Mattituck TMX540

My Mattituck Red Gold TMX540 engine finally arrived May of '06. WOW, what a beauty. Everything I expected and then some. The crate was shipped Yellow Freight, and the whole thing weighed in at 569 pounds. The wooden crate was substantial, and the packing was top notch. I opted to go get the crate at the Yellow Freight Terminal in my pickup. It was easier for me to work with at my home that way.

After tearing down the crate, I found that all I had to do was remove two lag bolts, and the entire top of the crate came off the palate. Oh well, live and learn. I would have had to take the box apart anyway because I was working by myself and would never have been able to lift the 5 sides of plywood and framing.

I had wondered how they would mount the engine in the crate. There are custom steel feet that are bolted to the engine and the crate. Very nice. looking over the engine, it sure is a beauty. And it's amazing how complete it is! Now to get it on the hoist and get it inside before it rains. A little tricky to do since I have to take it though my walk through gate, along my winding walkway, and into my basement.

Out comes my Harbor Freight cherry picker (collapsible hydraulic engine hoist). I used 2 ratchet straps (there are TWO engine loops!) and left the palate bolted to the engine. I then SLOWLY attached the hoist and lifted the engine off the truck. The palate served to help keep the engine from swinging, or bumping into anything. I rolled the hoist back and scooted through my gate, then lowered the engine to just above the cantilever legs. It took me quite a while to get into my basement, but it wasn't too tough a job, even by myself.


MAY 16 2006

Engine Mount

I picked up my engine mount directly from the fabricator in Indianapolis. This was a mistake, as I'll explain later.

As soon as I got it home, I cleaned it up and primed it.

My buddy Bruce Dallman (RV6 builder) and I had to run some errands in Indy. It was a good excuse to pick up the engine mount. I offered to Mark at Team Rocket just to pick my mount up, and save him a little shipping expense since I'm over there often enough.

The mount appears to be well constructed, but is essentially raw steel. I had to do some considerable scotch brighting to get the thing cleaned up and ready to prime. I used a retail self etching primer for a base coat and I'll use 1500 degree high heat tolerant paint for the top coat. Still haven't decided on a color. It will probably be white. I know, I know, I'm just asking for trouble with white. But at least problems should be easier to spot with a light color more so than a dark one. Well, it can always be changed later.

I probably won't have an engine until next year. Attaching the motor mount to the airframe should happen much sooner than that. As I am still waiting on updates of the plans for the EVO changes, I have to keep busy. So I'll probably mount the mount, and also work towards attaching the main gear and legs.

I GOT "REAMED" :-)

Mark Frederick sent me the gear leg reamer. I bought some cutting oil (Oatley, readily available) and used a 1 inch open end wrench to turn the bit. Instructions from Mark say to just get the nut to engage all the threads on the titanium gear leg at 10 pounds of torque to establish the proper depth of reaming the gear leg receptacles on the engine mount. After reaming for about 2 hours, and only getting one leg most of the way done, and the other about half, I ran out of gas. I will not offer to get parts on my own anymore. The engine mount is supposed to come with the kit, and already reamed.

Well, I reamed myself on this one! I volunteered to take the time to pick the mount up at the engine mount builder in Indianapolis. And the gear leg support tube reaming is kinda hard work. Albeit brainless, it was not fun.

This is as far as the nut goes on the leg after another hour of reaming with Oatley cutting oil and a "breaker bar". I ruined a ratchet doing this little chore. I was really leaning on the reamer, and it was moaning all the way around. It felt like I was really biting into the metal. But this process is much slower, and a lot more work than I ever care to try again. My recommendation: get your EM from Mark and make sure HE reams it for you!

One of my pre-Oshkosh chores was to finish reaming the engine mount. Mark F. advised that the threads needed to be totally engaged on the nut, and he wanted the reamer back at OSH. So I tried again to get the thing finished. I worked on it for about 45 minutes. I finally figured out that I was using too much cutting oil. I spun the reamer around with light force until it started to feel dry. Then I really leaned on it and it started biting in. At that point, it only took about 20 minutes to get the thing to go down in the tube about 1/8 inch, which was all it needed. After that, I was able to complete the other side in about another 20 minutes.

For those of you who will not have to ream your mounts, be thankful. The Team Rocket policy is that you get your "Indy" mount already reamed. Don't be a schmuck like me and get it without being reamed. It was not fun.

I haven't had an aerobic workout like that in years! I got no instructions how to use a reamer, just what the results should be. I was drenched with sweat and my hands still hurt. Not a good thing for a

dentist. Anyway, the trick was that I cleaned everything out, put cutting oil on the tip of my index finger and ran it down one spline on the reamer. That was even too much oil to let the reamer bite in, so I had to spin it a bunch to spread and thin it out (I guess). Once it started biting, you really had to use some muscle to pull the wrench around.

Now that THAT is over, it's time to go to AirVenture 2004!

NOTE: about painting the EM. I used a 1500 degree heat tolerant paint originally. It was a waste of time and money. Now I'm going to have to strip it off. The paint is very soft, not durable at all. Not that it's going to get banged around under the cowl much, but it's VERY easy to scratch off this stuff. I'm going to have to strip it. Then I'll either have it powder coated or used some kind of epoxy. I don't think heat is as much an issue as protection from bumps and scratches while working under the cowl. I ended up painting it with PPG Concept.

Mount The Mount

Here it is October '04 and I'm just getting back to the engine mount. I've decided it's time to get the airframe on the gear.

First of all, I noticed that the engine mount holes in the firewall are pre-drilled to position. That's cool!

Now that my engine mount (EM) has been reamed, it's ready to hang. I haven't put the gear legs on and trued up the wheel mounts or anything. I wanted the mount to be ready to bolt on the firewall first. That way I'm not fussing with the leg's weight and bulkiness when I hang it.

I found 3 firewall holes line up perfectly with the engine mount, but one was offset. The hole was located completely within the engine mount hole (looking through the tube on the mount at the firewall), but at the very outer wall of the bolt hole though the mount "foot" or "pad". That entire tube does look to be off just a wee bit. The foot does not sit flush on the firewall. All I can figure is that it was jigged wrong. Perhaps the firewall was not drilled properly. I really don't know. I do know that there is a slight mismatch of the mount to the firewall.

I didn't HAVE to fix the Engine Mount. It's just that three holes are perfect and one hole is off. I got to thinking a bit more about this problem. I wasn't sure if I hadn't drilled the two top holes up in size and screwed up the position. I removed the mount from the firewall and got out my tape measure. I confirmed that the engine mounts where the rubber parts sit behind the engine appear to be spot on. Then I flipped the mount over and checked the pads at the end of the 3/8 inch FW bolt tubes. Sure enough, it isn't square and the corner in question appears to be out of whack. Well, I feel better knowing the mount is off, not my hole drilling.

The next step is to crank down the bolts in the upper holes and see if it makes a difference on the bolt tube position in reference to the pre-punched FW hole. If I'm lucky, cranking the mount down will improve the hole position. After trying two bolts, I'll go ahead and finish drilling the lower right hole and bolt that down and check it all again. We've come to the conclusion that if the hole is within the 3/8 inch bolt tube diameter, we are just going to punch it and start a new hole. As long as we can incorporate the pre-punched (or pre-drilled) hole completely, there is enough "meat" in the FW and supports to proceed. Fortunately the engineers allowed for some variance in Engine Mounts.

The factory hole in the FW for the lower left engine mount was at the very outside edge of the 3/8 inch engine mount tube hole. It could not be punched. I went ahead and drilled it anyway, and the original hole was all but ablated. Just a hint of the little factory hole remains at the outer edge of the

new 3/8 hole through the firewall. The discrepancy isn't enough to be concerned about, let alone try to repair. I was told that I could take up the slack in the mount hole with J.B. Weld. Had the discrepancy been greater, I would have done this. As it was, I didn't need to do anything. Big sigh of relief!

Four hardware bolts have been used at this point to trial fit the engine mount. Once the gear legs are finalized and the engine mount is repainted or powder coated, I'll use the Team Rocket provided AN hardware to attach the mount to the firewall. I'm not using the good stuff until I "permanently" mount the mount.After having knocked the engine mount around a bunch, I realize that the high heat paint I used to cover it was a waste of time and money. That stuff is not very resistant to chipping and scratching, and even worse when it comes to solvents. All the paint is coming off and I'm either going to have it powder coated or I'm painting it with a hardened polyurethane. Dangit!

Another boner was painting the gear leg "feet" with Rustoleum rattlebombs. I thought it would be good enough, but it isn't. That stuff is just not tough enough or solvent resistant, so they are going to get stripped and painted with the PPG Concept that I purchased for the interior. That coating should be durable enough for use anywhere on the airplane. I've come to learn that everything that I topcoated is going to be stripped or heavily sanded and repainted with the right stuff. I was hoping to keep the carcinogens down to a minimum, but alas, it was not to be. Airplanes have a pretty rough service life, so I need coatings that are very durable. I've used the Concept before and it's pretty good stuff. That catalyzed urethane is very tough!

Rubber Engine Mounts

The Team Rocket F1 specifies a Barry mount, #94011-02 for vibration isolation between the engine and the mount. These rubbers have a lip for a 2 inch diameter "ear hole", and I believe that the overall diameter is 3 inches.

My Mattituck TMX540 engine actually came with smaller (incorrect) ears, and has 1 3/8 opening hole for the mounts, so the set I ordered above will not fit. Well, Mark Fredericks (and other builders) confirmed that the mounting angle of the smaller ears is wrong, and the ears have to be the specific ears for a C4B5 with the larger isolators. I've emailed Mattituck about the problem, and hope to get the correct ears back so I can mount the engine soon.

In preparation for getting the proper parts, I started to remove the ears from the rear of the engine. Pretty easy stuff... until you get to the sump side of the lower ears. Those 9/16 nuts are just nestled away in there where it's nearly impossible to get to with a standard socket or open end wrench. I think I'm going to need to buy a set of crow foot wrenches just to get on those 4 nuts. I'm waiting for the good word from those who know better before I proceed.

I bought my Barry isolators from AirSuppliers.com. They were $267 for all four in 2004, shipped to my door. That's a pretty good price. You can also get Lord mounts: #J-9613-53. I don't think there's a qualitative difference, but there sure is a cost difference. Expect to spend about $25 - 50 more for each mount!

Coating the Mount... Again

Getting the engine mount powder coated ended up becoming a bit of a PITA, so I decided to go ahead and finish it with the PPG Concept that I'm using on other interior and exterior parts. So light gray it is. The paint isn't perfect by any means, but it's a helluva lot better than that hi heat crap I had on there originally. Perhaps not as durable as powder coat, but more repairable? We'll see.

As soon as I get the crowfoot wrench from SnapOn, I'll get the gear legs on and torqued up. So far, the local SnapOn driver/salesman has dissed me two weeks in a row. One more chance, then I'll order it online or go somewhere else. I would have already ordered it online, but the price is the same as the local driver's and online charges you $9 shipping and handling. I thought I was going to save a few bucks, but now all I've done is wasted 3 weeks. Now that the mount is painted and ready to install, time is of the essence!

The Engine Decision

I was originally going to get a high performance Lycoming engine for my Rocket. I deposited an engine builder a substantial amount of money, and waited. And waited. After waiting months and months past the agreed finish date, I finally gave up and requested my money back. It makes it VERY hard to get enthused about building with so much disappointment.

When I finally decided to change to a different engine source, I was compelled to go with something more along the lines of a "gold standard", as well as an engine made from completely new parts. I didn't want to putz around with Joe Blow make you promises they won't keep fly by night part time used parts engine builder. What I decided to do was go with was a Mattituck TMX-IO540. I put a deposit (only $1K) on a Mattituck TMX IO-540 experimental engine. The engine and all of it's components will be new, factory Lycoming parts, with new optional components. I opted for dual electronic LSE Plasma III ignition and the RED GOLD option which flow matches, balances, dyno testing, and gives you an extended warranty. I also opted for higher compression piston, an alternator and Airflow Performance fuel injection and boost pump.

The TMX engine is essentially stock. This isn't going to make it a barn burner, but the engine should have at least all the "rated" performance it's supposed to have. And with the RED GOLD option, it should be as smooth as silk and potentially last a very long time. Dual Plasma III ignition should help keep it running smooth and efficiently as well.

Mattituck was having a hard time getting parts. I was the 10th TMX ordered after OSH 2005. When I emailed Mattituck to inquire, they told me that they had the parts for the first 8, and that those engines were starting to be built. Finally, I heard that all of my parts were in stock, and that I was on the production calendar in March '06.

Finally, at the end of March, '06 I got a call from Michael at Mattituck telling me the engine is ready to ship. WOOOHOO!!! Only 15 months since I first committed to buy an engine, I finally am going to get one! Now all I have to do is get the cash. Since the first builder **stiffed me**, I have to dig deep to pay the balance on this baby. Time to pony up and get that engine on the mount!

On The Gear - at least for now...

March '05 I was finally getting the engine mount remounted. I borrowed a 3.25 inch jobber bit to drill the 3/8 bolt hole in the middle locations of the engine mount. That went very well. Like the plans say, you take a small head drill (I borrowed a right angle cordless) and chuck onto the bit with it in the mount hole. Zip zip, went that quick.

The reason I started jumping on this remount was that I was told by my first engine builder that my engine was going to be done early. I suspect he told me this just to get me to pay the second third of the money for the engine, because it turned out that after waiting 8 additional months, the engine

never materialized. It was a year later before I got an engine from a second vendor.

I beat all the bad weather and rolled my 2 ton folding hoist ("cherry picker") into my basement. I started putting the bolts supplied with the kit into the mount, and I cannot for the life of me figure out how they go. No, the plans don't say. No torque values, either, although they have cotter pinned castle nuts. At any rate, I figured the longest bolt goes in the bottom and the shortest at the top. I tried several different combinations and that's the only one that comes close. Problem is that the bolts are too long in 4 of the 6 locations. Only the top bolts are spot on. I already have washers behind the castle nuts on those 4 bolts and I ran out of threads. So I've emailed Mark to ask what the ^*(% is going on. I think I'll need at least 3 washers on each one, and I don't think that's kosher.

The mount is tight, so I figured I might as well see what an F1 looks like on the gear in my basement. Well, it looks sort of like a giraffe. Or something WAY too tall to be in my 7 foot ceiling basement. The plane is taller than me...not that *that's* saying much. The plane at this point is 80 inches width outside the rubber and 80 inches or so tall. Hokey Smokes! I need a step ladder to get in!

I nutted up the gear legs just for funsies. I'm going to have to take them out, lower the fuse and take off the mount. Or at least take the load off the mount to change the bolts, or add more washers. Here I was getting all excited about being "On The Gear", and then fight this bolt length problem. It's frustrating and disappointing, to say the least.

Ok, I took the improper length bolts out one at a time. I added two washers (total 3 each bolt) and finally got results. Not good results, just results. One pair is still too long. The other pair of bolts are just right. Well, ACS knows me well. I placed an online order for replacement bolts (and lots of other

"stuff"). Cad plated AN6 bolts with drilled shanks. New size: 3 inch for the middle of the mount (at the footwell) and 3.5 inches for the bottom corners of the mounts. I went ahead and ordered the next size larger with both bolts, just to be sure the size wasn't somewhere in between.

Now the mount is on and the bolts are cranked down. I can hang the engine and start installing the cowl, baffling and FWF. The cowl fixture is on it's way and I should have the engine core hung just in time to use it with the cowl. Lots to do yet, but it's starting to look like an airplane!

The cowl is stuck on with duct tape. It stays put pretty well that way. But I have it on without bottom support just for this photo op.

The new bolts and some other things from ACS are supposed to be delivered to my office today. In the mean time, had ordered some hardened steel flat washers that were 1/8 thick. I left one standard AN washer under the head of each of the 4 too long bolts in the engine mount, and removed the two AN flat washers from under the nut. I replaced them with the hardened steel thick washers and got results. Not good results, just results. I'll be glad when the new bolts are here. I could get away with the way it's set up now, but I want that mount to be tight and right.

Footwell Area Mount Gap

EDIT: Even though there MAY be a gap between the footwell of the stainless firewall and the two inner mounting pads of the engine mount, you can't really shim the gap unless you change the hardware and get two longer engine mount bolts. I originally installed stainless fender washers inbetween the mount and the firewall footwell. In the end, I removed the two washers and just pulled the firewall to the engine mount pads with the TR provided bolts and castle nuts.

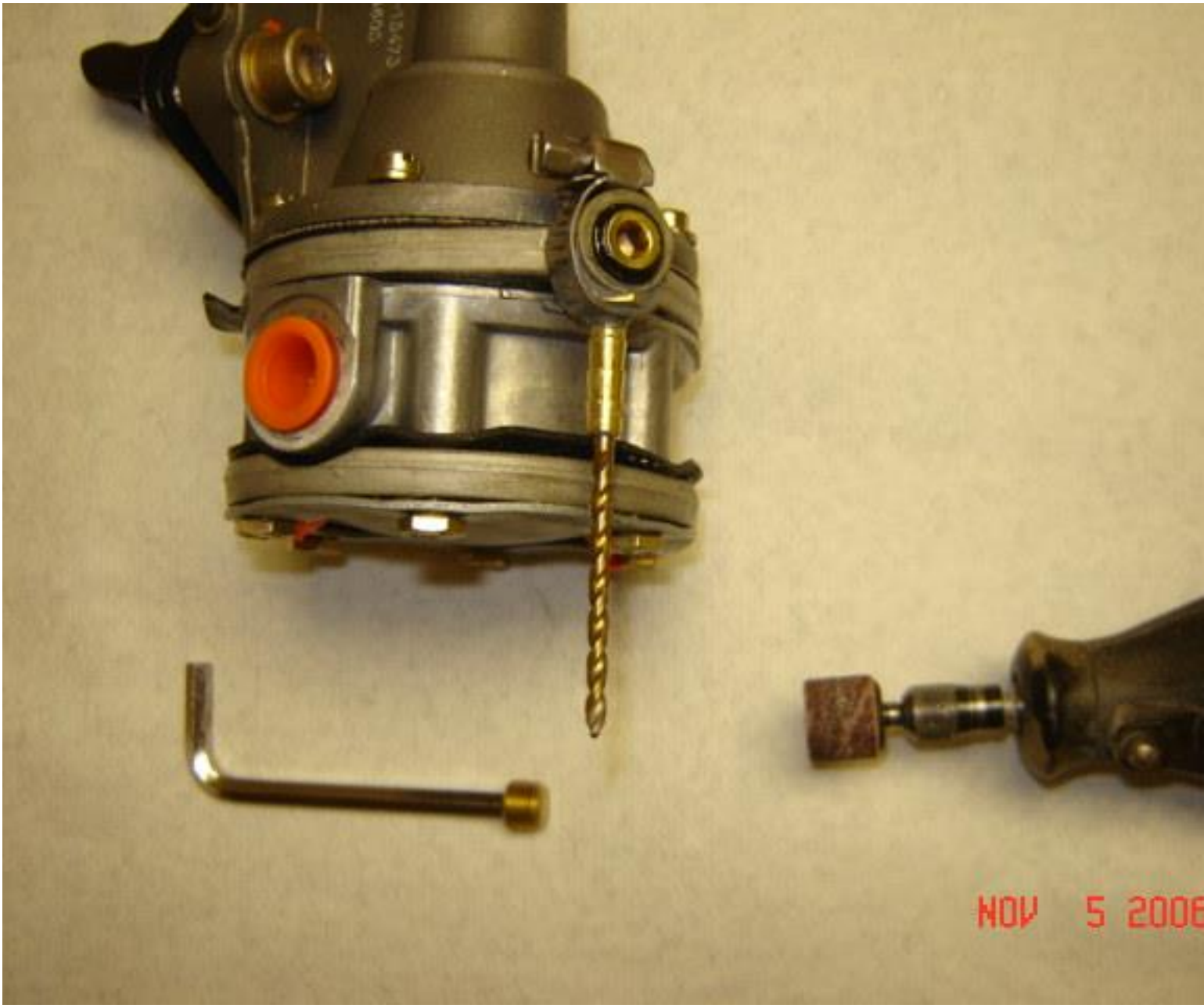
Fuel Pump Mod

Note: Tom Martin suggests instead of a hose barb: drill longways through the center of a bolt, cut off the head and tap it into the bottom of the drain port. He said Locktite was all you needed to seal it in.

Now, we got trouble, right here in River City.... I was worried about clearing the motor mount (oil filter), but hadn't thought about firewall clearance. Once the engine was set to position, I noted that the mechanical fuel pump was VERY close to the firewall footwell. There is a plastic cap covering a port on the pump right at the footwell.

Word from Mark is that the mechanical pump configuration is a common rocket problem. One solution recommended is to plug the hole, and tap the bottom of the barrel, then JB Weld on a drain hose from the bottom. If there wasn't another port 180 degrees from the orange capped port, you could perhaps just rotate the bottom of the pump by one screw hole to solve the problem. Tapping the capped port may be the way to go, but I emailed Don Riviera at Airflow Performance to see if there is a different configuration available for the lower of the pump. There isn't, but there is a complicated way to disassemble the pump and rotate the drain out of the way. Not for me...

I read how Vince Frazier and Tom Martin modified their fuel pumps and figured I was good to go using their brass hose barb technique. Regrettably, I couldn't find a small enough barbed fitting to suit me. The one in the pic on Vince's site looks WAY smaller than anything I could find. So I had to figure out a different way to do it. It's not pretty, but should be effective.



Note: In the pic at the left the hose clamp is oriented poorly. The screw needs to be on the outboard side of the port.

I bought a 1/8 x 1/4 brass (I think) hose barb and an "inny" 1/4 inch plug. I bought other parts, too, but these are the ones I ended up using!

The threads of the hose barb fitting were too big for the job. I *really* wanted to tap and thread a barb in there, but just didn't feel comfortable with the diameter being close to the size of the port. Next best thing (maybe) was to epoxy a barb on from the outside.

Turns out that the diameter of the port is precisely the same as a dremel drum. I used a dremel cut off wheel and removed about 2/3 of the threads from the barb fitting. Then I used the drum to grind it to match the curvature of the port. I dremeled the fitting all the way back into the nut (perhaps a bit TOO much?), but not into the recessed area near the barb. Well, maybe I got into it a little. But I didn't want to weaken the "neck" of the barb, so I tried to leave the thing beefy enough to hold up against the weight of the dangling hose shaking around with the engine.

The mating surface of the brass sat extremely flush with the port (with just the use of the dremmel drum!). And the mating surface of the fitting appeared at least 2 times the diameter of the ID of the barb all the way around! SWEET!!

Once I had the fitting mating nicely against the bottom side of the port, I grabbed up a small stainless worm gear hose clamp. And I drilled it large enough to accept the hose barb (from the "inside" of the clamp). Then I clamped the hose barb onto the port and positioned it carefully. I got the largest size drill bit that would insert into the barb and back drilled the port. Of course I stuffed paper inside the port to block the filings from getting into the pump. I drilled the port out enough that I could insert the butt end of the drill bit back into the barb and all the way into the port. This is a handy thing to be able to do.

Next, I grabbed a 3/16 allen key and the plug and test fit it. It screwed in easily, without resistance, all the way in to the drill bit. So I pulled out the drill bit, and drove the plug in until there WAS resistance. Then I back drilled through the barb again. Interestingly, the drill bit wasn't even half way into the face of the plug. I took the plug to the scotchbrite wheel and buffed the plug through the trench caused by

the drill bit. With the drill bit back through the barb, the plug went quite a ways in, with considerable resistance. Woohoo! Now I won't block the hole with the plug.

I carefully removed everything and cleaned out the port. I inserted new paper and prepped the surfaces of the port and the barb fitting for epoxy. I lathered up the two parts with epoxy. I set the drill bit into the barb, aligned the barb and the hose clamp onto the port and cranked down on the hose clamp. I cleaned out the excess JB Weld, but made sure that the brass fitting was adequately covered. I made sure that the port was glued to the fitting and that the fitting was glued to the clamp. I then ran the butt end of the drill bit in and out and made sure the drain was open.

Out came the paper blocking the port, and I used thread sealer and cranked the plug in until it butted against the drill bit. I removed the bit, and gave the plug about another 1/4 turn. It was snug.

Time to let the JB and the Formagasket set. Theoretically, I should be able to remove the stainless hose clamp and just let the JB take over. That ain't gonna happen, the hose clamp is staying, as ugly as it is.

Once the parts set, I ground down the Allen key plug, and I removed just a bit of the upper inboard most "corner" of the housing so that I have some firewall clearance. After I had the engine and the pump reinstalled, it turned out that you DON'T have to adjust the plug, but on my ship, I still needed to remove more of the housing from the inboard upper "corner" of the housing. There just isn't hardly any clearance, maybe 1/16th? Probably should have just taken a ball peen hammer and made more clearance on the stainless.

BTW, when I changed the hose clamp, I *really* pulled hard on the hose barb to see how sturdy it (and the JB) is. Plenty. Still, the hose clamp is in place for piece of mind.

Hanging the TMX540

******* NOTE **** : Don't hang your engine until you have modified the fuel pump drain port!!!!!***

Hanging the engine wasn't all that difficult, or time consuming. I did a little research on the internet and read a short explanation about the process on a Van's Airforce page. Wasn't all that helpful, but I got a bit of info, perhaps the most helpful was about starting to bolt the engine to the mount starting in the upper right corner.

I had to change out the ears on my 540. Mattituck made me a D4B5 instead of a C4B5. They fixed the problem and sent me new ears in less than 5 days. I mounted the ears with a 9/16 SnapOn universal joint socket (Thanks Bruce!), and hoisted the engine to position. My engine came complete, with a spin-on filter adapter and the filter safety wired to position. I chose not to cut the wire yet, so I wrapped the engine mount and the filter with heavy cloth and carefully hoisted the filter under the mount. After just clearing the upper bar of the mount, I raised the engine about half way. At that point, you have to be careful about the mechanical fuel pump and the sump clearing the hard parts. A couple strokes of the hoist, and then scoot the hoist back. Little by little, I swung (very carefully in small increments) up and back to position. I left the cloth on the filter and mount until I was finished. You don't have to go all the way back against the mount, remember you have to stick rubber isolaters in there.

The Barry mounts insert in a special way. I'm not sure the orientation of each rubber mount is all that critical, but getting the correct mount facing the proper direction is VERY important. The mounts come

with directions, and there's a copy of it in the F1 plans. I put the mounts in the proper orientation and taped them there.

I hoisted the engine by the hydraulic "cherry picker" and the two ratchet straps as close to hole alignment as I could get. I inserted the first bolt and washer through the back of the mount, through the rubber, the sleeve, the forward rubber, and the fender washer. Then another washer and the nut was threaded on a couple turns to allow maximum movement of the engine in the mounts.

The second bolt went in the upper left, and the third I put into the lower left. It was pretty easy to this point, and I started the nuts on these two bolts. The 4th bolt at the lower right took some effort. I actually released the tension on the hoist to the point where I could UN-ratchet the straps and change the front/rear orientation of the engine to drop the nose down a wee bit. Then, I hoisted the engine back upwards, and then I swung the hoist itself over to the right side of the ship a little to swing the engine to the mount. At that point, I had to manhandle the motor a little to coax the bolt through, but it wasn't a major effort.

Not bad, eh? I was able to hang the engine all by myself.

One thing to keep in mind, here.... if you don't have a tail on your fuselage and the empennage is sitting up on a saw horse, and the gear legs don't have the wheels attached, LOOK OUT! The plane is going to be so nose heavy that if you release the hoist, the engine will tip the ship right over to the

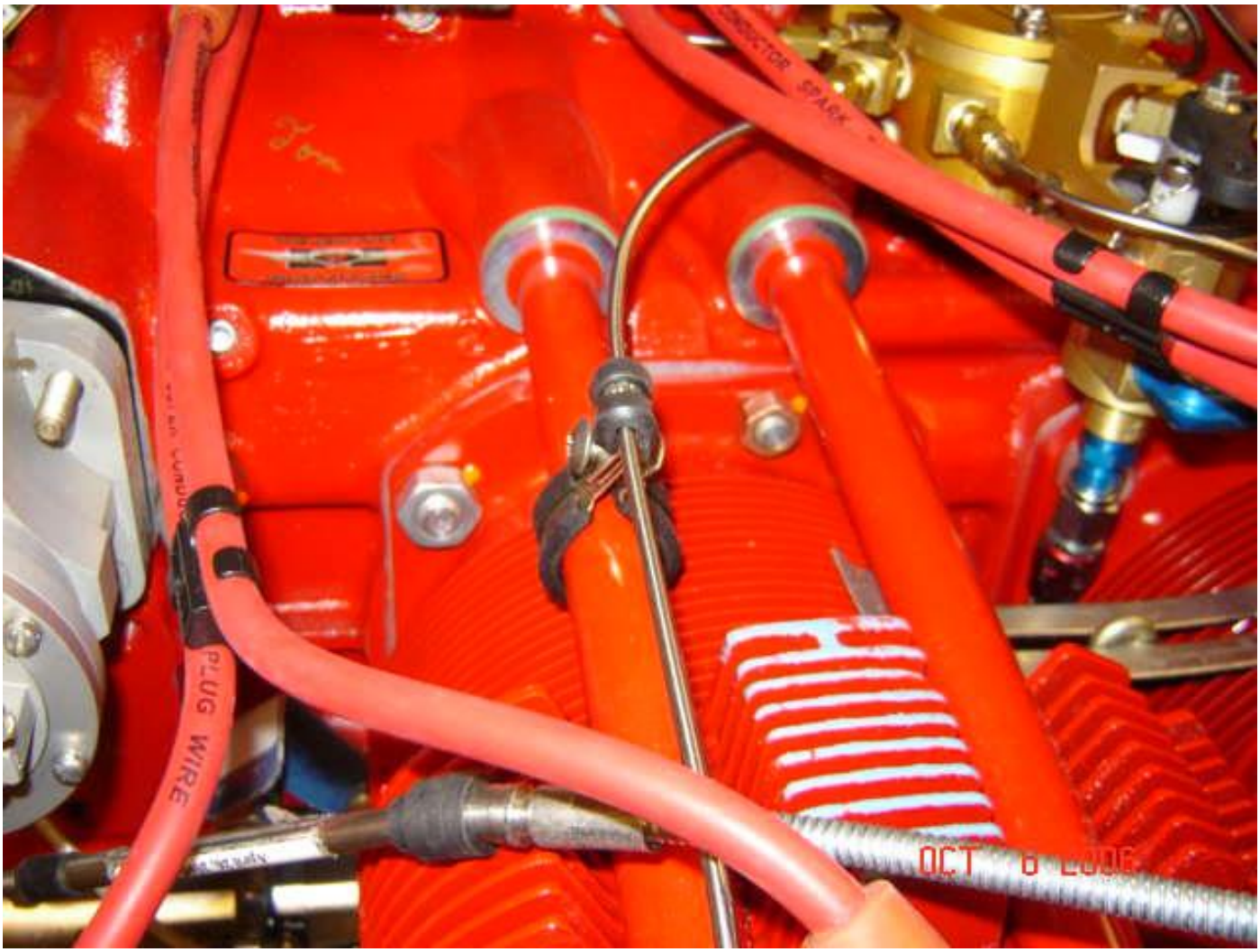
ground (and in my case the empennage will crash against the ceiling!)!!! I had to sand bag my emp deck with two 40 pounds of salt. I finally put a couple eye bolts in the wall studs and strapped the tail spring down. And left the 80 pounds of salt on the spring.

Engine Control Cables

Prop/Engine Control Cables, Brackets, Retainers and Installation

Team Rocket recommends (and sells) ACS cables for the F1 Rocket. The throttle and mixture typically use 60 inch (ACS A-920-600 series) cables, and the propeller governor uses a 66 inch (-660 series) cable. These cables are VERY nice; made to accept threaded hardware on the ends, have rubber boots in 4 places, and where the threaded rod is swaged on the inner sleeve, there is a fitting that allows that part to nearly swivel. Not bad for a $35 cable. One end at the lever will use a clevis and pin, and the other a rod end bearing with a castle nut which is cotter pinned through an AN3 bolt through the apparatus arm.

You have a choice with the ***Prop Governor Control Cable***. You can run the cable from the bottom of the engine or over the top. Most Rocket builders go over the top (in more ways than one), so that's my take. Since my fuel injection system is already cushion clamped to position, slightly repositioning the FI lines is necessary. Mostly what I intend to do is make a cable attach bracket that clamps on to the pushrod tubes with Adel clamps. I'm going to replace the setup installed by Mattituck with my own bracket. First I loosened the existing clamps, then formed a template bracket out of scrap.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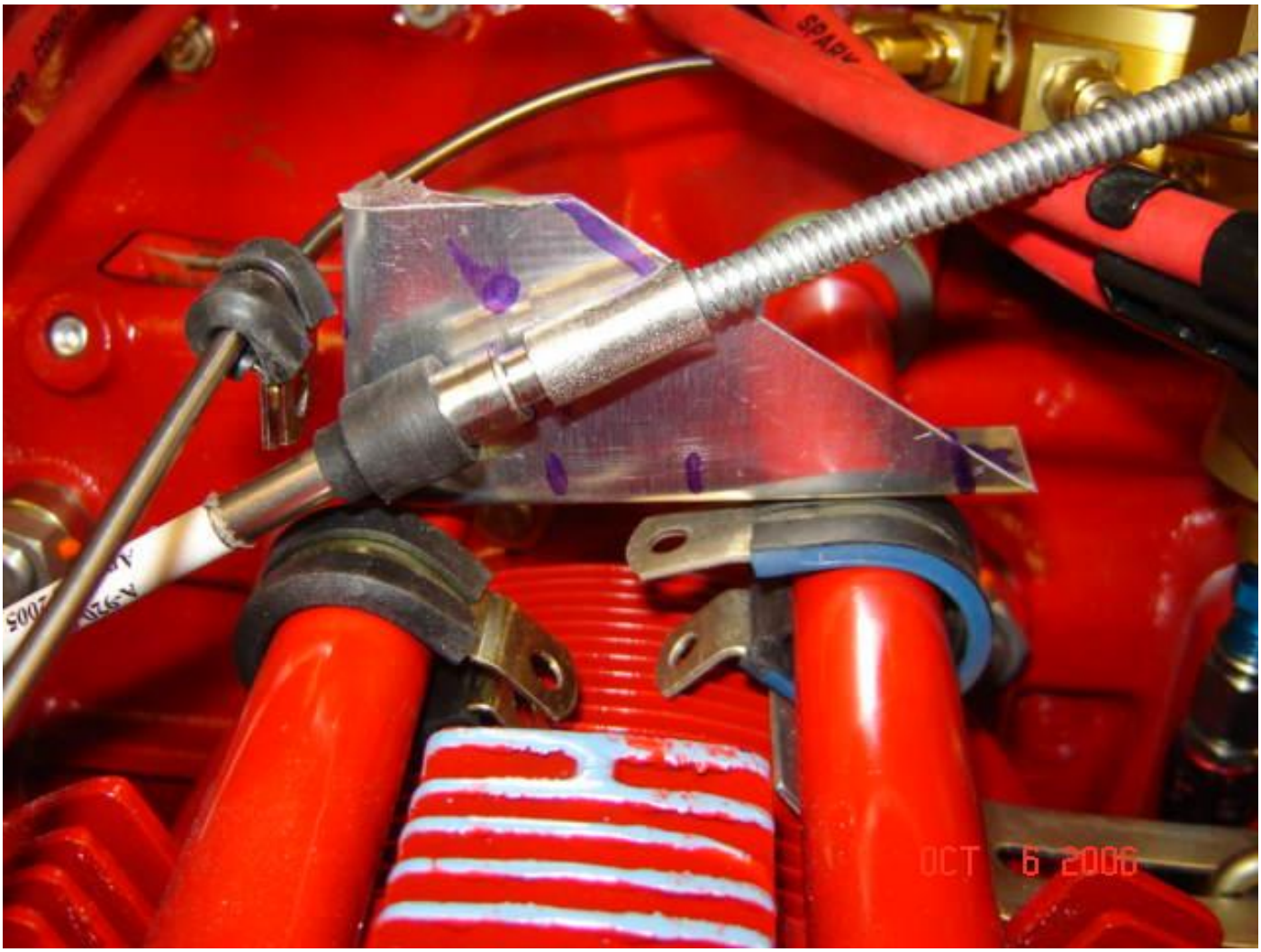


The largest part of the ACS cable is 3/8 diameter. I located the area where the 3 ACS cables (and eventually another push pull cable for the purge valve) will go through the firewall. This is typically done outboard of the motor mount. I bought some pre-made stainless firewall shields from Wicks and used them to locate the holes on the firewall. Then, using my small unibit, I ran the prop cable hole through the FW. I removed the rubber boots from one end of the cable and slipped the cble through the FW into the cabin. At this point, the quadrant is NOT in a fixed position. I'm waiting until I have all 3 cables hung before I decide the final resting spot for the quadrant.

The ACS cables have over 3 inches (nearly 3.5) of travel. The MT prop governor arm moves about 2 inches, and so do the throttle quadrant levers. So far, so good. I attached the rod end bearing on the forward end of the cable and nutted it down about in the middle of the threads. I marked the shaft on the cable rod at 2 inches travel for reference. I went ahead and set the cable in the cabin into the cable bracket on the #2 bulkhead. So far the location of the cable end looks good.

At this point. I have the cable just slung over the top of the engine baffles and I have LOTS of slack. I'm starting to think I can just use a 60 inch cable if I route this cable quite direct to the prop gov. Rather a tight fit than a lot of extra slop to tie down. I have an extra 60 inch ACS cable, we'll see how it goes.

There's lots of choices on cable retainers. You have to have some method of holding the ACS cable to the bracket. The #2 bulkhead cable retainer that I made seems to be doing well. Now I need

something at the other end. KISS. I went to the hardware store and looked for tiny U-bolts. They'd have to be about 1/8 diameter and fit inside the round 1/4 inch slot in the 3/8 inch "ferrule" on the cable. And in the case of the 3 quadrant cables, you have to cantilever them from a bracket, as well as keep the rubber boot from contacting anything. So, I went to Rural King, the farm store, for some airplane parts. I bought a stainless cable clamp (1/8) and I bought a stainless EYE BOLT (also 1/8). They both are still too wide to fit in the slot, so I ground them both down and scotchbrited them to fit. Of course I had to open the eye bolt to get it around the cable. Turns out that the eye of the bolt is right at 1/4 inch, and you can effectively completely close the eye back around the cable. Now the question is how will it hold up in service?

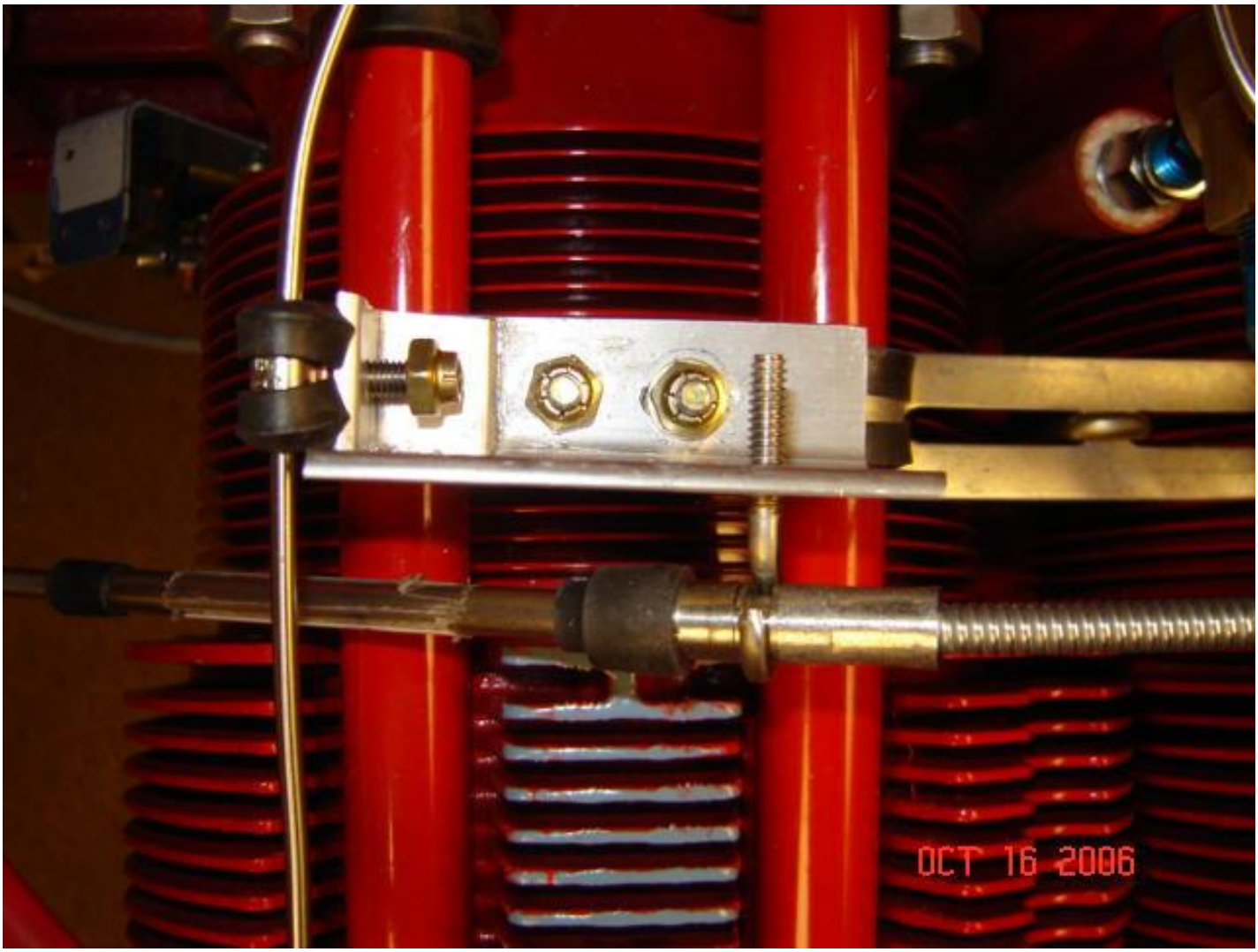
At this point, I'm using the stainless steel eye bolt. I may scrap the idea and remake the entire bracket using only 1/8 angle and safety wire. The stainless eye bolt crimps around the cable quite securely. The problem is that the tension for and aft on the eye bolt in service may tend to loosen up the rather small diameter shank and nuts. Not a good situation. Although in a test fit, the setup seems quite secure. Either way, I'm definitely adding some safety wire.

The template bracket that I made was a wee bit short. When I was setting up the cables, I put them at the maximum extension with the clevis and rod ends at their midpoint. All three cables started out this way. So now the location of the slot in the prop cable is back about 2 more inches. So I need a longer and *TALLER* bracket. The farther back you attach the cable, the higher you have to make the attach point in order for the cable to clear the push rod tubes as the prop governor arm travels. I still used

the two Adel clamps. Instead of using formed angle, though, I cut up some 1.5x1.5x.125 extruded angle. Heavy, but strong. And no cracking on bending (a real problem of mine).

The bracket is held in position on the pushrod tubes by #12 WDG (wedge) Adel clamps. The fuel injection line has an Adel clamp, too. I cut up a piece of 3/4x/34 angle and stuck it to the big cable bracket with one AD4-6 rivet and some JB Weld.


OCT 16 2006



The prop governor cable bracket is just test fitted. It needs to be cut down some that then primed and painted. Also, I'll use a stainless eye bolt that completely contains (retained) the cable, unlike the "hook" in the picture. I might need to attach other cables or wires to the bracket, so I'm leaving it as is until I get a little farther along. Still have to attach the purge valve cable and secure the spark plug wires.

The ***Mixture*** and ***Throttle*** cables are twins, and they will be routed more or less together and they'll be mounted in the same way. They typically run under the engine at the very bottom under the sump. There's nothing there to attach to (once you're passed the engine mount). You MUST attach these cables to something relatively rigid, like angle or bolts. So the next big project is to fashion one BIG bracket or a couple small ones that attach to the AP fuel servo bolts. This is going to get ugly.

The construction manual shows some elaborate brackets for the twin cables. It's made of plate and angle, and it goes between the sump and the AP elbow. I didn't have an extra gasket to do this. I also determined that the massive bracket only sat on the face of the elbow attach to the sump, about 3/4 inch wide are. The advantage of the plate type of bracket is that it has 4 attach points. Since the throttle cable needs a retainer about 4 - 5 inches aft of the elbow, having extra attach points up front is a benefit. It's BIG though, and gives you another potential source for leakage (although I think that's

probably a very minor/slight risk... but what do I know?!).

I tried to make two brackets, each of which would attach to 3 bolts, therefore making it possible to take the bracket on and off without removing the AP unit. Well, that didn't work and I scrapped the idea. You CAN NOT use the two forward bolts holding the AP fuel controller elbow to mount anything below the elbow flange. There's just no room for anything but a nut and two washers. I decided, what the heck, let's make a single bracket and sling it off the back two bolts of the fuel controller elbow and see what it's like. If it seems "floppy", screw it, I'll go with "the plate" mounted to the sump under the elbow.

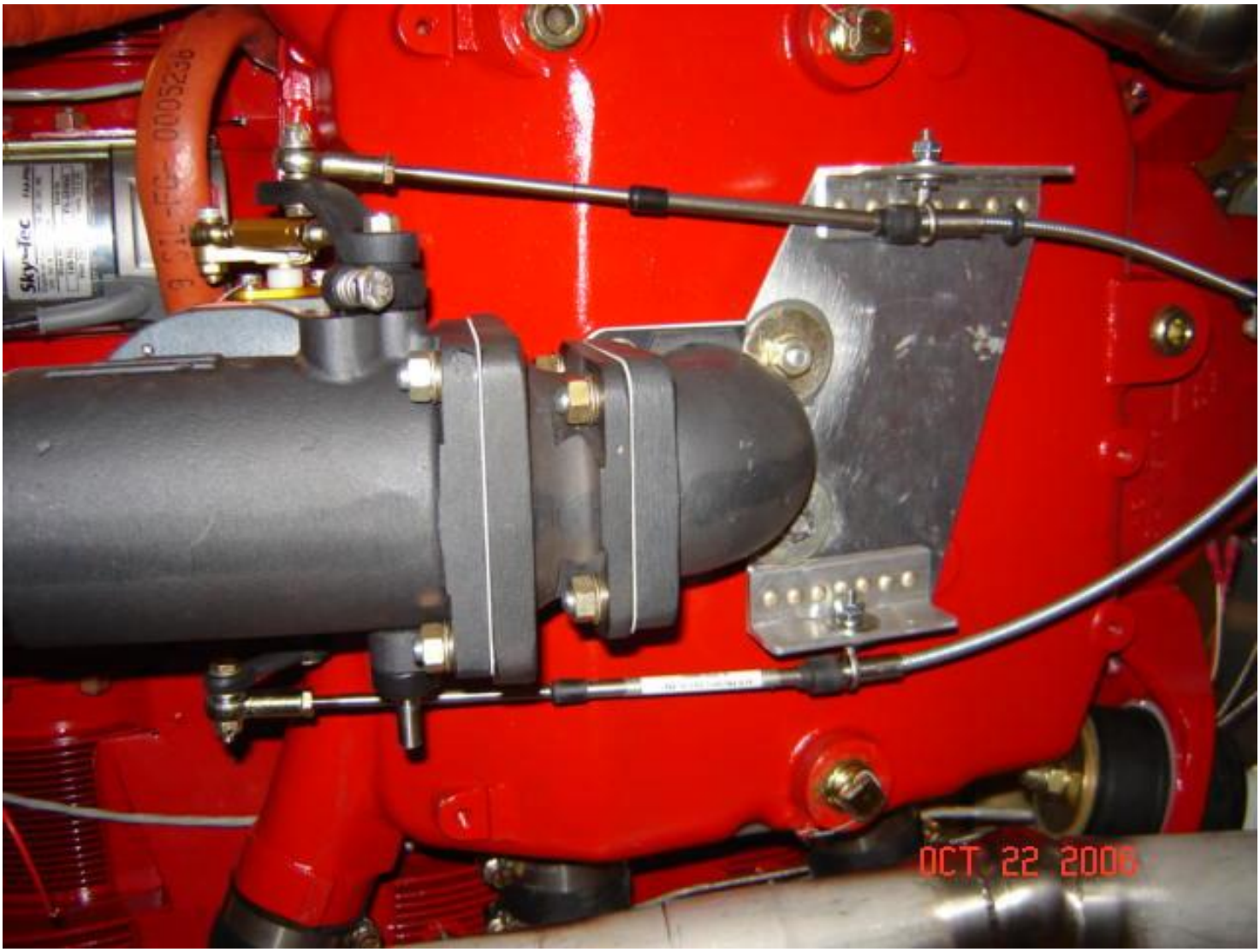
Wicks sent me some pristine .063 alclad, so I chopped up a piece about 5x7. I took the AP unit off the sump and over onto the bench with the cables loosely attached by the rod ends. I sat the cables straigh out from the arms and then used the gasket to approximate the two bolt holes. Now the idea here is to have the AP unit already bolted up, THEN bolt the cable bracket underneath it. I'd still have to work around the big "tube" of the AP fuel controller elbow (about 2.75 inches dia), but at least I wouldn't have to contend with the steps around the elbow. After marking up the .063 piece, I found that the plastic cap of a can of spray on contact cement was almost a perfect match to the elbow tube diameter. I drilled the bolt holes, and then used a dremmel to cut out the arch and fit the piece to the elbow. I Cut a couple 1x1x.125 angles and drilled them to the appropriate places on the sheet.

Ok, Ok, I went a little crazy with the rivets. AND I sure don't need that much angle to attach a little (hangar) retainer for the cable on each side. However, I'm a little timid about the placement of the retainers, so I want to leave in some "adjustability" (turns out I did).

You might guess that one of the biggest concerns about this idea is the potential for failure of the bracket. That would cause loss of throttle and/or mixture control... that would be VERY bad. The .063 alclad is pretty strong, but a.) it's only going to have VERY small contact against a nut on the fuel controller elbow, b.) the edge distance of the bolt holes near the body of the elbow is questionable at best, c.) the angles, particularly on the throttle side, are somewhat cantilevered WAY away from the attach point, and d.) the cables are going to move with engine movement and vibration, and will put a load on the far outside of the bracket.

I decided to improve the strength as much as I could. I took two large AN steel fender washers and trimmed them to fit the body of the fuel controller elbow and of course aligned them with the bolt holes. I epoxied them to place. That takes care of the edge distance problem and small contact patch with the nuts. It also does a lot to strengthen the entire bracket. I think by the time I get this thing trimmed down, it should hold up fine in service. But it WILL be one of the things I monitor on a regular basis.

In order to reduce the "cantilever" forces, as well as the load induced by the weight and movement of the cables, I plan on retaining the cables (by the .125x.250 dia slot) as close to the fuel controller elbow as possible. The mixture cable slot will be within about 1 inch of the elbow, and the throttle cable slot about 4 or so inches aft (and about 1.5 inches laterally).



When I marked the location for the eye bolt holes in the bracket, I had the cable and rod end (set in the middle of the threads) extended as far out as It would go. That gave me the aft most location of the retainer slot in the cable. I realized later that I had barely enough travel in the cables to go stop to stop. There were only 3 threads holding the rod ends on the cable. That made me nervous. So I redrilled the holes 3/8 inch farther forward on the bracket. Actually, I could have come forward 1/2 inch without any trouble. Now I have more room for adjustment and the rod ends are more securely threaded onto the cable.

What I did find out fitting this all up with the cables hooked to the quadrant and retained at both ends was that the cables are going to be subject to a lot of heat. Team Rocket recommends the cables be covered with fire sleeve. I'm not sure that will be necessary, but I'll know more when I actually get the cables clamped to their final position. Another thing I figured out was that with all the extra cable slack, and the location of the angle, I could actually mount the throttle cable retainer *inboard* on the angle on the bracket. That would serve to give it some heat protection. It also makes checking the retainer hardware a bit easier. Too bad that the mixture side of the bracket didn't have enough play to allow mounting that cable retainer to the inside of the angle. If I want to do that. I'd have to make a whole new bracket. I may do that later on. For now, I just want to get finished.

Engine Baffles

My baffle kit came from Vans. Yes, of the RV fame. The kit is for the RV-10. It fits the Lycoming IO-540, but not the F1 Rocket. So you have to modify it. And even as a kit, there is a LOT of work to assembling this baby. After having worked on it for a couple days, there's still a long way to go. I can't imagine how much work would be involved if I actually had to use templates and make my own set of baffles.

The baffle kit is quite complete, with hardware, supports, screens and flexible seal material. The plans are quite nice as well, with large pics and easy (sorta) to follow instructions. For about $250 when I bought it, this kit is WELL worth the money. It probably saved me about 20 or 30 hours of work.

BTW, I believe there is an F1 builder who also sells a baffle kit for the F1. I think the price was around $500 for the set, and it is supposed to be "plug and play".

About a year and a half ago, when I was told I would get my engine from the first loser that I did business with, I got the kit and started doing some work on it. Well, without the engine, it's kind of tough to assemble the baffles, especially when the F1 cowl is so different than the RV-10. But I worked with it a little and pre-trimmed some of the pieces.

Now that my TMX is hung, I can start trial fitting the parts. The F1 baffle set is going to be quite small at the aft end, and there is hardly room to attach even a small oil cooler at the back. Most builders remote mount a large Positech cooler onto the engine mount, then fashion a duct from the baffles to the cooler. Knowing this, I did NOT cut any holes in the baffles for any ducting. In fact, I didn't cut any holes in the pieces at all. I just started fitting them up and screwing them down... loosely in their stock fashion.


AUG 26 2006

Sorry about the slightly out of focus pic. My new digital camera sucks (or I can't hold my hands steady...). I need another new camera.

It may not seem like there has been that much cut off, but it took me about 4 hours to trim these pieces right on the ship with tin snips. Not that much has been removed from the aft wall, perhaps 1/2 inch. From the forward end of the cowl, however, quite a lot has been removed. I cut about 5 inches off the front end, then tapered the baffles to follow the inside of the top cowl contours. This is what the left side looks like rough cut. Again, sorry about the poor pic quality. I tried about 10 times to get it right.

TIP: Take a metal rule (or something flat and straight) and lay it flat along the boot cowl skin. Project it parallel to the nose of the ship along the aft side of the baffles and use that to reference a mark for a cut line. It takes a lot of guess work out of how much to trim.

For those of you who are getting a Mattituck TMX engine, or dual Lightspeed Plasma III electronic ignition and fuel injection, the top of the engine gets quite crowded. I had to remove the front sky hook and reposition it to the front boss and move two of the coil sets toward the middle of the engine. I had to move things around in order to fit everything inside the baffles as well as to fit the cowl over the top.

At this point, the front "floor" of baffles isn't really in place at all. I did have the governor set to place and the arch behind the starter ring. But the floors have to be matched to the lower cowl. You might be able to see in the pics above how the left floor hangs down at the front of the baffle set. That angle is quite severe, and the air inlet opening in the F1 is not that large. And not that deep, either. So some reconfiguring is in order to get that airflow ramp coordinated with the F1 lower cowl. That comes next.


RED GOLD
AUG 28 2006


AUG 28 2006

The lower cowl isn't too bad to place on the ship by yourself, even with no clekos or anything holding the top cowl on. I used a tall box and slid the lower cowl under the engine, then pulled the front tab up under the top cowl and clekoed it. At this point, the lower cowl is hanging by one cleko (through carbon fiber reinforcement). The zipper (hinges for pinning) lines up very easily at this point, so I pinned up the one side. Then I clekoed the tab on the other side, held up the lower cowl with my knee and my left hand, and started the pin with my right.

The front floor of the baffle (at least the left floor/ramp) actually fits in the cowl at a steep angle to match the angle of the prop governor baffle. That's fine on an RV-10, but on an F1, it's not necessary for the ramp to be that long OR at such a steep angle. That's going to take some custom work. You could certainly just install the baffle floor ramp as for an RV-10, then use the rubber seal material to create your own corrected ramp. However, I want to make sure that I get good support of whatever baffle material I use.

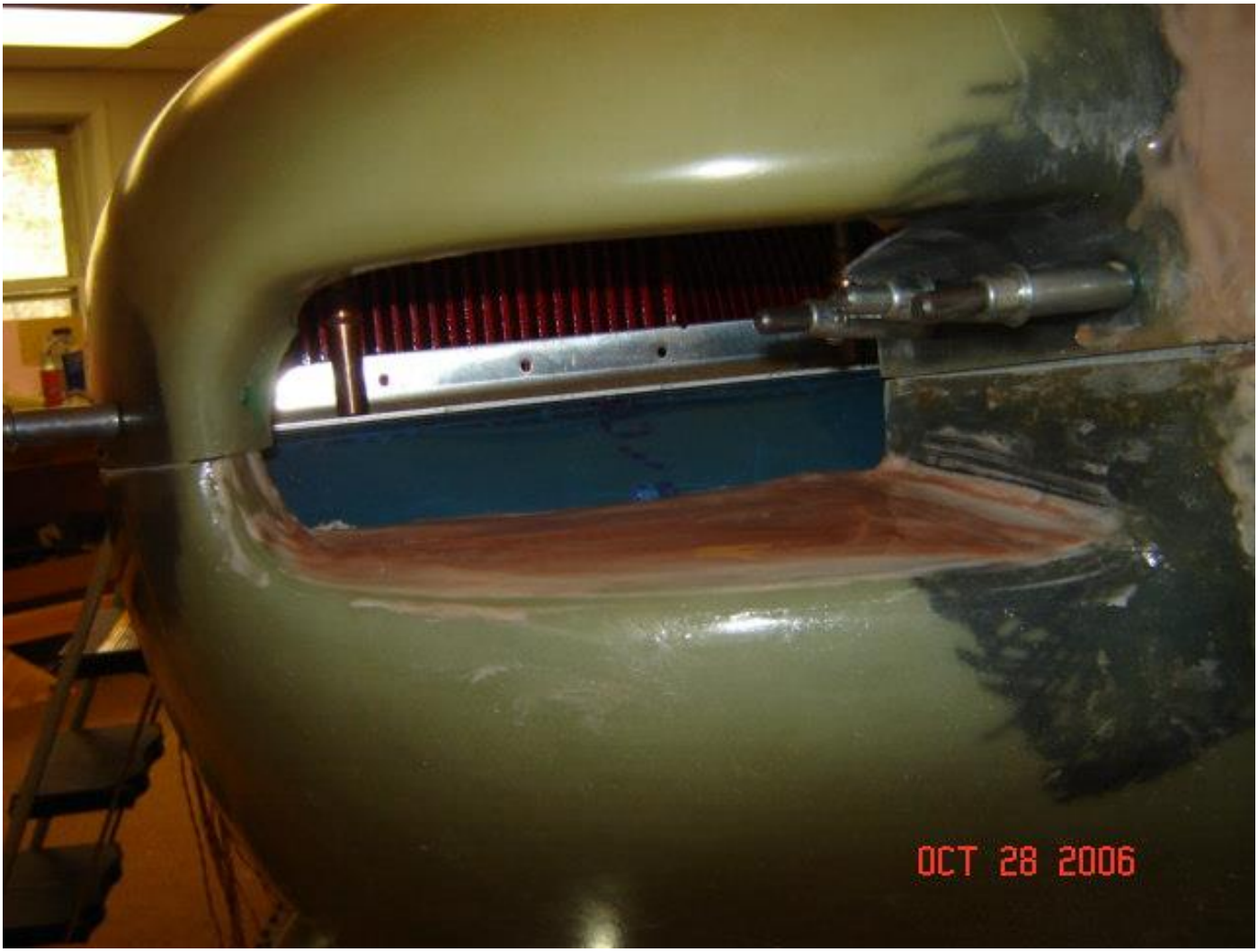
After setting the lower cowl in place, I looked through the inlets to get an idea of what I still needed to do. I noticed that on the ship's right, the pour foam ramp that I started from the inlet was about the right angle and depth (to the top of the front cylinder), but the left cylinder is a few inches aft and the ramp needs to be extended. IOW, I still have a LOT of work to do on the engine cowl. Time to go back and drill the attachments for the engine cowl before proceeding any farther.

On the front floor baffles, the parts that form the ramps from the lower lip of the air inlets, you definitely don't want to follow Van's plans. Those parts need to be nearly straight, not bent down at 60+ degrees as recommended for the RV-10. At the same time, the middle pieces that arc around the prop shaft area also have to be modified. The left part has to have the formed flanges cut off , and then new bends made to raise the lower attach flanges to the level of a nearly horizontal ramp. The right part also needs a little trimmed off, but I re-bent it first. Not only does that part need the attach flange raised up, but the angle that it sits facing forward should be changed so that it angles toward the air inlet. IOW, instead of closing the area off over at the engine case, I chose to make this part close off the airflow over at the air inlet. After I trimmed and re-bent the parts, I also trimmed the forward edge of the ramps to where they just sit under the cowl lip.

With the ramps shortened and bent upwards to accommodate the F1 cowl, there is enough meat under the side baffles that you can mark and bend those parts to form an attach flange under the front ramps. I think I'll attach a pair of nutplates on these and screw them down instead of riveting them. Actually, I think I could just RTV them together since the air pressure is going to force the ramp down onto the side baffle flange, and the cowl won't let the baffle move laterally. Still contemplating how to do some of the final attachments so that these parts can all be made removable.

After I rough trimmed the baffle material, I considered where to run the lower spark plug wires through the side baffles. There are a couple of joggled areas that interlink and overlap between the pieces. Those joggled flanges are drilled to prevent cracking. I decided to use those holes to run the spark plug wires. I used my step drill and opened up the holes. The only problem with this idea is that when I finalized the height of the left baffle, the grommet and wire between 1 and 3 ends up being at the upper edge of the flange. It shouldn't pose a problem, but I will have to work the soft baffle material around it.

Now that the baffles are roughed in, and after routing a few cables and hoses, it's time to finish trim the top edge of the baffles where they mate to the cowling. Mark Fredericks suggests that a rule of thumb is a finger width gap between the cowl and the baffles. About 1/2 inch. That was my goal. Working with just the upper cowl clekoed to place, I eyeballed the upper edge of the baffles from under the engine, through the oil door and through the air inlets up front. Also, you can see the aft baffle pretty easily looking from behind through the motor mount. I ended up trimming off about another 1/4+ inch all the way around the side baffles and as much as 1/2 inch from the aft baffles. The only places that concern me are around the #1 and #2 cylinders. There's only about 1/2 inch of baffle material above the cylinder head. Not much clearance to attach soft baffle material.

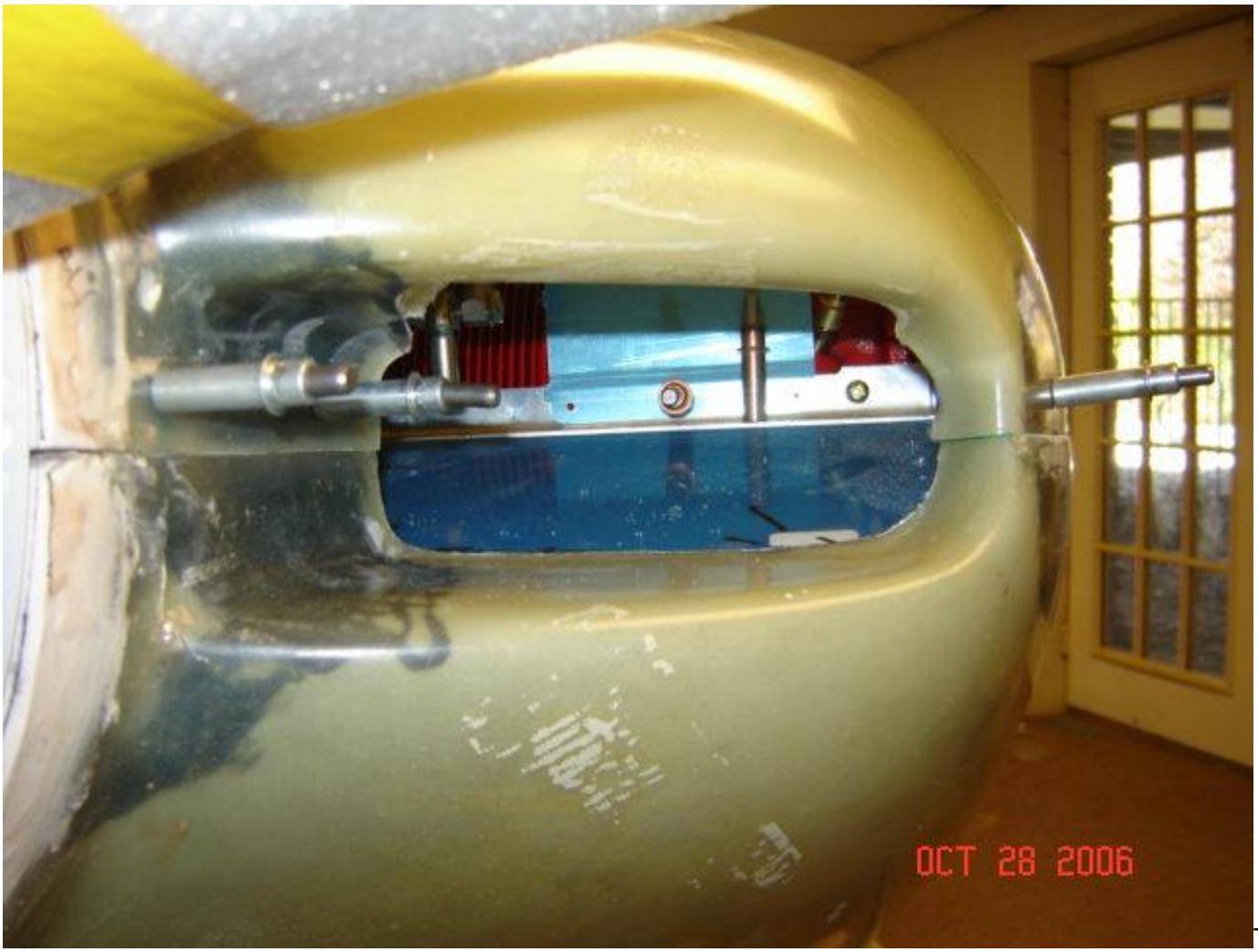


With the aft and side baffles trimmed and dressed to shape, time to go back and work on the front baffles and then start assembling the hard parts. I've already got them nearly roughed out. For me, that means probably a full day or more working on them just to get them to fit.

After about 4 addtional hours working with the front baffles... trimming, fitting to the lower cowl, re-forming, then bending the side baffles to fit, and then finally drilling the side baffles to the inlet ramp baffles, I think I have something I can work with. Regrettably, I still don't know how to transition between the cowl and the aluminum baffles, but it's all really close.

I cut the right inlet a little short. The ramp angle was VERY steep too. So rather than try to re-bend another ramp baffle, I decided to build up the cowl inlet. I had contemplated doing that a long time ago anyway just to lessen the ramp angle. Now I can improve the transition and make up for a slightly gapped right inlet ramp.

The gap was probably 3/8, and I could have easily made up the difference with soft baffle material.



The left side inlet ramp has a longer and more gradual angle at the air inlet. I cut the ramp on that one just right. I still may have to cut it back more soon as I decide how I want to transition between the fixed cowling and the movable (shaking with the engine) baffles.

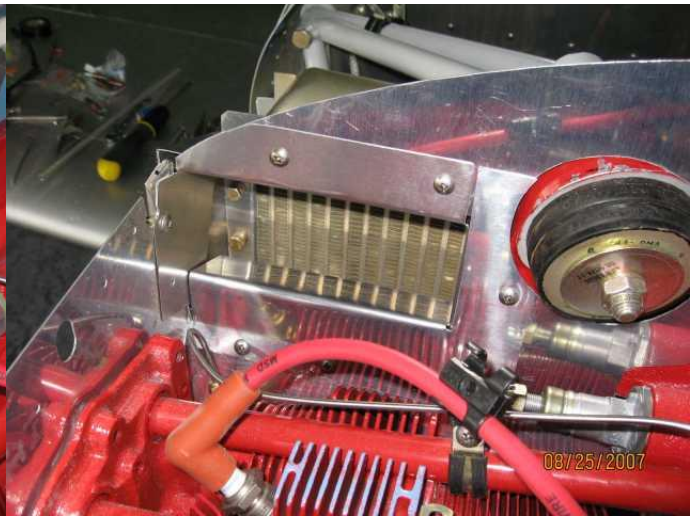
There's still some minor fitting to do, and I have to drill the baffle around the governor to the left ramp. I'm not using the bracket to hold the "spinner" baffle to the engine case bolts, either, so I'm going to have to make up a little bracket for that, too. Then the baffle assembly process begins. Lots of countersinking and riveting to do there.

For now, though, the micro on the ramp is setting, and I'm taking a break.

Here's a couple big pics of the left side baffles after they are doubled, riveted and the plug wires set. Note the mode around the prop governor, and that segment is made to be unscrewed from the air ramp from the bottom.

I may insert an air vent duct on the left air ramp scoop above. There's lots of room at the back, and logistically that may be easier. I'll insert that last. The right side is ready for soft baffle. Time to finish up the right side!

Part of finishing the right baffling was to finally get the oil cooler baffling set. I didn't have enough clearance between the parts, so I remade the duct on the hard baffles. Also, Tom Martin and others thought I had TOO MUCH opening and that cooling of the #5 cylinder would probably be compromised. So I made the opening to the cooling fins about 1/3 or so smaller, and closed off some of the bottom of the cut out. After I installed the nutplates for the #8 screws, I popped two rivets in each flange to hold soft silicone baffle material. I used 4 separate pieces, but if I have enough soft material left at the end, I may drill out the rivets and just use one contiguous piece of silicone baffle on the baffle duct to the oil cooler. That will give me a tighter air seal there, although that seal is never going to be absolutely tight with engine movement.



Sorry, no pics of the silicone parts, they just wouldn't show up.There is about 1/4 to 3/8 clearance between the oil cooler duct and the baffle duct. The silicone material is riveted to the outside of the baffle duct flanges so that the silicone material seals between the ducts (of course!).

The rest of the right side of the hard baffles was pretty easy. That aft corner piece actually seemed easier to insert when it was fully riveted than with just individual pieces. Also, the left air ramp was pretty easy to fit up. After it was all set up, I tossed on the top engine cowl for a final look see at the hard baffle contour. I had to trim a little off of the front right top edge at the big turn towared the ramp. Getting 1/2 inch clearance all around is pretty tough. Closer to 3/8 in some areas, but there's enough meat there to hopefully rivet on the silicone baffle. That's next.

Airflow Performance Fuel Injection

Mattituck (and others) has an option to purchase/install the Airflow Performance fuel injection, fuel pump, aux pump and filter. As a kit from Airflow Performance, the one that is specified for the Team Rocket F1 is 8000021and comes with just about everything but the actual fuel lines and connectors.This is a list of parts that Mattituck provided (list is from AP's website).

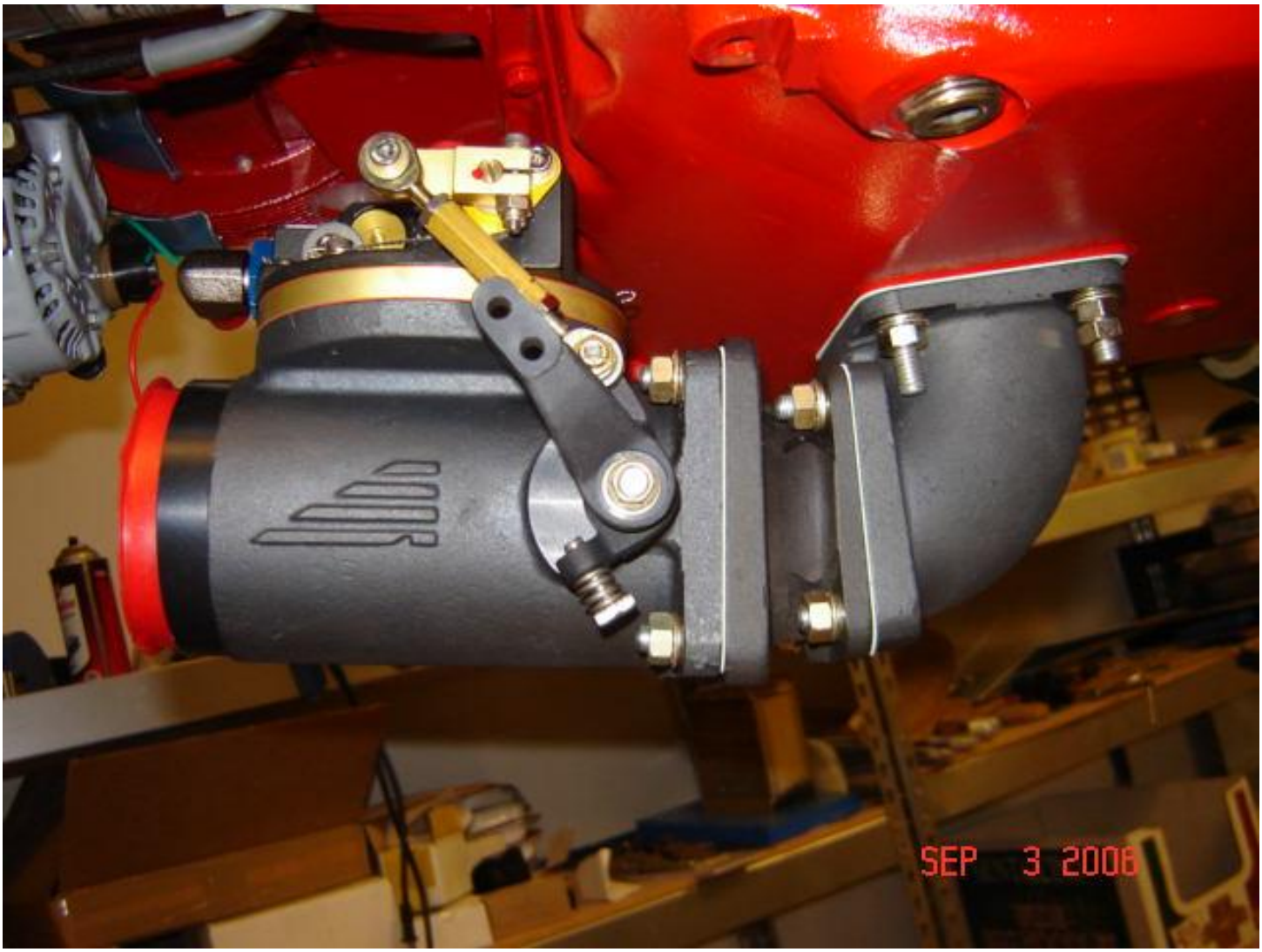
Qty P/N Description

1 5020006 FM-200 Fuel Controller
2 1010059 FM-100 Gasket
1 1020061 FM-200 Gasket
1 3010081 95 Deg. FM-100 Intake Elbow
1 2090162 5 Deg. FM-200 Intake Adapter
1 2090124 Purge Valve Assembly
1 2090183 Purge Valve Bracket
1 3090009 Flow Divider
1 2090148 Lycoming Flow Divider Bracket
6 1090104 Nozzle Line Fitting
2 AH-C3169X2-WH 1/8" Pipe Plug
5 AH-3350X2 45 deg 1/8 pipe to 1/8 pipe
1 AN911-1 1/8" Pipe Nipple
1 AN822-4D 1/8" Pipe to #4 90
1 AN-816-4D 1/8" to #4 Fitting
1 LFDHDKT Flow Divider/Bracket mounting hardware kit
1 1090187-27 27" SS Nozzle Line
3 1090187-21 21" SS Nozzle Line
1 1090187-15 15" SS Nozzle Line
1 1090187-14 14" SS Nozzle Line
6 1090152 .028 Injector Nozzle Assy
1 L6NLHDSI Lyc 6 Cyl Nozzle Line Bracket and hardware kit
1 3090050 Aircraft Boost Pump Package
1 1090079 Maintainable Fuel Filter Assembly
2 MS21919WDG26 Cushion Clamp
2 MS21919WDG29 Cushion Clamp
1 9001 API Catalog
1 9003 Tech Manual

My Mattituck TMX540 engine came with the AP flow divider and all the components, including purge valve, assembled on top of the engine. The engine is, however, shipped without anything below the sump. Mattituck sends a good amount of paperwork with the engine, including an AP manual. The AP manual is repleat with lots of theory and diagrams to help you organize your fuel system. As far as I'm concerned, for the IO-540 and F1 Rocket kit plane installation, the AP manual sucks. The pictures are LOUSY and there's nothing specific about the Rocket setup. The manual is set up to accommodate everyone, mostly 4 cylinder RV's and has little to show for the big 6's. I had to glean as much as I could from going to various appendices and try to figure out how to set up the parts on the lower part of the engine. Well, it's not THAT hard to figure out how to bolt on the 90 degree elbow, the 95 degree adapter, and the main "throttle body" (fuel controller FM-200) assembly to the bottom of the sump. The studs for the elbow were on the sump, and Mattituck furnished the 1/2 inch course nuts. However, the nuts were wrong with the rest of the studs (already assembled in the AP parts) because ALL of the 1/2 inch nuts with the package were course, and the studded AP parts require fine threads. Fortunately, I bought the big AN hardware kit from Aircraft Spruce and I have what I needed to bolt it up. Not I have LOTS of extra course nuts should I need spares for the exhaust system.

The 90 degree elbow installs facing forward. You have to put the washer, the star washer and the nuts on all these AP studs and tighten them down sequentially to keep from binding against the body of the parts. The 95 degree adapter goes on so that the adapter tips the throttle body upwards toward the engine. You might guess this given the upward slope of the lower engine cowl. The main throttle body unit goes in place with the round part and fuel fittings upwards. I think that is going to make

plumbing the parts a bit of a bitch, but based on the pics, that has to be the way it goes. Looks like I may have to drop the throttle body to connect those fittings first, then bolt it up to the adapter and attach the other ends of the fuel lines last.



The throttle mechanism is on the left side and the mixture is on the right. Notice in the picture above that there are TWO mounting holes for the cable rod end. The lower hole allows about 2 inches of travel, and the upper hole allows about 2.5 inches of travel.

I can now rough in the cables to these armatures. As far as the plumbing goes, well, it's back to the manual to see if I can figure out how to put it all together.

Exhaust

Mark at Team Rocket sells a nice Vetterman stainless exhaust with all the hardware, including gaskets. I bought mine from another builder who decided to go with cold air induction. The Vetterman exhaust is a sweet bolt up unit. The parts fit very tightly, and I had to use a torch to heat up a couple of the collars to fit the parts together. Also, one of the pins would not insert into it's weldment, so I had to dremmel the pin so it would rotate into it's proper position.

With a test hang of the system, it looks like the tailpipe is going to hang too low into the cowl out of the box. Once the unit was bolted up, it was very easy to relocate the tailpipe by rotating it at the ball joint. The hangers are supposed to hold the tailpipe in position.


SEP 9 2006

The exhaust hangers were fun to put together. The instructions are pretty basic and straight forward. You have to drill and bend some mild steel to correspond to the angle of the footwell engine mount bolts, then bolt it up. Simple and effective. The pic shows the bracket on the outside of the tailpipe,

which puts the two pipe tail end openings quite close together. I don't know if that has any effect on noise or performance, so I'm waiting to hear on that issue, too.

The exhaust stacks have to be drilled for EGT probes. I'm going to try to locate mine as far from the spark plugs as possible and of course away from the engine cowl. They may end up oriented toward the inside of the engine, but perhaps I'm over thinking it. I could easily just drill the holes outboard as far aft as possible and clear everything. I'm waiting for recommendations from Mark.

Time to order heat muffs from Rick Robbins. Mark doesn't sell those, so I'll have to call Rick and get those going. The heat muffs can be 7 inches for the left side and 9 inches for the right side. Randy Pflanzer's description of his muff system: ...*"on the left muff, you want the aft inlet clocked at 1:30 o'clock and the forward output clocked at 3 o'clock. On the right muff, clock the forward input at 9 o'clock and the aft output at 10:30 o'clock. All clockings are looked at the muffs from aft to forward. I just used the standard size hoses, whatever that is so that all the other stuff like heat valve and rear baffle fittings from Van's can be used. "*

Once the exhaust was located by the hangers, I clekoed the engine cowl back on the ship. I wanted to see how much clearance I had around the pipes. Keep in mind that I used the cut lines embedded in the fiberglass from the factory. Some guys have told me that I was not going to have enough space at the air exit under the cowl. Well, the exhaust has just enough clearance between the mount, the belly and the cowl. It looks SWEET! And the UGLF fits up along the leg against the ship and the cowl beautifully. I think this is what Team Rocket intended! Down the road I'll just have to see if the cowl lets enough air out to cool the engine compartment. Lots of discussion on that item on the TR email list.

Again, I have the two tailpipes hung as close together as the hangers would allow. This may change. Also, the tubes rotate, and that changes the orientation of the end tube and the tip to the belly of the plane. I'd like to minimize drag as well as maximize getting the exhaust away from the belly. Not so much to keep the belly clean, but to keep the sonic pulses from beating me to death through the belly. That aluminum floor becomes quite a drum when being pounded by exhaust gases. I'll probably cut the tips parallel to the floor once I get the end tubes oriented so that the exhaust is directed down away from the ship as much as possible.

Heat Muffs and Heat Valve

I bought a pair of heat muffs from RobbinsWings.com for my 2 inch Vetterman exhaust. Rick Robbins made me up a pair of stainless exhaust heat muffs per Randy Pflanzer's specs. Work on these units is VERY nice, and you get everything you need but SCAT.

There's no HVAC to the rear seat in my Rocket, so the plan is to daisy chain the pair and run the heated heat through a stainless heater valve on the firewall. I may purchase or fashion a "Y" and tap the heat into the NACA duct and run it through the eyeball vent, as well as let it disperse to my feet right out of the box.

The structure for the units are the end caps held together and onto the exhaust pipes by two long screw rods. The end caps are captured by the body of the heat muffs then steel band clamps are

used to hold it all together in place

These Rick Robbins heat muffs are eccentric, too. you can tell by the pic of the assembled can below that the muff sits off center. It looks to me like you can rotate the end caps and perhaps slow down the air by letting the air in through the narrow side. You'd get less airflow, but a lot more heat. We'll see how the install goes, but I think I'll allow a little slack in the SCAT, just in case I want to re-orient the end caps to change the airflow inside the muffs. That's just cool! Well, maybe I should have said shit hot?