The Engine Cowl Halves

I did this part in a little different order that most. If you have the cowl fixture, you are perhaps better off not mating the cowl halves until the top half is aligned on the airframe. Since I didn't have the fixture and wanted to keep pressing on, I went ahead and mated the halves. I was working by myself, too, and I thought the cowl would be easier to put on the fuselage in one big piece, rather than two halves.

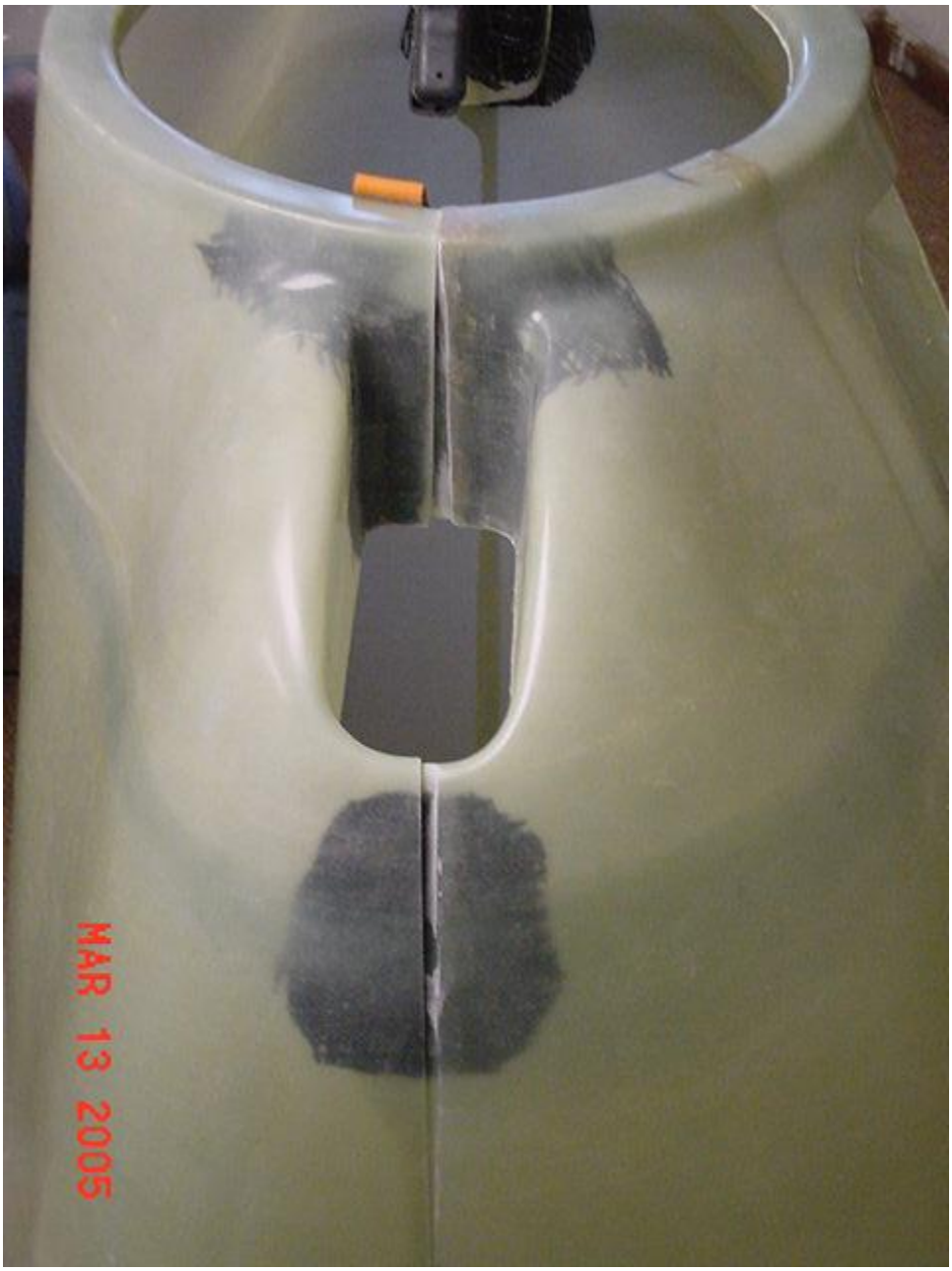
There are cut lines molded in the cowl halves, so I took the molded-in cut lines as gospel, and cut the cowls to size prior to fitting up. I pretty much completed the assembly of the two halves while I was waiting in line for the cowl fixture (simulated spinner backplate). Whether I cut the cowl too short remains to be seen. I don't think so. To this point, the Team Rocket parts have always had a little more to trim beyond the molded lines, so I should be OK. Heck, you have to fiberglass the aft end of the cowl anyway, and the bottom side of the lower cowl at the firewall is all air outlet and completely open, so it can't be far off. When I set the cowl up on the ship just for a look see, it fit beautifully. Now it's just a matter of alignment. Here's how I got going:

I grabbed up the two big fiberglass cowl halves. I set the top cowl on the workbench and taped along the cut line that's molded into the fiberglass from the factory.

**Note: See in the pic above how the tape curves a bit along the long side at the tab (black carbon fiber) and the air inlet? Had I to do this over again, I would probably bias this line the other direction. It would be better to have this upper cowl turn down a bit at the tab and inlet rather than upwards as the factory mark indicates. It will give you more fiberglass "meat" at the mating edge for the hinge pin penetration. The factory line gets the hinge pin very close to the edge of the cowl, and this is one way

to increase the width to the edge there and make you less likely to break the cowl at the hinge pin access. Although I have to admit, Mark's cowl hinge pin is nearly at the minimum edge distance and after a few hundred hours his cowl is having no problem at all in the hinge pin area.

I bought a cheap air operated body saw from Harbor Freight and it worked great for this job. I made the horizontal edge cuts and removed the excess material. I then tried to put the cowl halves together. Well, I may have already misinterpreted one cut, but it should be easy to fix. I cut the inside of one of the air inlets at too steep and angle, and it's going to come up short. What the heck, I'm going to be doing so much glass work, that adding a little there ain't no biggy. But the halves are going to take some serious "touching up" to get them to fit right . I want them to be fairly passive sitting together. The areas around the inlets are going to take some dressing down.



You can see the discrepancy in the angle of the short tape on the side of the spinner opening/air inlet. The angle should be the same as along the long side. Oh well, the beauty of fiberglass is that it's repairable. I've repaired enough small fiberglass parts in my day (wheel pants and other cowls) that

I'm not distressed. Just bummed that I'm starting out this way. Drat.

Well, maybe it wasn't a mistake (it wasn't). It sure looked like one when I put the parts together. However, it appears that I cut it correctly but the cowl is warped a bit in that area. Let's see what happens...

I made the side cut along the top cowl per plans. There is a nice little scribed line glassed right into the fiberglass pieces. It's a little hard to see, and taping along it is a good idea. Unfortunately, as I have already fessed up, I tend to "Cut Once, Fix Twice" !! I know, I know, it's supposed to be measure twice, cut once. Anyway, I thought I had it dicked. But I guess I might have been wrong. (for once, I wasn't)

The Cowl halves sat together better after the big cuts along the lower edge of the upper cowl. But the areas where the flanges overlapped needed some dressing. I used a hand rasp and a couple files and went at it. The halves just started sitting together better and better. Once I cleaned up the inside corners and sides on the upper cowl and the outside of the same on the lower cowl, the parts began to really sit together nicely.

At this point it was time to make some measurements and start getting that 15 inches of round spinner area squared away. I measured each side across the spinner opening and measured across the air inlets with the halves spring clamped together. I had to sand about 3/8 off of the flanges to get the disc round at 15 inches. Once I did that, of course I had to go back in and clean out the insides of the upper cowl. All this fitment was done on the upper cowl. The air inlets look pretty uniform. It's hard to measure there, but I tried to be consistent with my tape measure. While I was doing this, I had to

take the parts apart, then back together, then apart, then back together. When together, I tried to estimate the position of the upper cowl over the lower cowl to try and keep it close to specs later on.

The more I trimmed and sanded (with my Permagrit 11 inch metal sanding block), the better everything fit. And it was getting more and more passive as the halves went together. The only thing was that the halves didn't seem to fit very well on one side of the cowl at the spinner area. It was better than before, but still it didn't seem right.

Watch those sharp edges when your working on this stuff. My sanding block slipped off several times and I slit the tips of a few fingers. Besides getting blood all over the place, it HURT! Yes, I'm a wussy, and my hands are like baby butts. Finally, I decided to slow down and be more deliberate in my block sanding. I still banged myself a few times, but not bad enough to warrant gloves. And BTW, if you are sensitive to epoxy or fiberglass, you'd better don the whole protective gear through all this process. I had long sleeves and long pants. When I really get into the heavy sanding, I'm putting on a mask and gloves, too.

It looks to me like my cowl has warped. The "disc" of the spinner is 15 inches round and the innies go inside the outties quite nicely. It just looks like one side runs uphill around the spinner. One side is beautiful, and the other seems a bit catywompus. When I clamp it and close the gap where I supposedly cut wrong, the spinner lines up flat. But, BOY, there is a lot of tension on those parts.

In the pic above you can barely see that the spinner area angles inward to the middle where the two halves meet. It may not look like much in this picture, but in person, it's quite fugly. Time to email Mark and ask him how to proceed. Sure enough, Mark confirmed that this is a problem solved with a

hair dryer or heat gun. I'll set my heat gun on low and see if I can get the area to relax a bit. (I didn't bother heating it)

I have some other questions about how to proceed, and I'll post them here soon as I find out what the scoop is. My Verizon mail servers doesn't seem to play well with Mark's A O helL server. None of the pictures I'm sending him through my DSL line seem to get through without scrambling into gobbeltygook. Since I don't keep all the pics here at work, I can't send him all the jpegs with the questions. I try to send almost all of my pictures to the DocThrock.com server, even if they aren't on the website. Unfortunately, I haven't uploaded them all, and of course the one's I need to send to Mark aren't there. Duh.

We finally got our communications straight and Mark confirmed a couple things not laid out early in the plans. The area of carbon fiber on the lower cowl near the front is indeed left for an alignment and support tab. It should be about 4 inches wide by about 1 inch tall. All the tabs and overlaps on the cowl halves seem to be about 1 inch wide.

Another thing Mark confirmed is that as the outside of the lower cowl turns back toward the air inlet, there is no accommodation for a recess. IOW, there is no indentation in the mating line where the top cowl meets the bottom cowl in this area. The top merely overlaps the bottom. Yuck. Looks ugly and doesn't fit well. Cut it off. So the story here is that you leave about a 4+/- inch width of carbon fiber tab and everything else gets cut off to form a butt joint between the cowl halves. How easy is that? Some of this stuff is probably intuitive for a lot of builders, but by now you've probably realized that I do some bone headed stuff. That's why if something doesn't look right, or I'm not sure, I ask for help. The stupid ones are the ones that aren't asked, right?

I taped the lower cowl at the cut lines after confirming the 15.5 inches from the lower radius up to the cut line per plans. Right where it should be. Marked it with a blunt (mistake) sharpie and started cutting. The little cheapo air saw worked well for this, again. While I was at it, I taped off the aft cut line molded in the fiberglass of BOTH halves and cut those, too. I cut them right to the line. We'll see how it turns out later.

To smooth some of my cuts, I got out my Permagrit sanding block and used the course side to rip through the edges to straighten them up. Not perfect, just enough to get an idea how straight everything is. I under cut the area at the bottom of the cowl by about 3/8 or so inches. I couldn't tell which line to use, so I was conservative. That area hangs out in the breeze anyway, so no need to worry about it at this point.

I set the halves together and clamped the sweet side. Sure enough, the warped side sat together better. Not great, just better. Another moment of truth... there's been a couple of those already... Drill the inlets. I started on the sweet side. 3 holes using a 12 inch #40 bit. I measured from the back of the

sweet hole in about 1.5 inches and made the holes about 1.5 inches apart. That puts one screw just inside the lip of the air inlet, but far enough out that I can get a screwdriver on it. SWEET! Sits together great.

Interestingly enough, the other side wants to sit together better, too. I went ahead and measured it. That side isn't as deep, so I marked the holes an inch from the back of the inlet and spaced the holes 1.5 inches. I didn't like where the front hole sat, it was outside the carbon fibers, so I moved that hole aft a bit. Later on, I may fill these holes and choose a different spacing, but for now it should work fine. I kind of forced it together there and figured out that I had not relieved the inside corners well enough yet, so I got out my hand files and went to town. Finally, I got the parts to sit together passively, but there was still a sharp angle where the cowls met at the inlets. I forced the "nose" at the spinner together and lined it up. I held it closed with one hand and closed the gap at the other end of the inlet with the other hand. And I held it there. Carefully I drilled the first hole at the front, then clekoed it. Forced it all together again and held it and drilled the hole at the other end and clekoed it. Then I let go and drilled the center hole. Not bad!

With 6 clekos in the cowl, it really wanted to sit together nicely.The horizontal cuts on the sides of the cowls are pretty close. It's not flush sanded yet, but it's close. I have to verify the size and shape first, then I'll tweak the alignment.top to bottom. So far, so good.

Instead of using a heat gun, I just set the clekoed cowl over my oil heater. I'll check it every hour or so and see if it does any good. Safer than a heat gun for me. Less heat and I won't tend to fry it like I have tended to with a heat gun in the past. I'll let you know how it works. I hope I don't go back down there and find a big lump of slump. (It helped a bit, but not as much as I had hoped)

The heater helped some, but it took all night. After I adjusted the parts some more, it sat together more passively.

The cowls are drilled and clekoed in the inlets. The next thing to do is measure the cowl to make sure it's the right size. As near as I could figure, my firewall is 34 3/8 inches wide at the broadest points and 27 inches tall. I set my cowl on it's nose and took my big metal rule and checked the size. I set a 1x2 across from where the curve at the bottom of the cowl starts up the sides of the cowl (where the "flat" starts at the bottom) and assumed that it would be the bottom of the firewall. And then I used the rule laying on the top, sort of like the picture in the plans and made sure there was 27 inches top to bottom. Then I used a tape measure and found that I did indeed have 34 and 3/8ish inches across the widest points side to side. I think theres a modest margin for error here. Anyway, I think I have the right size and shape.

Having confirmed the size at the aft end, I set about trying to "square" the cowl up. I tried to keep the lines, where the two halves mate as a butt joint, as straight as possible to keep the hinge straight. I

had to do some serious hand filing in the areas of the carbon fiber "tabs". That really didn't matter in that area, I could have just as easily filed the upper cowl instead, because the hinge stops before the tabs. Mark said the tabs are only supposed to be 4 inches wide and that two screws go in there, on of which holds the hinge pin in place. The hinge also stops about 3 inches shy of the aft edge of the cowl. That's still a long span, so I wanted to keep the cut edges where the butt joint between the cowls as straight as possible. Besides, the cowl looks better with a nice straight joint here.

I did some trimming and filing around the spinner, and I sanded and filed the side cuts. Both halves really started sitting together well, but there is still tension in the one side of the spinner. I clekoed everything back together and set it over the oil heater again. With the thermostat up full blast.

The Hidden Cowl Hinge

Again, you may want to wait until you get the cowl fixture and the top cowl aligned before you attach the hinge to both halves. Also, if you don't want the hinge "teeth" to show between the two cowl halves, be sure to bias the #4 hinge as far up as possible by drilling the rivet holes at the minimum edge distance in the hinge and on the cowl.

After work this day, I got out some #3 and #4 hinge that you use to hold the upper and lower cowls together along the long sides. The wider #4 goes on the bottom and the smaller #3 on the top cowl half. You are supposed to start the piano hinge 3 inches from the aft end and terminate it 1.5 inches from the "tab". Being the wiz that I am, I measured that to be 30.5 inches with my tape measure and cut me some hinge. Then over to my drill press. I set a fence up and drilled the #4 hinge first. I biased the holes top to bottom on the hinge to be more toward the bottom (away from the eyes). The reason for that is that when you install the hinge on the lower cowl, you bias the eyes upwards so that when you look in the gap between the cowl halves you do not see separate eyes. So you scoot the hinge upward a bit over the cowl edge. And so to keep a good edge distance, you therefore have to move the holes down away from the eyes and the cut edge of the cowl. IOW, the holes are drilled a bit south of center on the #4 hinge.

**Note: to get the eyelets of the hinge far enough above the edge of the upper cowl, I highly recommend that you drill the holes in the #4 hinge in the lower 1/3 of the body of the hinge. I would shoot for minimum edge distance on the rivet holes of the #4 hinge. Don't go for the center. I drilled mine just south of center, and the hinge pin still comes through very close to the edge. The cowl turns up a bit at the front end in the area of the tabs, so you are going to lose some edge distance no matter what. Get those hinge eyes up as much as feasible.

Man, 120 holes takes a while. I eyeballed every one of them after I set the fence on my drill press. I shot for smack dead middle of the eyes, but let the fence take care of the depth. My mind started to wander at one point and so did the fence. Good thing I came back to earth before I REALLY screwed up the piano hinge. That stuff ain't cheap.

I wanted a real pretty junction between the sides, although you don't want it TOO good. If it's too tight, I suppose the paint will crack. There seems to be a global .040 recommendation for separation to keep parts from cracking the paint off one another. This time, mine is less that that. I can always sand it back. But I wanted the sides very close. I set the two halves together on the nose. I held the front "corners" (where the tabs are located) and went ahead and drilled a hole. I then clekoed that one hole on each side together. That keeps the front corner area nice and tight. The aft ends are still flopping around loose. But they are touching enough that you can see where the high spots are. Again, I used my trusty Permagrit sanding block and smoothed those butt joints until there was practically no daylight visible between the edges. Once I had the first side mated, I duct taped it together in 4 locations, then ran another piece right down the joint. Then I did the same sanding and taping on the other side. This part wasn't too hard. Only a 3 Band Aid job. Boy, those edges get sharp. I finally got smart and started rounding them with the fine side of the sanding block.

Good help is hard to find... Note that gravity is keeping my Permagrit block securely to the floor. Also note that fiberglass shavings are pretty much impossible to get out of carpet. The carpet in my basement has been wet several times and it destined for the dumpster. Otherwise I would not be working on fiberglass over my carpet.

Once the halves were clekoed at the spinner and taped together along the cut edges, I set a couple boards at an angle up on my bench and I put the cowl up there on it's side. Per the plans, I marked 3 inches in from the aft edge. I put the #4 larger hinge with the pin in it along the cut line. I eyeballed to put the solid body of the hinge so that it just barely went above the cowl edge, thereby hiding the eyes. (Note: try to get the eyes at least 3/16 above the edge of the upper cowl!!!) I hand held the hinge and drilled the first hole #40. In goes a cleko and on to the next hole. I did this all by hand and Mark II eyeball. Four holes and clekos evenly spaced from end to end, then a quick check of the hinge pin to make sure it was still moving in and out easily. Next, I put the #3 hinge one and pinned it into place. I tried to hold it centered on the pin, but it didn't work out that great. On one of the sides, I drilled the #3 hinge side too "tight" and had to go back and drill new holes to get the pin to move

relatively easily. On the other side, there was a glob of epoxy under the hinge that raised it up, and I had to dremel it down, then sand it flush so the hinge would side right. I stopped at this point to have a TV dinner and veg. Next thing to do is figure out how to get the pin through the tab to the outside. Then I have to drill the remaining holes and get to the JB Weld and riveting.

The cowl halves look kind of cool at this point with the hinge material making a neat silhouette with the overhead lights shining though. Well, the picture doesn't do it justice. But I thought it looked cool. Maybe I spent a little too much time behind the drill today...

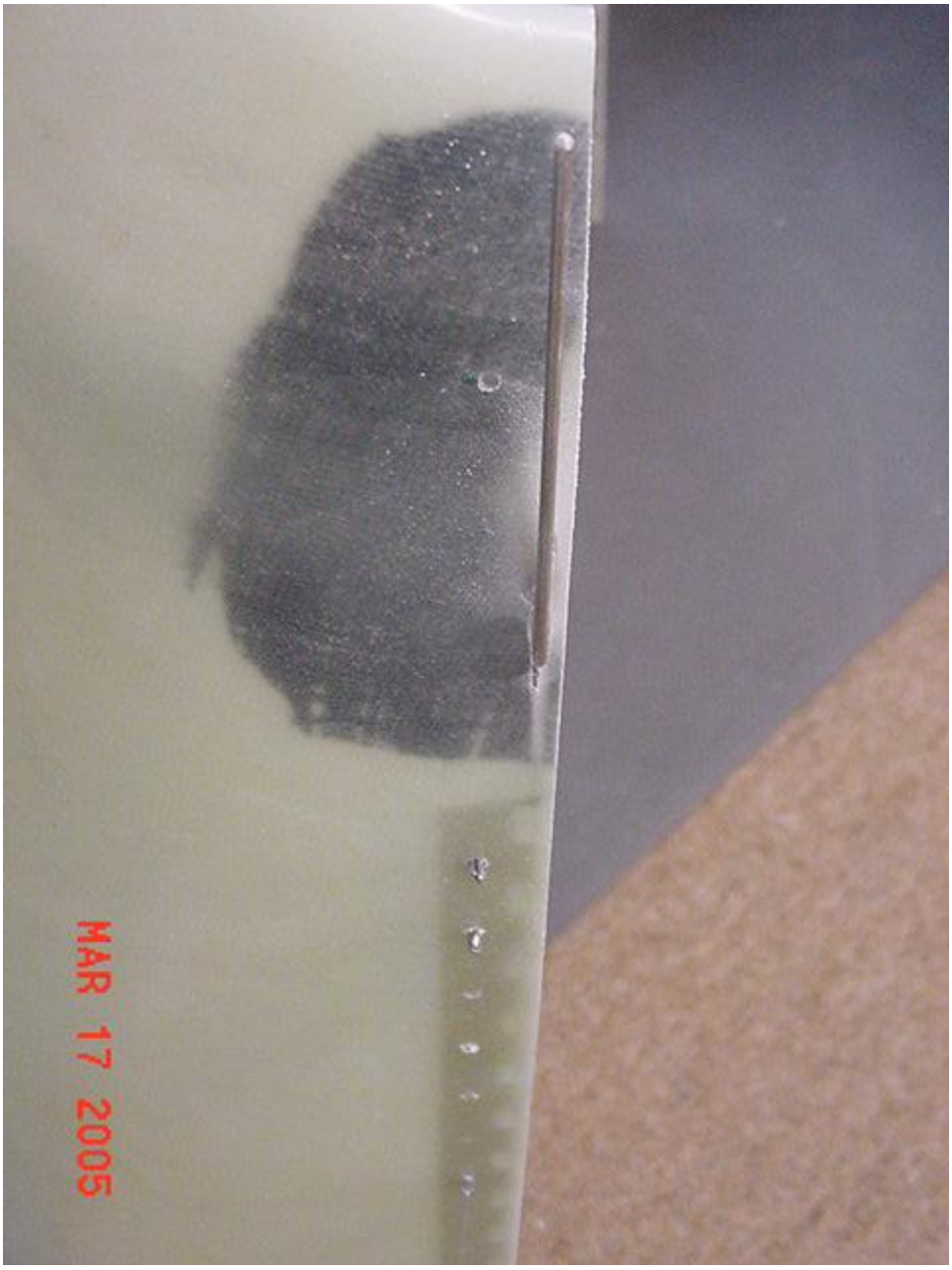
The aft ends of the cowl halves aren't perfectly aligned flush yet where they meet. I'm resisting the temptation to sand them flush. At this point I don't know if one side is too long, or if the other side is actually too short. Until I get a cowl fixture (or my MT prop) to use as an alignment jig, I just won't know.

The hinge pin comes through the cowl tabs from the inside to the outside, where it is retained by any

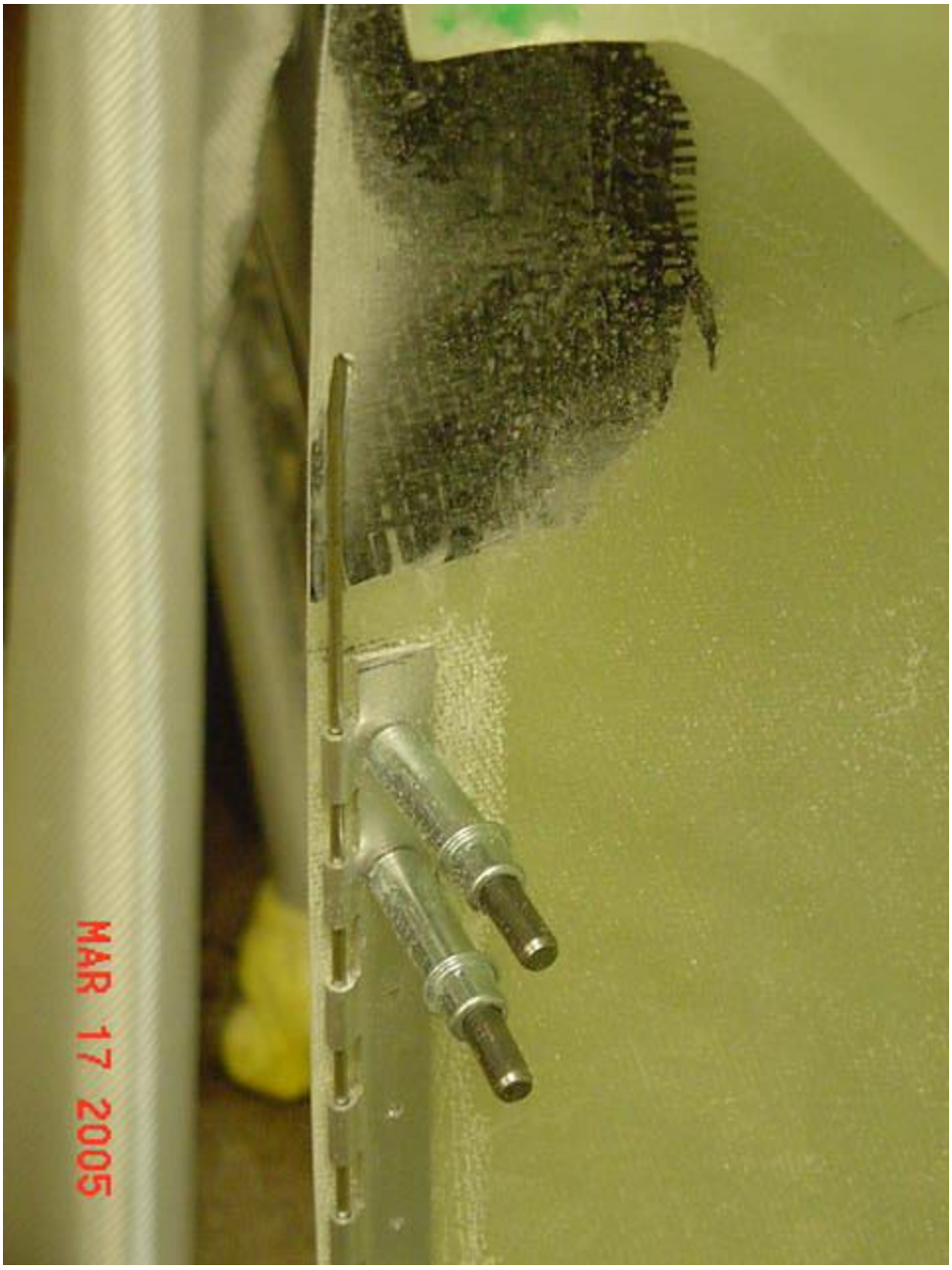
number of methods. The simple way is just to bend an eyelet in the pin and screw it down with a nutplate and #8 screw. First you have to penetrate the cowl. The word from Mark is to eyeball the process from over the top of the edge of the cowl so that you can see the inside and the outside at the same time. He said essentially take a #30 long drill bit and aim for the eye of the hinge. He also stated that if you do it right, no other support for the pin is necessary. I wondered if I shouldn't glass in a guide from the exterior hole to the hinge eye. I'll try to follow the KISS rule. As Mark will tell you, I tend to think "Space Shuttle" when I should be thinking "Tractor". OK, I'll try to lighten up.

I think when I try to do this, I'll run the hinge pin through and then shine a really bright light over the pin from the inside. That way I can at least mark the level of the track of the pin. Then it's just a matter of aiming for the hole. I can do that.

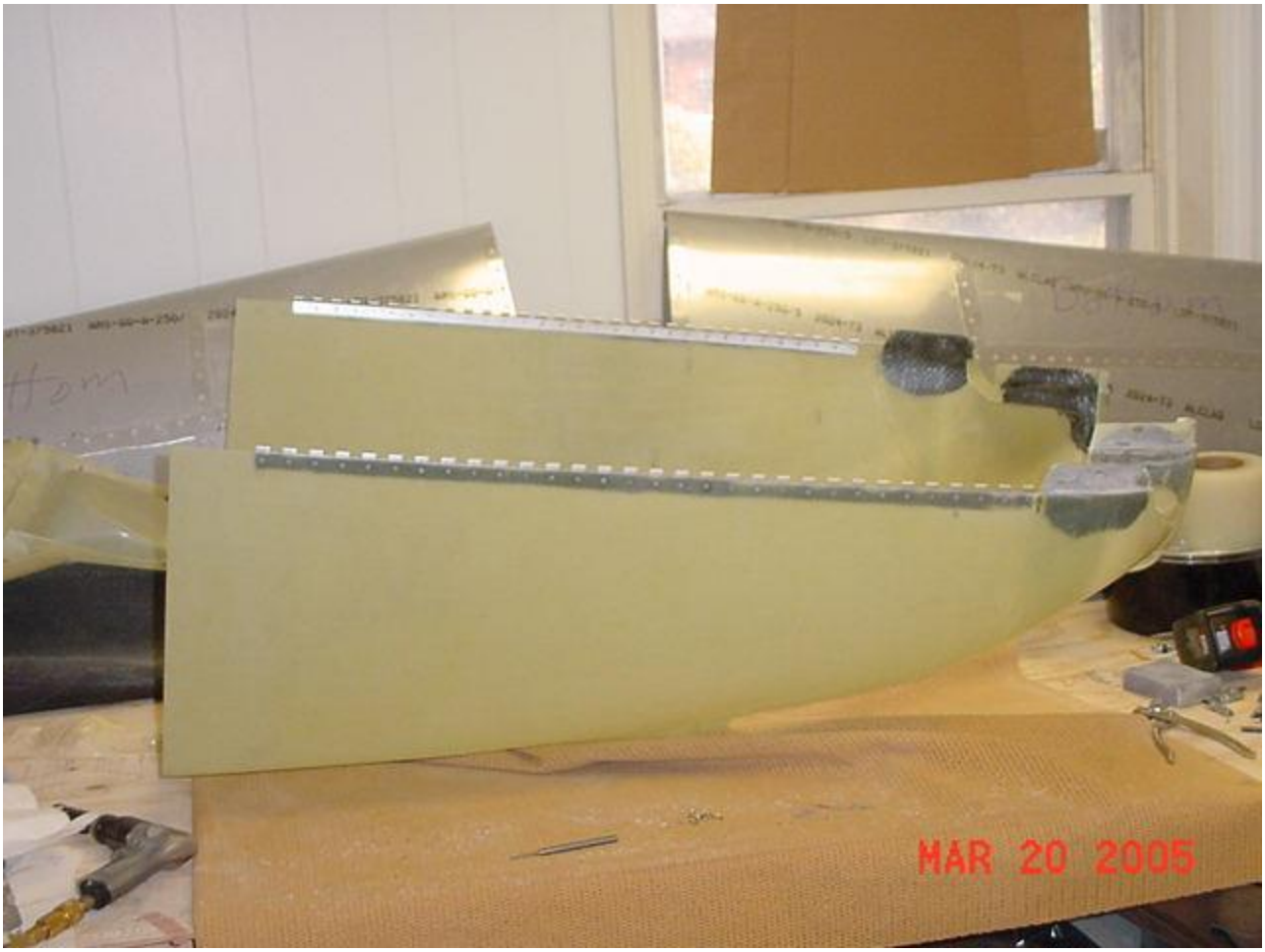
I haven't been able to find a "cowl fixture" to align the cowl yet. Mark has one to lend, and it may be on the way soon. The "Indy Gang" shares one that belongs to Jim Winnings, but it's out on long term loan, evidently. The reason I bring this up is that I will soon be at a standstill with the cowl. Of course I haven't mounted my engine yet, so the fixture won't do me any good. But in the next two weeks I hope to have the engine and cowl mounted and lined up. I asked Mark if I could go ahead with the air and filter duct that has to be fitted on the bottom cowl. He was leery because the shape of the air scoop depends on the cowl. And unless the cowl is on the ship in it's proper shape, the air scoop could end up not fitting, or at least look a little wonky.



Lunchtime came a little early today, so I ran home (got my motorcycle out..). I pulled the cowls apart and flipped the upper onto my bench. I ran the pin in and got an idea where it contacted the cowl. I used a long #40 bit (not 30) and lined it up as best I could. I started the drill perpendicular to the fiberglass and then turned the bit towards the hinges as I went along. It popped through before it could make any kind of a slot. And Boy, is that glass thin there. The edge is like 1/8 inch or less from the hole. YIKES. I ran the pin in and out, and sure enough, it headed right for the hole. I decided to help it along with my dremel. I slotted the inside, ran the pin through and then slotted the outside a little. Now that baby runs right in and out of there. I think I need to re glass the slot some and then clean it up some, but overall, it's a go! Now to do the other side, then contend with the tabs on the lower cowl. Now for a ride back to work!



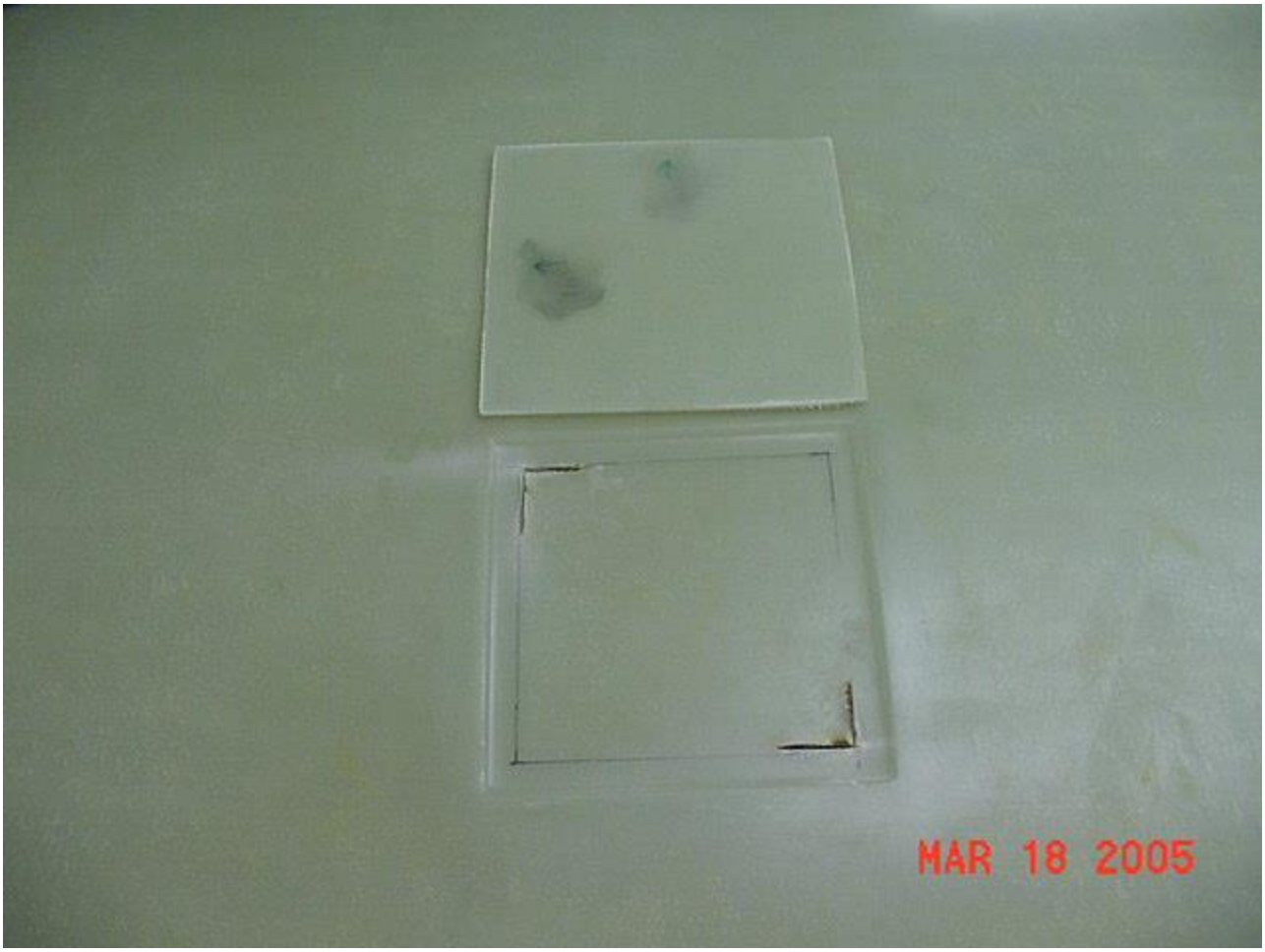
Once the hinge position is set and the slot is drilled for the pin, it's time to think about permanently mounting the hinge. The plans recommend that you epoxy AND rivet the hinges to the cowl. Time for some JB Weld. I finished drilling all the holes in the fiberglass and countersunk it for a soft #3-4 rivet. I prepped the hinge for riveting and bonding. I mixed up the JB and slathered it on the lower part of the hinge then worked it upward over the holes with an "Ah stick". Originally, I was going to coat both the fiberglass and the hinge, and I started with the fiberglass. I didn't like the result halfway through the first hinge, so I quit. I merely covered the hinge body and tried to stay away from the eyes, knowing that when I squeezed the rivets, the JB would migrate. And it did. You can see through the fiberglass enough to tell where you have good coverage with the epoxy.



After completing the 4 hinges, I went back and cleaned the area around the hinge eyes and rivets. Then I ran the pins through. No problem there, just a little tighter than before. I figured I had better go ahead and pin the halves together while the JB sets up, just to ensure the best alignment.

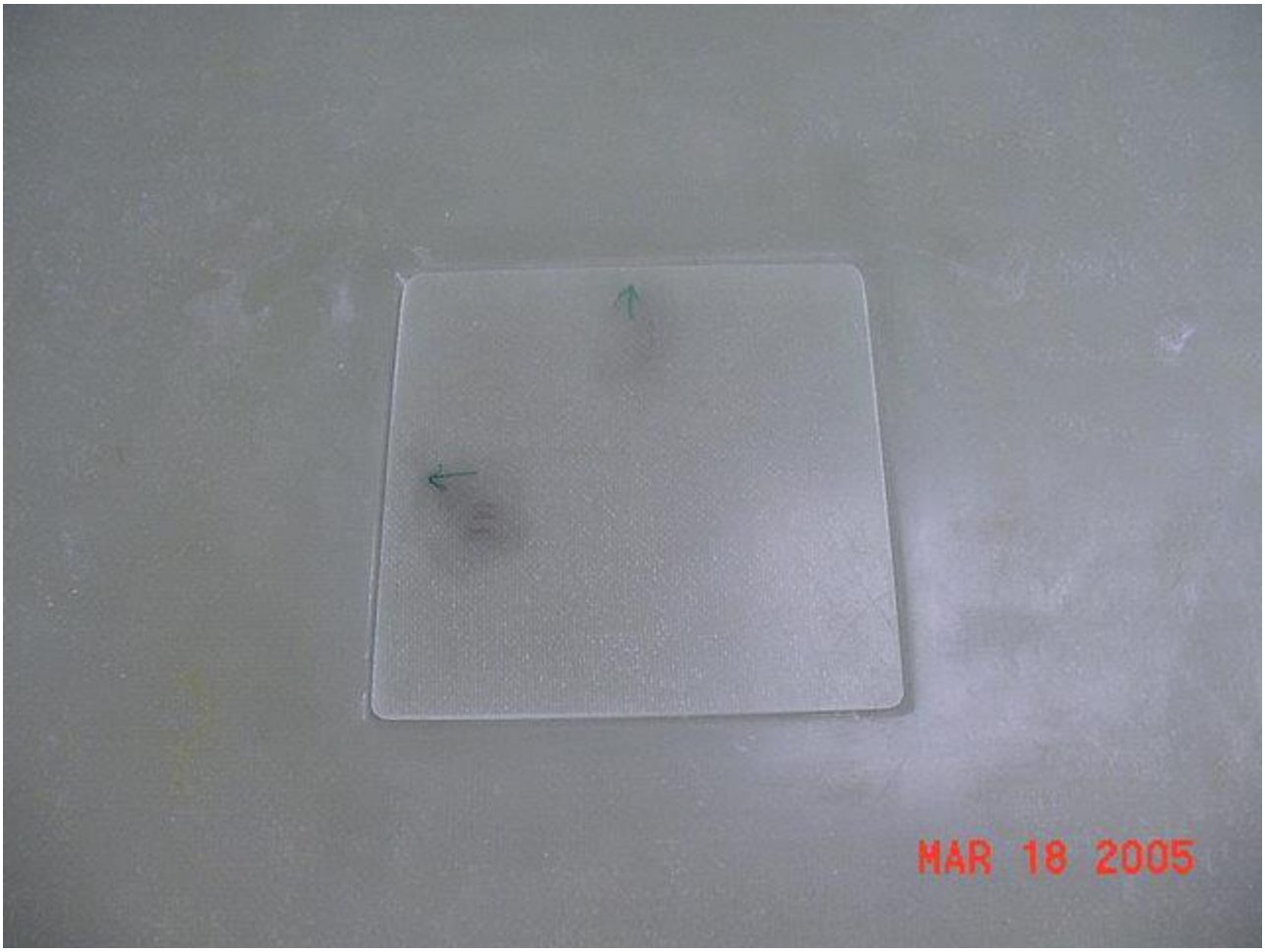
The Oil Door

I like how Randy Pflanzer did his Oil Door. He made his hinge hidden and protected. Less mess and perhaps a better seal. I don't plan on making a plenum, so I need my door plenty strong. My plan right now is to use one Hartwell clasp, but it may take two of them to insure that the oil door stays down and sealed.



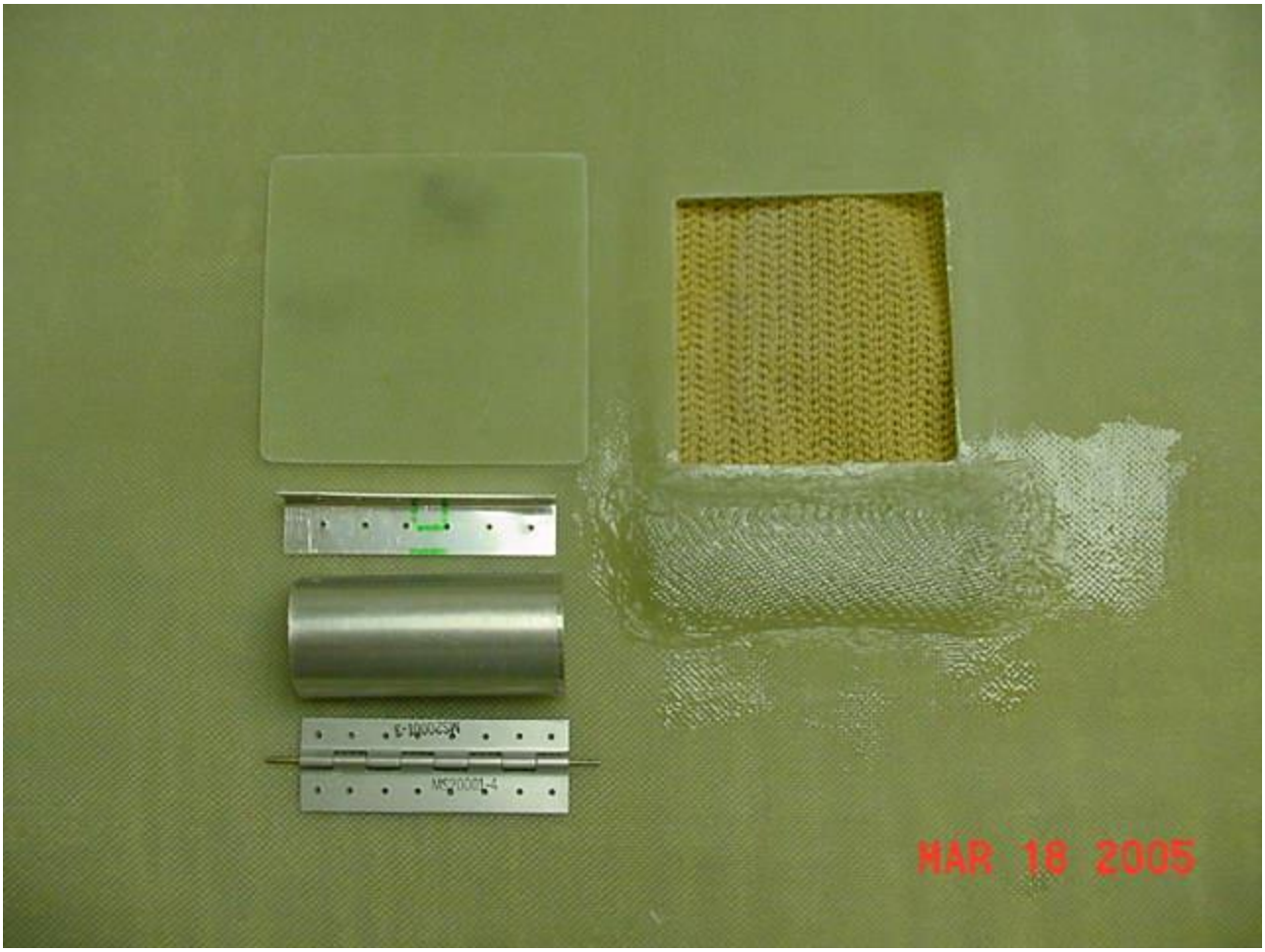
The plans suggest 5/16 to 3/8 inch border around the cut out for the oil dipstick door. I did not make provision for cam locks in the corners. I measured a liberal 3/8 around the inside of the oil door recess on the top cowl. Then I took my dremel and made corner cuts that were big enough to be able to follow through with my air saw. I used my Permagrit block and smoothed the inside edges.

The oil door comes scribed, so I used my air saw and cut it right to the line. Then again, I used my Permagrit block to square it up and smooth it off. The door sits in the recess of the cowl rather nicely without any cleanup of the cowl. The recess is just right. You can adjust the door on the engine side if you want it to sit better..

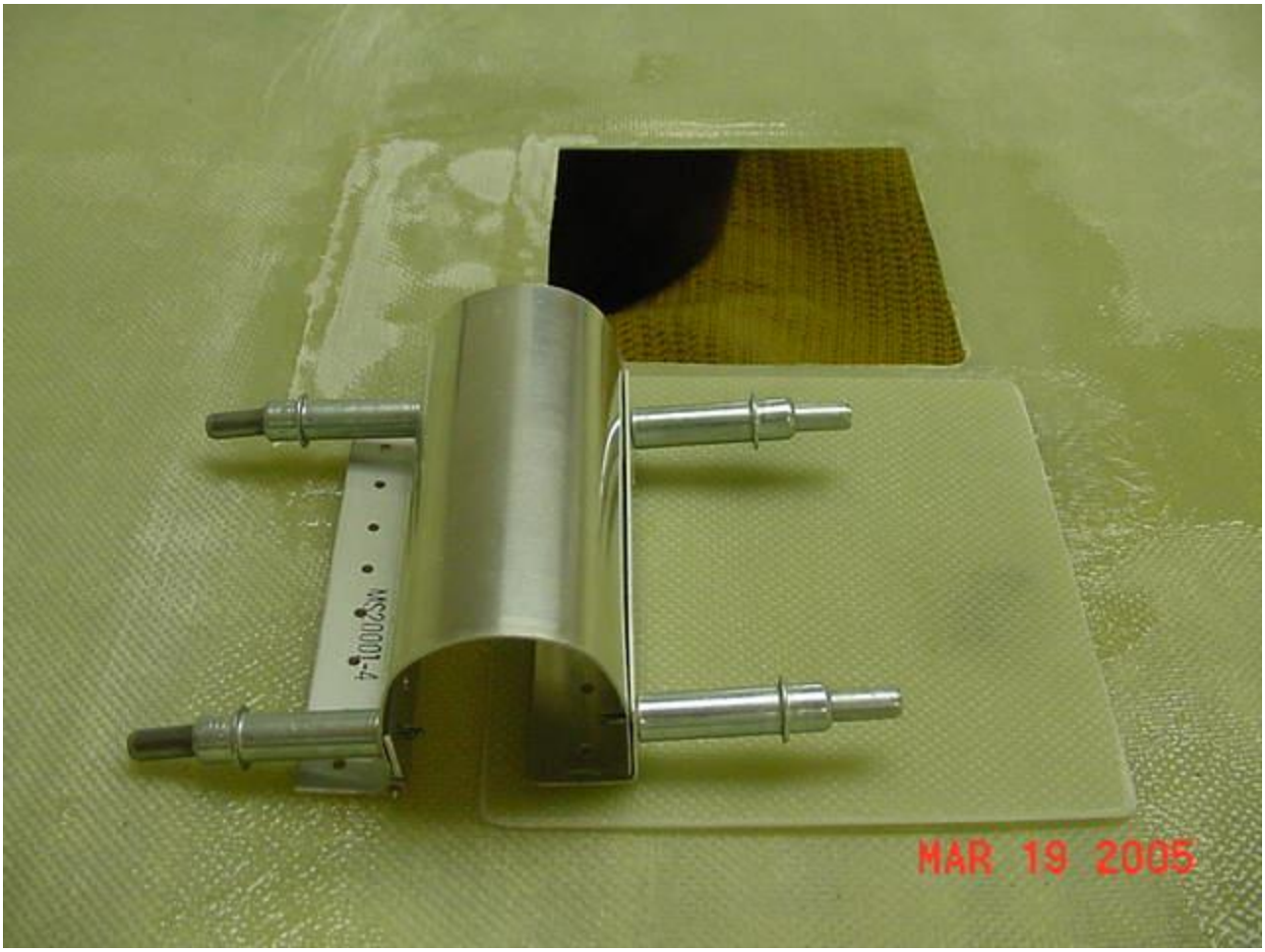


I wasn' t sure which way the door was supposed to open. I think it's supposed to open toward the mid line of the cowl. At first I figured it opened toward the rear. I think it's less likely to be a problem if it wants to open in flight it it's hinged along the center side, rather than at either end with the airflow. So I'm hinging it at the "top" of the door, not the aft end.

I laid up several layers of cloth to reinforce the hinge and bring the underside level with the step recess around the opening in the cowl.



I used .032 scrap to make a 3/4 x 3/4 formed bracket. I also used the same scrap to make the body of the hinge, but later changed it to .040. Turns out that once I cut the #3 and $4 hinge to mate the cowl halves, the left over hinge was just the right size to use for the actual hinge. I am using the #4 against the ship (bonded and riveted) and the #3 section will be riveted to the .032 curved body with #3 rivets. The body of this type hinge has to be rolled and then shaped. The idea is to attach the hinge remotely, so that when you flip the door up, the rolled area of the hinge curves out away from the edge of the opening, and allows the oil door to swing back away from the access. Hard to describe, but a nice way to function.



The plans recommend that you use doublers to level the hinges. I won't need to do that, because the layers of fiberglass I've put on to reinforce the hinge area also serve to bring the level of the hinge down to the level of the stepped lip in the cowl opening. Actually, with this method of oil door hinging, you don't need the thickness to level the door anyway. The rolled body of the hinge is very adjustable, and will allow you to level the door very easily.

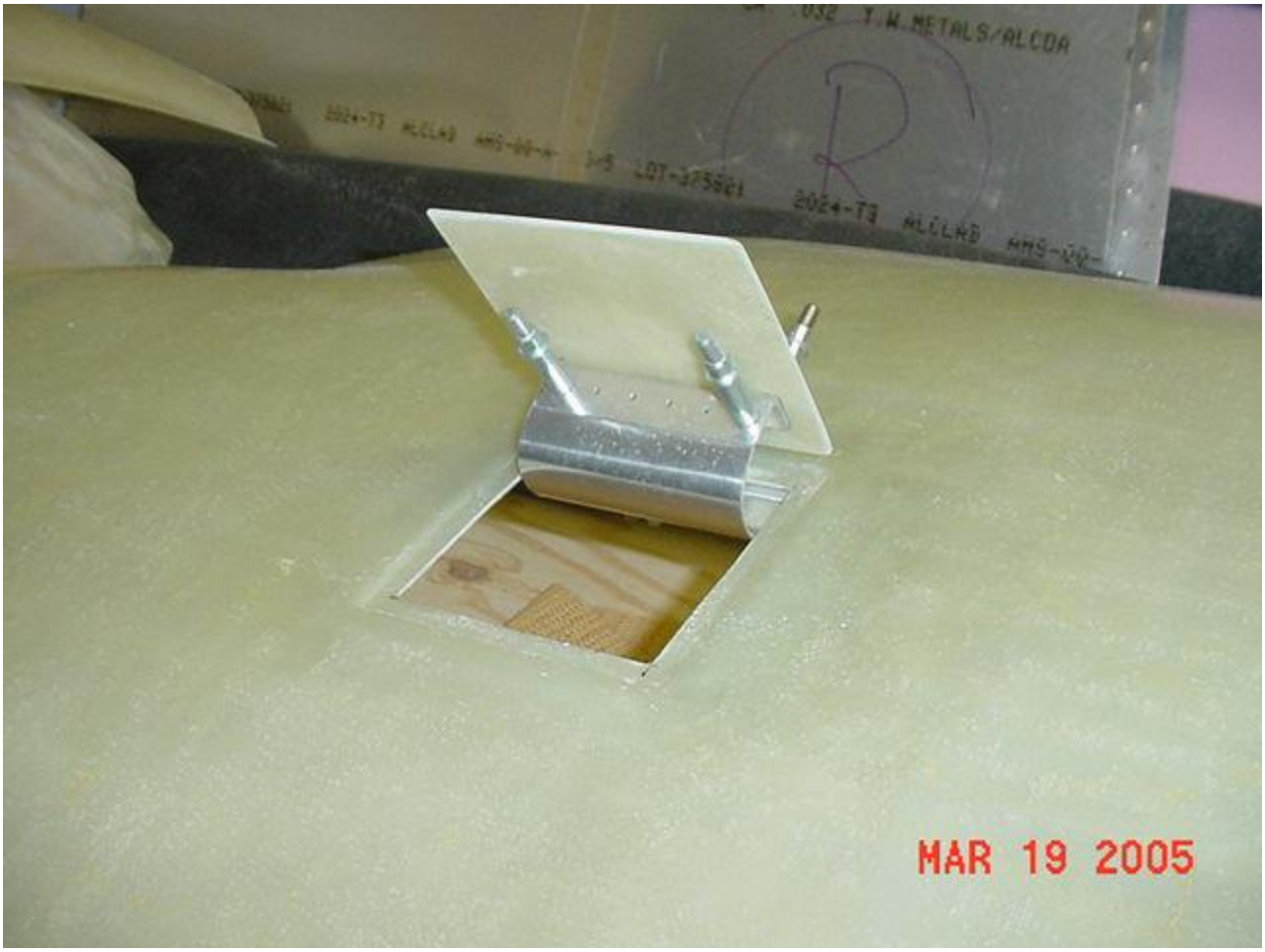
The tough part about this is where to locate everything. The hinge has to clear the lip of the cowl AND the Hartwell Clasps that I'm going to use to close it. Well, it was going to be guess work, or I could just do a trial run. With as few holes as possible. I set the cowl on it's back on top of a couple containers so I could locate the hinge assembly and then "operate" it. First, I taped the oil door in it's recess so it would stay in place upside down.

What I found was that the best operation seemed to be when the apex of the curve in the rolled body of the hinge sat directly above the lip of the opening. My rolled piece is nearly round, so this was kind of a no-brainer. I've seen hinges like this that were no where near round and so the apex above the lip would not work that way.

You could actually bend the arc of the body of the hinge oblong or lean the bend with the apex biased toward the hinge. Then you just turn the bent angle that attaches the hinge to the door around so that you can open the angle to more than 90 degrees. What I mean is you just set up everything so that the hoop of the hinge body leans more toward the hinge. The more you bias it that direction, the farther open the oil door will be. Then the door is more likely it is to stay in the upright open position without holding it because it will lean back over center. I could actually still do that. The only thing that would be a good idea to change is the bracket on the door. In order to lean the hinge over more, I'd have to close the angle of my bent .032 bracket beyond 90. It would do it OK, but it's just not a real good practice. You don't need to make the body of this hinge a bow or half circle, either. I'm sure you've probably seen a hinge similar to this already in the aviation world. You could make the body much smaller and make sharp bends in it to keep the body much smaller. I may end up doing that down the road. For now, I just wanted to get the door on, and this was the easiest way for me to make it. at the time.

I went ahead and drilled 2 #40 holes through the #4 hinge on the cowl and clekoed it down. Next I taped the hinge up to the cowl to hold it against the oil door. I went ahead and traced the oil door bracket with a sharpie and also marked the two outer most holes. Then I flipped the cowl upright and shined a light up from the bottom so I could locate and drill the holes. What I found was that the bracket wasn't flush to the door and the light was pointed at an angle. So the shadow that I drilled was NOT directly over the hole, but offset about 1 diameter. No biggy, I just used the drill and ripped the hole to where it should be and clekoed it down. Nix the light. Ambient lighting was enough to see the black marks I drew. Even the holes drilled in the bracket were visible. Anyway, I drilled the hole at the other end and clekoed it.

Moment of truth again. Take off the tapes and VIOLA! It worked! And the way I have the roll in the hinge body, the door should flip back and stay there.



The door actually opens more than shown in the pic above. The clekos are interfering with the full travel of the hinge.

I went ahead and changed the hinge body (the rolled part) to .040 T6. I was going to use something heavier, but I think you loose adjustability if you go with really thick, heavy metal. Another consideration here is that the slop in the hinge only lets you get this thing so "tight and right".

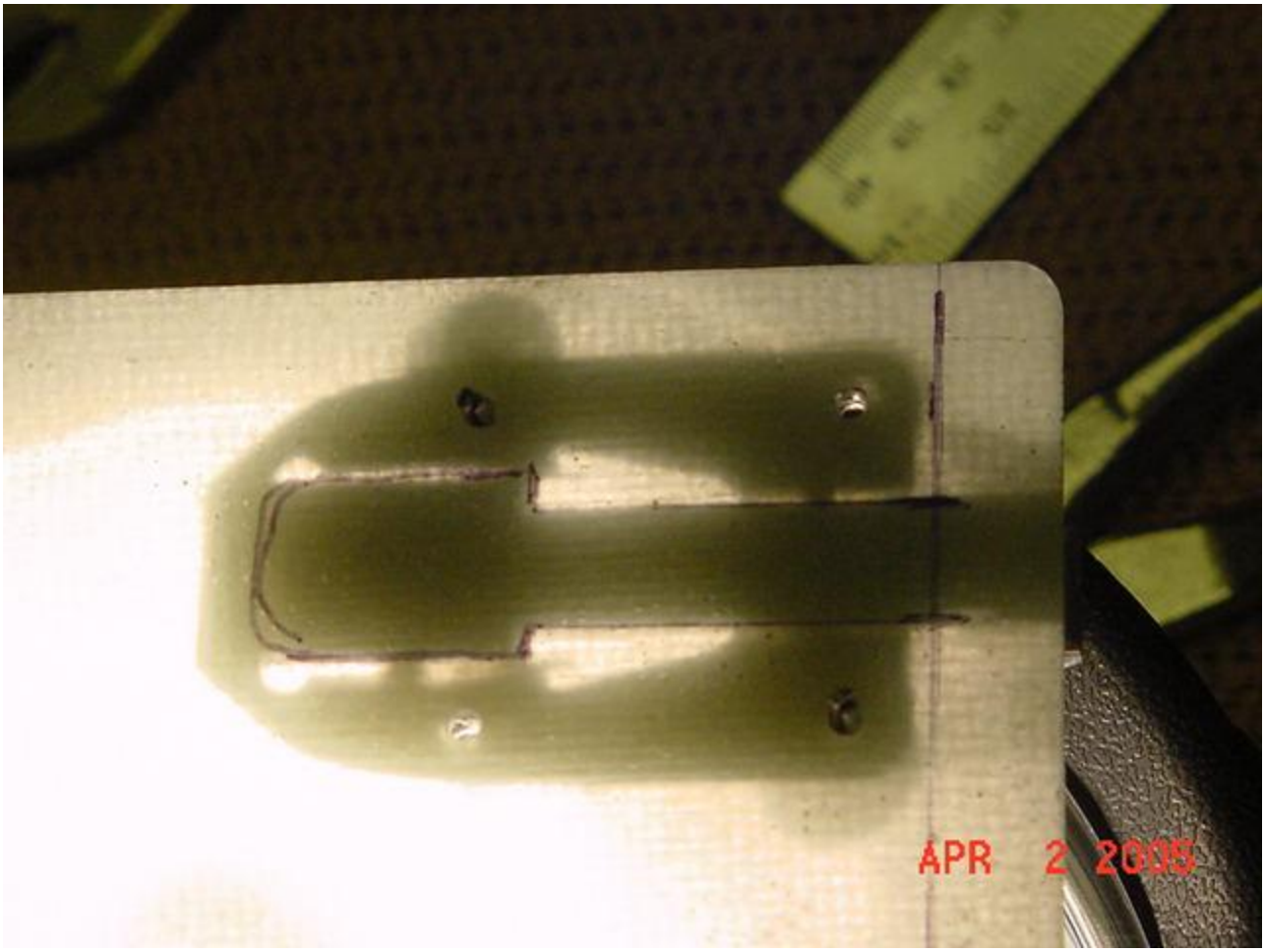
Hartwell Latches

The F1 Rocket kit comes with Cam-Loc fasteners for the Oil Dipstick Door. I didn't want to use those, I wanted to make the door operate without tools. The Hartwell latch is a neat spring loaded clasp that heartily grabs the lip of the cowl and can really hold the door firmly. I bought two different sizes from ACS, and I found that the smaller pair was adequate for the oil door.

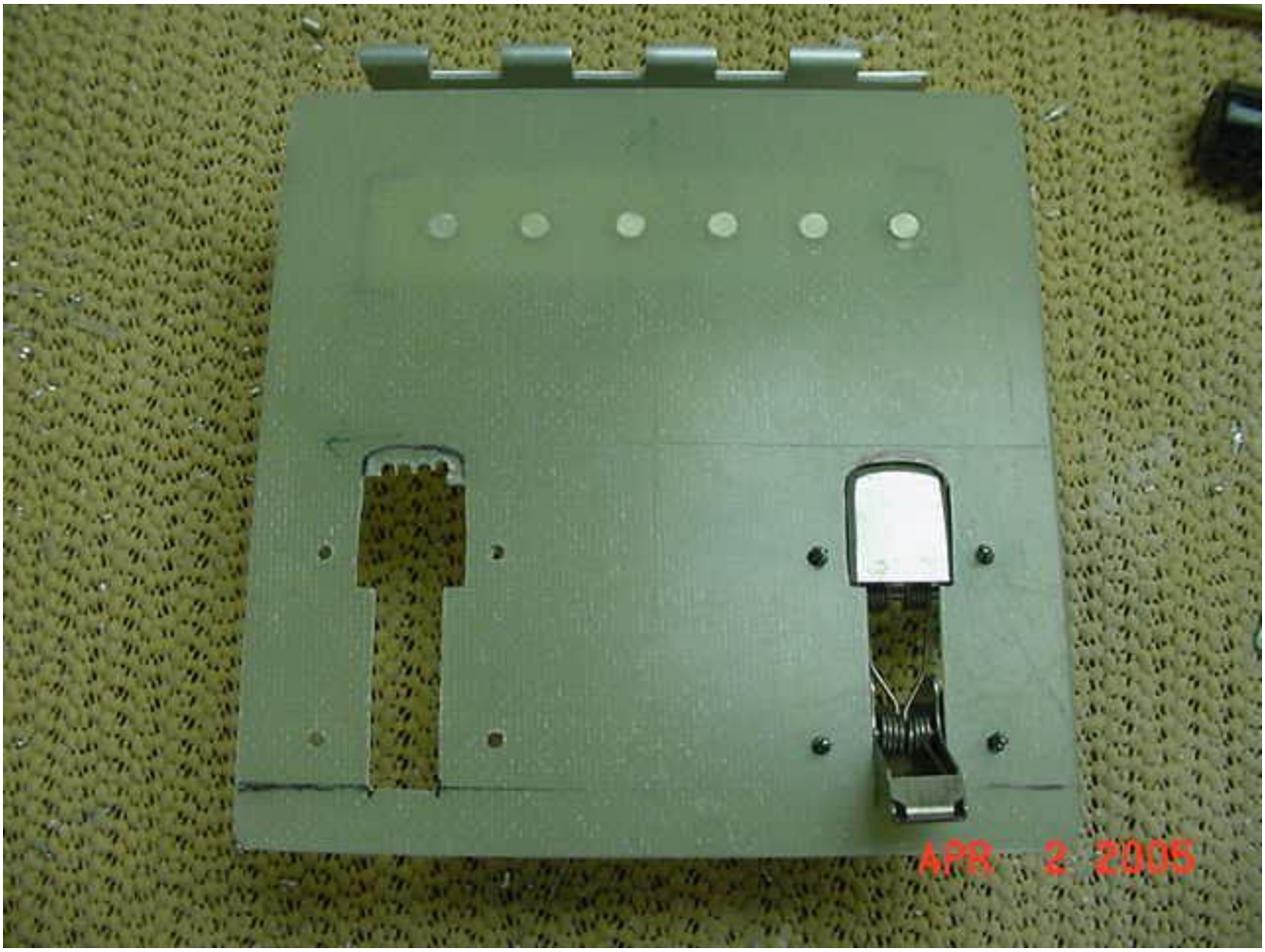
There are no instructions on how to install the Hartwell latches, so I started searching the web. I didn't find any instructions, but I did find some nice jpegs that gave me the idea on how to start.

First of all, I measured the lip around the oil door inlet. It happens to be 10 mm. I marked the perimeter around the fiberglass oil door that same 10 mm. Now there is a joggle on the Hartwell where the narrow lever becomes the hasp that locks under the cowl lip. That joggle needs to be placed at the 10 mm mark. In my case, that made the hasp of the clasp stick out away from the edge of the oil door a little. That's OK, I want as much grip as these two little latches can manage. I was quite prepared to modify the lip to increase the grip. Fortunately, with my positioning of the joggle, it worked out very well.

I laid the latch on the oil door and tried to place the 2 latches symmetrically. Well, in doing so, I ended up violating the 10 mm border with the latches. Not bad, but I had to reduce about 2 mm from the outside edges of the latches to get them to clear the lip of the cowl inside the oil door opening. Had I needed to reduce more than that, I would have had to start cutting back the lip. Fortunately, the 2 mm worked out. I placed the outer edge of the narrow lever on the latch at 20 mm from the edge. I wish I would have used 25 mm, and that would have saved me a little grinding. Oh well, it turned out fine. I positioned the latches on the oil door and drilled #40 though the latches. Then I clekoed the latches to the oil door. So far, so good.



I sat the Hartwell latch on the bottom of the oil door and hit the back with a light. That made a nice silhouette, and I used a sharpie to trace the outline of the latch. Then I used drilled, files and a coping saw blade to cut out the recess for the latch in the oil door. It takes a lot of fine work to even get the recesses decent. I went back and hit it all with sandpaper afterwards so that when I operate the latch, the fiberglass edges aren't sharp around the latches.



The rivet holes in the latch will take a #3 countersunk rivet, probably a -5. I'll cs the oil door and squeeze the rivets in each corner of the door. And that will complete the latches and the oil door. Then I just have to insert the hinge pin and fasten it down. Very nice little project!

The Air Scoop

If you plan on putting in Cold Air Induction, you should go ahead and fit the air scoop, but the air box and filter will be quite different.

Mark at Team Rocket (well, he IS Team Rocket) advised me not to put the scoop on until the cowl was on the ship. He was concerned about the shape of the air scoop (and sub parts) and it's relationship with the shape of the cowl. That's why the plans show the air scoop constructed after the cowl is aligned and mounted on the ship. It looks like Randy Pflanzer just made his with the cowl half sitting on it's ass all by itself, so I think I'll go ahead and keep pressing on to try to get it finished. I will at least put the cowl halves together to have a more stable surface to work with, and while sitting on it's ass end, the cowl should be close to it's shape in service.

I still don't have my engine core or the cowl fixture yet, and the cowl is not installed or aligned on the ship. I used my cheapo air saw and cut the air scoop to the molded-in trim lines. Then again, I used the Permagrit block to square and smooth it up. Next thing to do is to cut the lip of the lower cowl around the spinner. This is one of the many areas of the plans that leave the work to your imagination. I essentially had to come to the same conclusion with the air inlets, so I'll cut away on this area, too, to eliminate the wonky overlap in deference to a butt joint.

Time to put the dremel to work. I wish I had one of those air driven cut off wheels for the rest of this job. A dremel is a wee bit small for this, but it will suffice.

Well, I was right. A dremel just isn't enough. In fact to get this POS to fit even close, I finally got out my 4 inch side grinder and went to town. I had to gut behind the spinner area on the air scoop and grind the holy shit out of the spinner area of the cowl. What a lousy piece of work. Now I know why the plans recommend you reinforce the pieces. It's because you have to mangle the shit out of them to get them to fit, and they end up so thin that you know they will crack in service. In fact, I already cracked the air scoop at the spinner on one side, so I'm going to have to repair and reinforce that piece. Well, there's a bunch of reworking and finishing anyway, so it's not really THAT big a deal. But before I go much farther, I'm going to reinforce under the spinner area in the lower cowl big time.

After a few hors of sanding and grinding, I finally got the POS air scoop to fit on the lower cowl. It seats rather nicely now, thanks to lots of stupid cheap labor... me. Once the scoop was fitted, I went ahead and cut the mount open. That alone took about an hour to cut and shape and smooth.

Then I cut the big air hole (where the air scoop attaches) in the lower cowl per plans. 7/8 on the sides, and 1.5 inches at the front. The rear is a guess. I left it alone. It isn't hurting anything. You are supposed to radius the corners to 1 inch. I looked at the pic in the plans and guessed. Looks good to me!