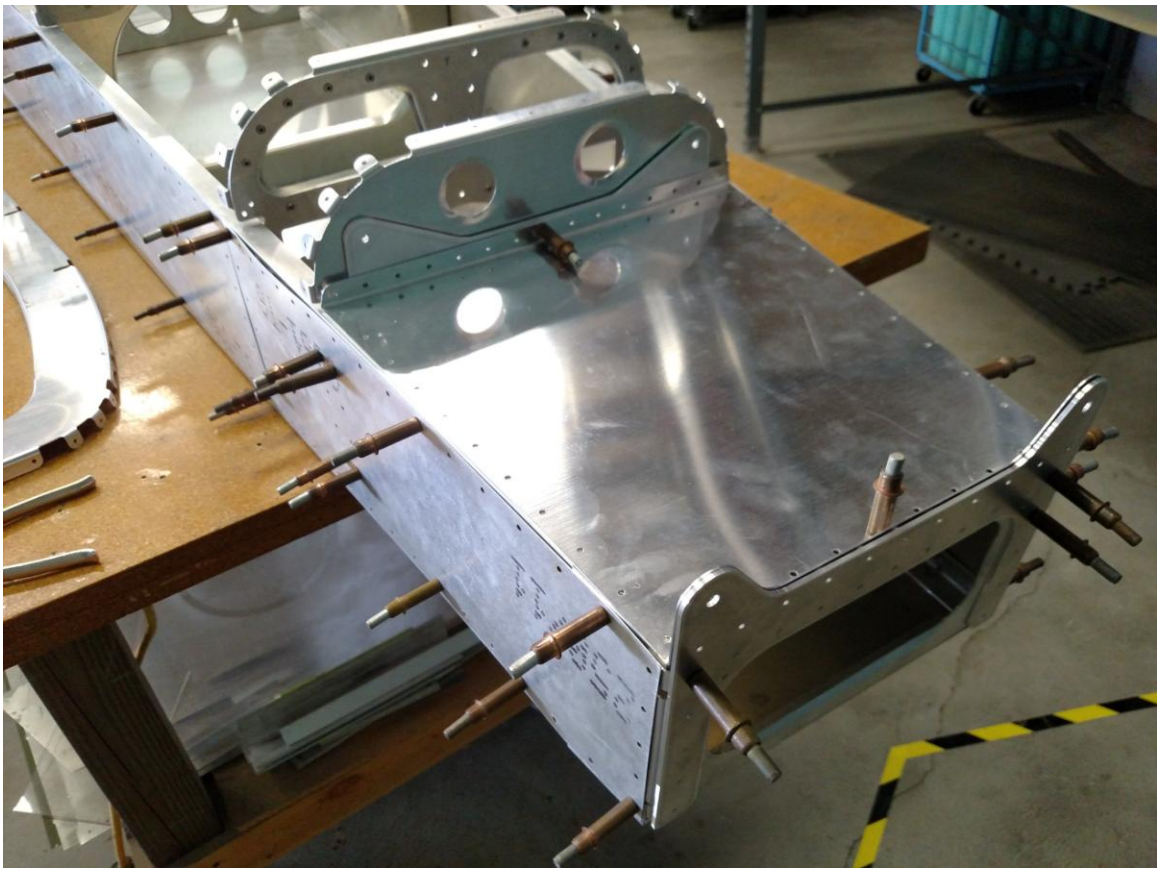
Progress Report 9-2-16

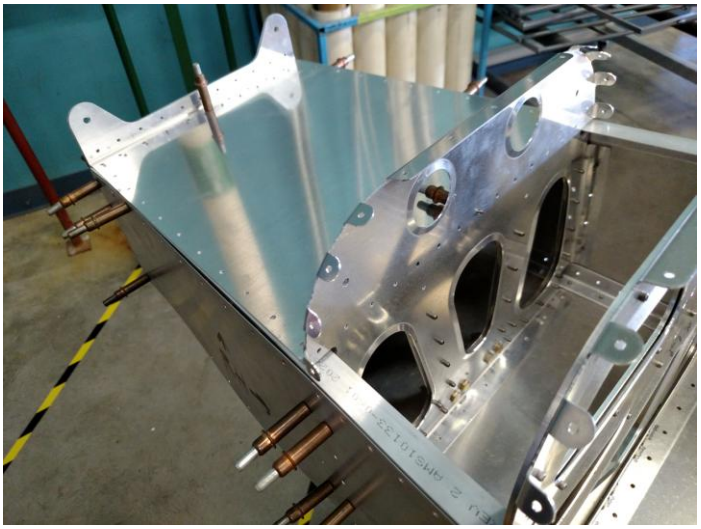
Horizontal Stabilizer

Horizontal Stabilizer rib tooling built and tested: Test runs of ribs produced spot-on parts. The drive to make things fit with final hole size and no de-burring presents an extra touch. The pay-off is reduced build time and a more accurate airframe. The builder will have to take out some "banana" in the longer ribs, which is only a few tweaks with the fluting pliers. This is however, a good thing, since it scores a positive in the 51% column for the builder. If you look close at the ribs, we locate the holes in the flange close to the bend. This reduces the chance of the skin and rib flange not being tight against each other. This is especially important when attaching the last skin panel, when there is no way to push up the flange against the skin.



Tailcone

Parts are continuing to be produced for the tail cone assembly, final version will enter static testing once wing testing is concluded.



The panel between station 8 and 9 creates a torsion stable “notch” to allow the install of the one-piece horizontal stabilizer. A small aluminum fairing will most likely close out the top, but the stabilizer is fully skinned from tip to tip.

Wing Static Testing

Although the wing tested is not 100% representative of what will fly on the S-21, it proved the spars, fittings, and ribs are up for the task. Loaded to 6g’s, which is ultimate for normal category (we are going for 6+4-, which means ultimate will be 9+ 6-), there was some deformation and skin buckling. Nothing unusual or unexpected. The test specimen did not have span wise stringers, and other features that will be incorporated into the final design. The value of testing an under spec wing gives real world data on where to beef up structure without adding excessive weight.

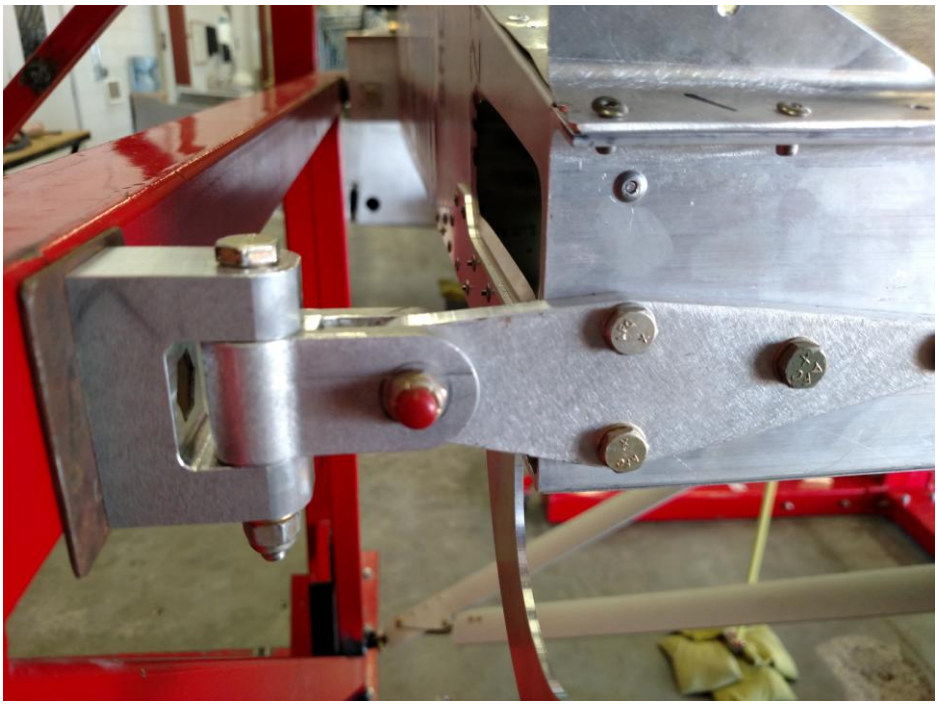
It has also provided us enough data to confirm some concepts for all metal wing options for current models that could be weight competitive with existing wings. The potential of the DZ wing is very exciting. The dual spar design has some very nice advantages, entry door design, tank location, less or no trim change on fuel burn off.

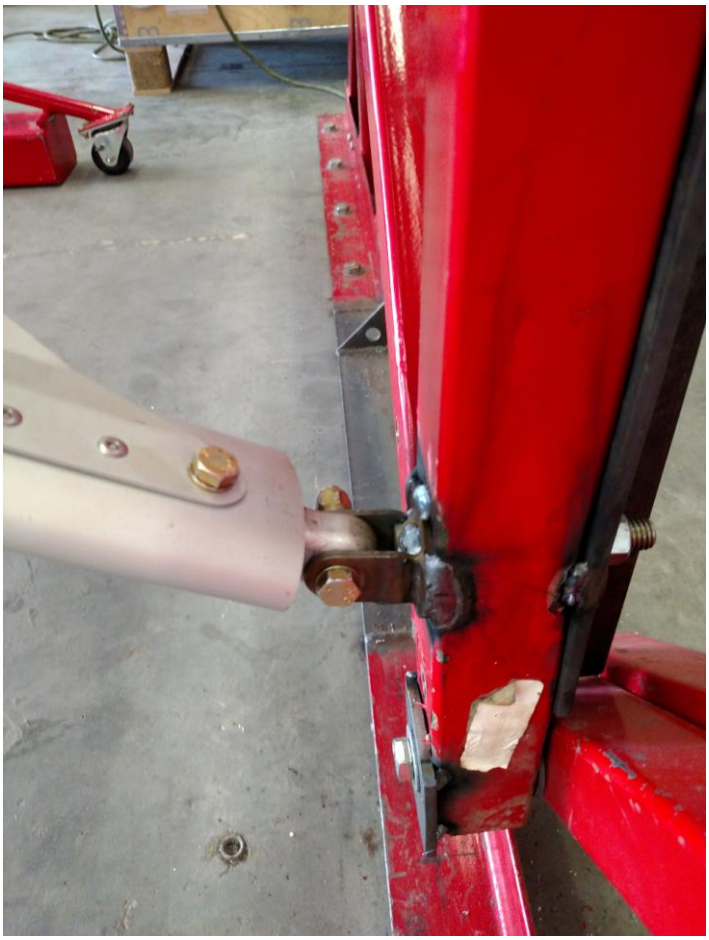
The fly-on wing design will be loaded into the testing equipment by mid October, expect a full report to follow.

Rear strut attach showed slight deformation at 6 g’s, the single strut version will void this load path, and if a two strut version happens, a compression strut will fix the issue.

The bottom of wing remains smooth after many loadings to 5 and up to 6 g's. Buckling at strut fitting locations appears after limit load, and is no factor on final versions.

A stronger rear spar fitting is required for the higher gross. This CNC fitting has ample safety factor.





Twice we had to stop testing to due fixture deflection. Testing will resume with final version of the wing and a much beefed up fixture.

Check out the Video on Facebook

In this video you see a sample wing being load tested to 6 g's, which it made in flying colors, with the exception of some minor easy to remedy issues. We kept getting large deflections, and the source was not the wing, but the test rig kept bending. We stopped testing twice to shore up the rig. In the video you hear reference to reading the deflections. Deflections are the early tell tale sign of a components ultimate success. The DZ wing spars are proving consistent with the FEA predictions. This wing is showing very minimal defection at 6 g's which is great, since we hope to move ultimate up to 9 positive.

Thanks for tuning it for the latest on the Outbound. Look for the next posting in 3 weeks. RJS