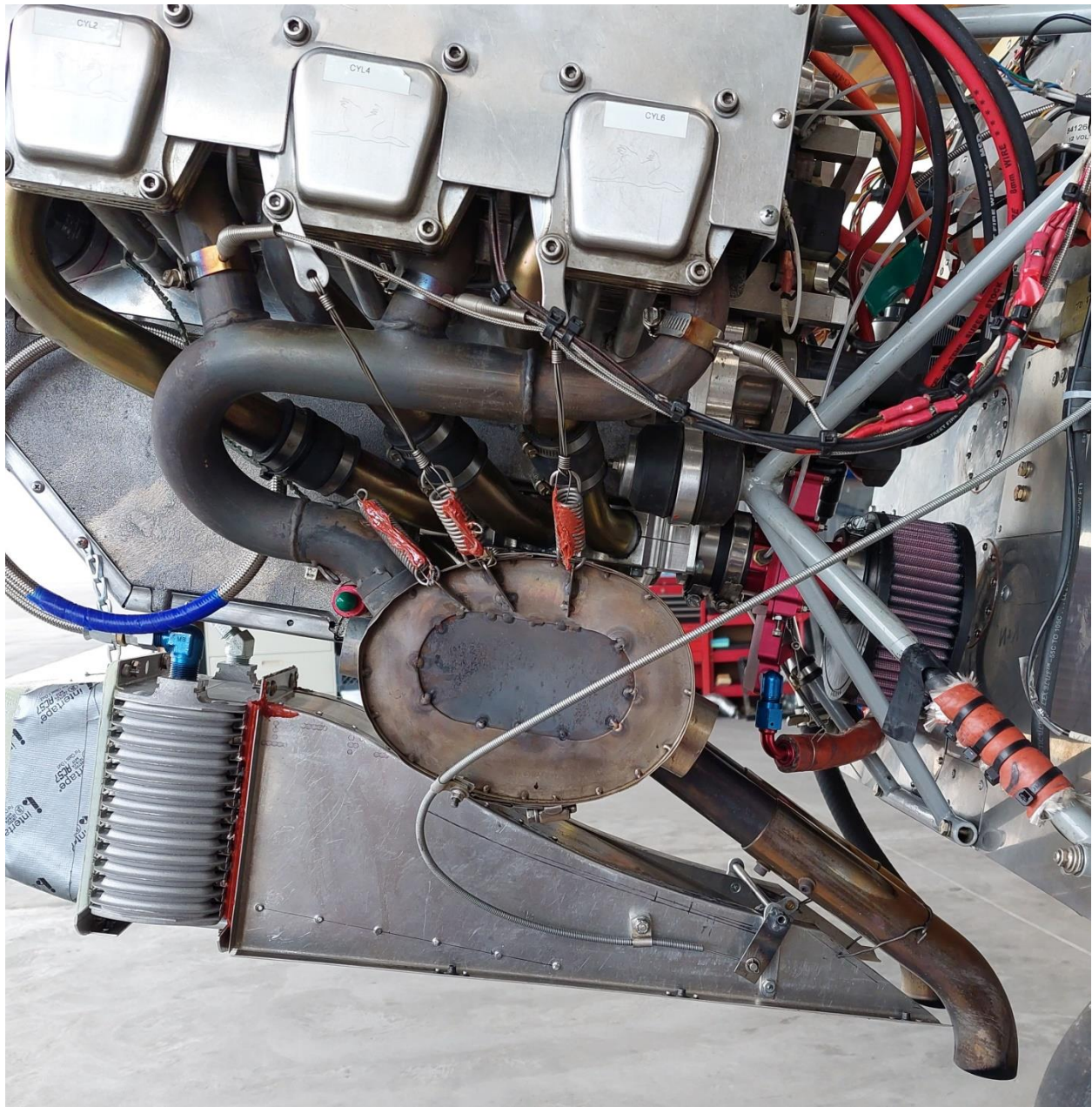
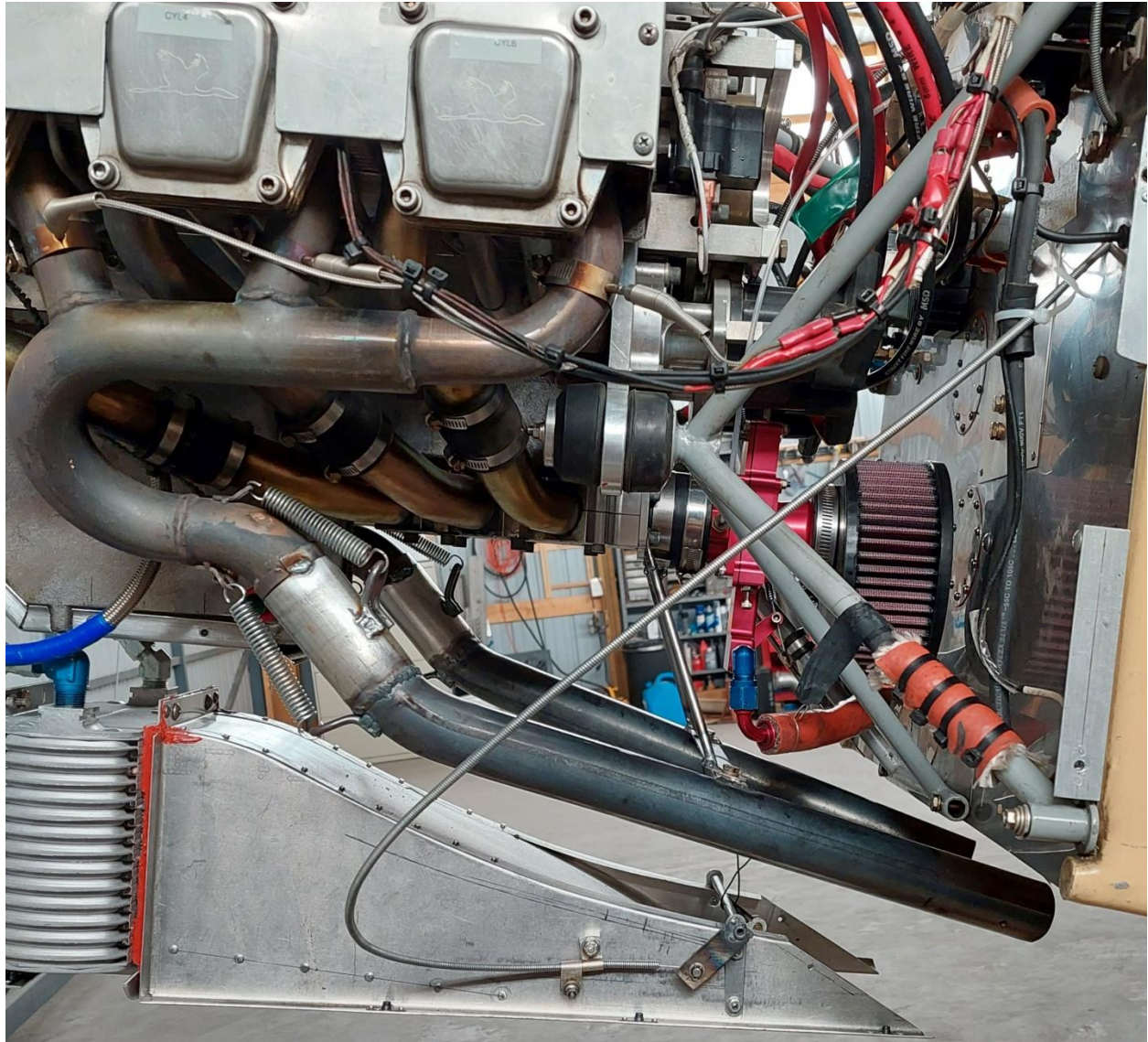


RANS S7/JABIRU 3300 EXHAUST SYSTEM PROJECT

My Rans S7 has an early First Generation Jabiru 3300 engine installed. The early Jabiru engines were plagued by overheating problems and my airplane had serious overheating problems when I bought it. I have made a number of improvements to the engine installation to keep temperatures under control. I have replaced the oil cooler, reworked the intake system and improved the cooling baffles. One major improvement was to remove the muffler and replace it with tailpipes. The original exhaust is pictured below. Each side of the engine emptied into a log manifold and then into a muffler.



I removed the muffler last spring and replaced it with tailpipes as shown below. EGT spreads with the muffler were about 250 degrees in warm weather and removing the muffler reduced EGT spreads to about 150 degrees in warm weather. The muffler didn't actually muffle very well so it was no loss. Replacing the muffler with tailpipes also reduced weight by almost 6 lbs.

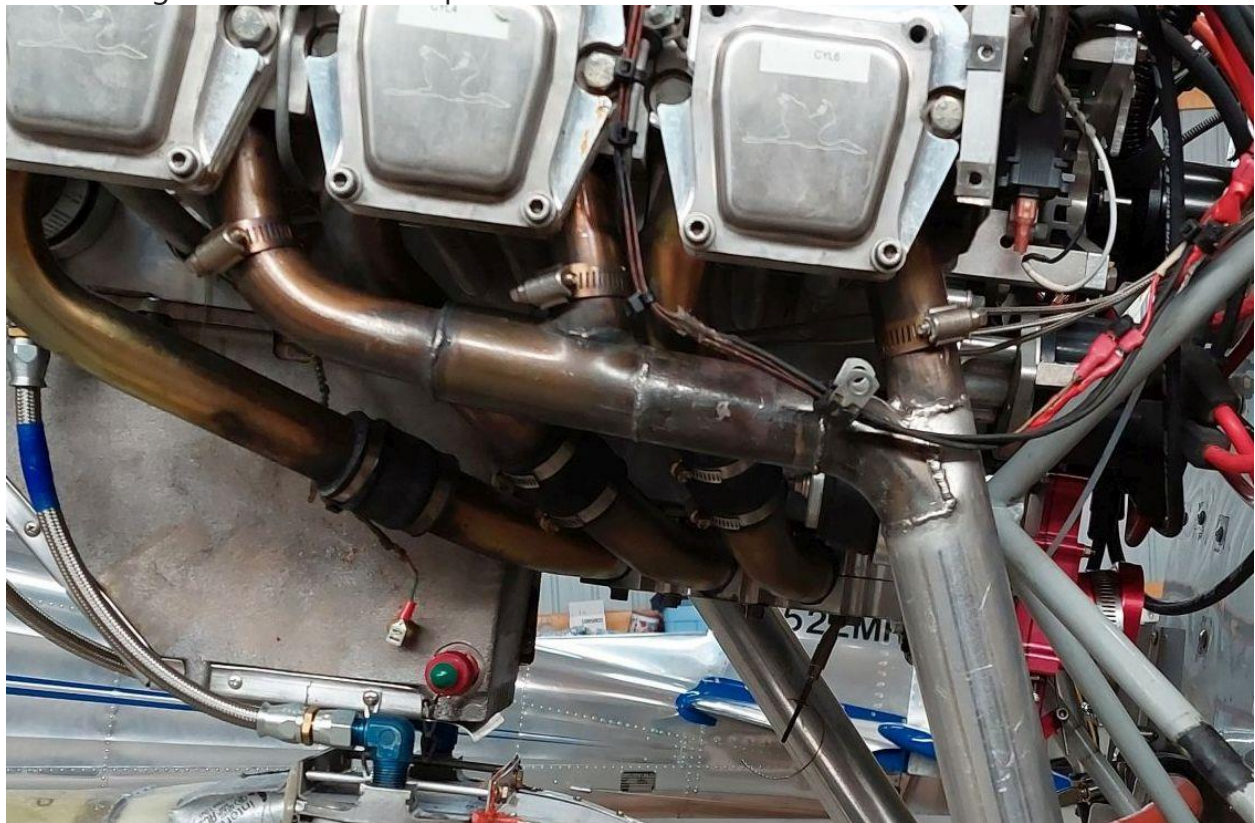


The engine ran fairly well through the summer. However in cold winter temperatures EGT spreads increased to 260F at high power setting. Fuel vaporization suffers in cold weather which leads to poor mixture distribution and the wide spread in EGT's. The Jabiru engines have strict EGT limits of 1328 degrees. Keeping the mixture rich enough to keep the hot cylinders to 1328 degrees led to misfires in the cold cylinders because of the too rich mixture in the cold cylinders. I felt that the exhaust system was still part of

the problem. The exhaust flow first running forward and then through a U-bend and then through a dogleg had to increase backpressure. Also the pipes from the front cylinders entered the manifold at a right angle into the U-bend. It just couldn't flow very well.

When we had a stretch of snow and cold in the forecast I decided to rework the exhaust system. I had been thinking of building a set of tuned headers. However, headers would add weight and keep more heat in the engine compartment. Several other factors discouraged me. It would be a long complex project, I have never welded stainless steel before, and I didn't know the geometry of the exhaust ports. Reworking the existing system would be a smaller project and I would get welding practice with stainless steel and learn what the port geometry is. So I cut the old system into pieces and welded it back together into a simpler system.

I first cut the pipes from the front cylinders off the manifolds and put them on the back cylinders. Then I swapped the second and third cylinder's manifolds from side to side. That way all the pipes are angled toward the back. Then I filled in the gaps with cut off pieces and added a tailpipe. The primary tubes are 1-1/4". The manifold is 1-1/2" and I used a 1-3/4" tailpipe. This change further reduced the weight of the exhaust system for a total weight loss of 9 lbs compared to the mufflers.





So was it worth it? I have flown 5.7 hours since the change, in temperatures from -10C to 9C. Before the change, I avoided flying in temps much below 0 because the engine ran so poorly. It now runs fine at -10C. EGT spread in cold temperatures decreases by about 70F. I am now able to run the engine leaner and it also looks like my fuel consumption is lower. It turned out to be a lot work and it took about 3 times longer than I expected but it paid off.