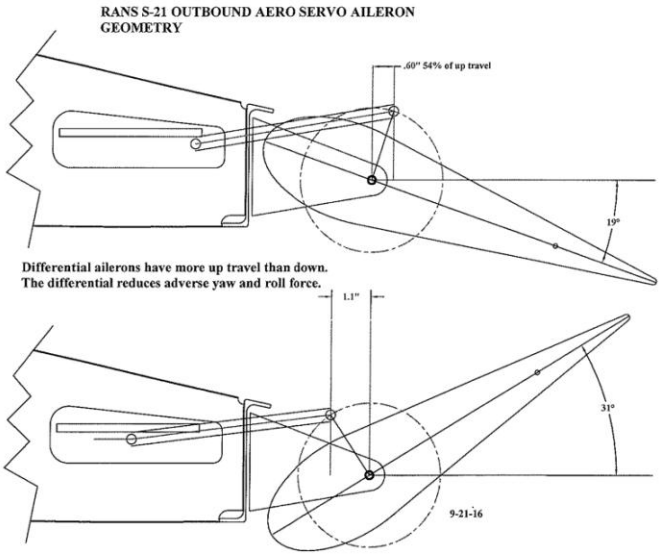
The D spar has a joggle where the top and bottom of the one piece skins lap over the spar. This first row of span-wise rivets need to be flush, since this is in a critical flow zone. Solid flush rivets are preferred, but we are testing blind flush rivets. The bottom skin will be attached using blind flush rivets. The option is possible for the entire wing to be flush. To dimple the wing skins and ribs adds a few hours, but some feel the need for the potential speed, and we are happy to try and make a pathway for this to happen.





Aero Servo Ailerons

I am a big fan of light roll force. To insure the Outbound handles in a way pilots will truly enjoy, we have decided to swap out the Friese style ailerons for aero-servo. The benefits are many; lighter roll forces, less weight required to balance, less drag, (since it omits the outrigger hinges) and they have the same reduction in adverse yaw.



Wing Final Design

After the static load test, further optimization was possible. We increased the rib count, and added stringers, which will be special extrusions cut to length and drilled to match the skins with final holes size.

Inside the wing at the strut station will be a welded steel cro-moly truss. This ties the two spars into the load path to the single strut. We will show you this truss and how it integrates into the wing, along with static test data. Since this truss is a critical element it will arrive powder coated and ready to bolt into place. Inspection panels will be located so the truss can be inspected during condition inspection. There was some concern about dissimilar corrosion. Between the spar and truss is a bearing plate of aluminum, then a shim of .020" Lexan. The Lexan provides a non-conductive barrier between the two metals. We have used this with great success on every S-12, and S-12XL Airaile to protect the boom from the steel collar that wraps around the boom.

We hope to integrate into the strut truss the mounting for the aileron bell crank. This will speed assembly, reduce weight, and part count.

Fuselage Progress

We are doing final fit-up of the fly-on fuselage. This aspect of the project is testing the skin fit and method used to cover the welded cage. The front section is directly borrowed from the S-20 project but, from the boot cowling aft is all new. To attach the side and belly skins aft of the front section we have a network of small tabs that key in the skins. The skins are made to shape with most all the holes, except where the tabs are welded to the cage. The builder will transfer drill into the skin once positioned on the welded cage. This method assures an accurate fit. Capping strips that wrap around the cage tubes at the bottom of the door opening finish off the assembly.

Thanks for stopping by, stay tuned, more to follow! RJS