

SHROUDLINES

A Dallas Area Rocket Society Production



Member of the
National
Association of
Rocketry

Section #308



May/June 2015
Volume 24, Issue 3

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Robert and William Vanover pose with their 8" Uber Pike Level 3 project.



Ignition!

By Gary Briggs

Well, it has been a rough couple of months on the rocketry calendar. Most summers in recent memory, we were generally fighting burn bans to get launches in. This year it has been the rain. Who'd a thought we would have cleared our annual average rainfall by the end of June? DARS did squeeze in the June launch and by all accounts it appears to have been a good one. On the contest side, both MegaLaunch and DARSTAR XI have been postponed to a time where the field is more applicable to rockets and less to boating. Here is to at least slightly drier times ahead so that rockets can be flown. In the meantime, you should have had plenty of time to build...

I have a build queue that is a mile long. It is broken out into 3 categories:

- 1) Built but not finished rockets. This includes rockets that have been repaired from flight damage or rockets that I acquired that required repairs. It also includes projects that were completed, but haven't gotten into paint yet. I can make the excuse that rain and humidity has slowed me on this task this year, but the reality is that I just haven't had the time. These rockets represent the quickest new birds to fly and the shortest path to that satisfaction of completion, so they should

- really get the attention, but then there is the next group.
- 2) Rockets that are partially completed/started or in need of repair. These include models that I had an idea on and probably had the parts around or the kit available to start the build, but for whatever reason (Squirrel!!), I got distracted, and shifted my focus to something else. I used to regularly have 2 or 3 builds going to maximize time between glue drying, paint prep, etc. Now that I have very little time for builds, this results in more incomplete projects. I continuously go through mental gymnastics about fixing damaged rockets verses new builds. They each provide a different type of satisfaction, but this can create analysis paralysis. That brings me to the last group.
 - 3) Unbuilt kits and concepts. Everybody is familiar with this one. You got a good buy on something you thought you needed to have on a HobbyLobby close out, you won a kit at a contest, you bought the kit or all the parts for something that at the time was going to be the coolest thing since AP motors were invented, and then, life gets in the way of your hobby...

So what's a builder to do? The left brain folks will tend to head to Excel and list all the builds out and

maybe weigh the time required to completion, or coolness factor, or whatever to determine what to work on. Others may just stick their finger in the wind choose the project that speaks to them and dive back in. Others still may buy something else to start, since we never have quite enough. What's your strategy here? Is it an important topic or just another waste of time while you should just be building? Ah the intricacies of the hobbies we love...

Once again we are struggling for content. I hate to be a nag, but without content there is no Shroudlines. As a club, we need to determine if that is important to us or not. Please share your thoughts.

I do want to thank the regular contributors, that include Bill Gee, George Sprague, and Robert Vanover. They have really carried the newsletter in the past few months. Thanks to all the others who have also contributed on a less regular basis and keep the content coming.

This month, due to lite content, I am giving the entire newsletter to Robert Vanover, to regale us with more details of his awesome level 3 project. Robert and his nephew William always build spectacular rockets and the details he puts into this bird are just stunning once again. Until next time, have a great summer. GB

Bill's Something #14 - Attaching fins

By Bill Gee

It is sometimes said that old habits die hard. More on that later. What is often true is that those old habits may take a long time to form. Many people who have been building for awhile have their own favorite way to glue fins. I will describe mine.

Some people like to fill the grain in their fins before attaching them to the tube because it is easier to fill and sand flat pieces of wood than fins on a rocket. I do not. My experience goes back to when sanding sealer (and balsa filler coat) was all we had. Based on clear butyrate dope, these coatings did not allow the leading glues at the time to penetrate the wood and form a good bond. Today, some (including me) fill wood grain with porous products like Fill'n'Finish which theoretically should work with white or yellow glue, but I still fill the fins after they have been glued into place. Old habits die hard.

Other than using specialized tools, there are essentially two ways to mark a tube for fin positions. The method favored by Centuri was a circle printed on the instruction sheet with radial lines indicating where the fins are to go. I never liked those as I seldom managed to hold the tube centered perfectly on that circle. The other method is a wrap-around marking guide. If you have been following my ramblings, I presented a method for making your own marking guide in the first installment.

Today, I usually reach for the Estes tube marking guide set. Pick the appropriate disc for the size of the tube, slip it into the end of the tube and mark it for three or four fins. Simple, reliable and accurate. The

only improvement to this technique which I will do someday is to transfer those radial marks onto the flat faces of the new Estes tube cutting guides. Old dogs can learn new tricks after all. But this approach works only for standard Estes tube sizes. My only real complaint about the Estes tool is that the provided plastic straightedge is flexible and sometimes warped; I use a replacement aluminum angle from the home improvement rocket store. A one yard long piece is cut into an easy handling 15" tool and a 21" one for those longer tubes.

One final word on tube marking - if the fins are to go at the very end of the tube as most seem to be, extend those alignment marks onto the end and even the inside of the tube so that their positions remain visible with the fins in place. Doing this helps greatly with getting them aligned parallel with the tube as you are gluing them.

What other tube preparation do you do? Some builders sand the entire tube to roughen up the glassine coating for better paint adhesion. Some builders sand away much of that coating where the fins are to go so that they are gluing to the paper of the tube instead of that outer coating. I do neither.

Usually, I use a needle chucked in a pin vise to poke a series of small holes in zigzag fashion along the line where the fin goes to allow glue to form "rivets" into the tube. Some builders do the same with the root edge of the fins, but I often mess up the wood that way so I quit trying.

One final word on preparation. If the tube is small or the fins are thick, I

wrap a piece of sandpaper around a slightly smaller tube or dowel and sand a slight concave curvature into the root edges of the fins, both to provide more gluing surface and to make it easier to get the fin perpendicular to the arc of the tube.

Before actually gluing the fins, decide whether you are going to glue a fin directly over the marked line or next to it. Some will insist that gluing next to the line makes lining up the fin easier; I will not argue with that, but make extra marks or do something so that you always glue the fins on the same side of the line. Some make two lines instead of one on the tube for each fin, but that is more effort.

And now for the actual act of gluing. If you have been building very much at all, you have probably heard of the "double glue joint." There are many differing descriptions about how to do this. What I do is to apply a small bead of glue along the root edge of the fin, press the fin onto the tube and immediately remove it. Let the glue set for about thirty seconds then apply another small bead of glue to the root edge. Press the fin into place on the tube and it should "grab." Use a toothpick to smooth out any glue which seeps out of the joint.

You have a little bit of time to move the fin around before the glue really sets so take the effort now to see that the fin is lined up parallel to the length of the tube and sticks out perpendicular to the arc of the tube. I like to sight along the length of the tube to see whether the fin is parallel. As I usually install the motor mount before attaching the fins, I put a used motor into the mount and visually line

up the fin with the nozzle for perpendicularity.

When a fin is attached and aligned to my satisfaction, I set the tube horizontally with the new fin sticking straight up. With double-gluing, five minutes is plenty of time for a fin joint to set up so that I can do the next.

A fin joint is not complete until fillets have been applied, both for lower aerodynamic drag and greater structural strength. Yellow and white (to a lesser extent than yellow) glue both shrink as it dries so thick fillets tend to develop holes and bubbles. My solution is to apply only a small amount of glue at a time. I usually do two light rounds with yellow glue for strength. Do the two facing sides of adjacent fins at a time and let them dry with the rocket lying horizontally. Light applications dry pretty quickly.

Follow that with a heavy round with Titebond Trim and Molding glue for streamlining. This specialty glue is thick, so it stays in place and resists bubbling. If you need to smooth it more than once after putting it on, use a moistened finger - it is that thick. This is a rather recent development. Old dogs do learn new tricks.

A common problem with filletting is a chemical reaction between sanding sealer and glue creating bubbles. White glue does not do it as badly, so I often go one final light fillet with white glue even though I no longer use sanding sealer. Old habits die hard.

Some kits feature through-the-wall (TTW) fins. Tabs on the root edge

protrude through slots cut in the tube. Larger rockets and especially those with larger motors benefit from the added strength provided. Remember that most of the strength is from the leverage on the tab between the motor mount tube and the outer tube, so be sure that the tab extends all the way to the motor tube and that enough glue is applied to that vital joint. For larger rockets, a common technique is to delay attaching the aft centering ring until last so that beefy fillets can be applied between the fins and the motor tube as well as those between the fins and the inside of the body tube.

Now we get to the big part about old habits dying hard and the subject of fin jigs. Some years ago, I found and bought a discontinued Estes fin jig in a hobby shop. Reading online revealed that it was somewhat collectable and that the earlier metal version was much better than the plastic version I had acquired. So I never opened and tried it. My only regret is not donating it to the NAR auction back when it could have brought in relatively big bucks.

When I first heard about the Guillotine fin jig from Ted Macklin, I was convinced and bought one. Upon trying it, I realized that I am so stuck in my old ways and using the jig to be very different. My workspace is not very brightly lit; an easy solution is to clip a couple of flexible book lights onto the frame to put extra light where it is needed. I also found it difficult to do my usual double glue joint with the jig and putting a tube with a freshly attached fin into the jig for

final alignment and drying to be problematic; I do not have any ideas about how to solve this. One other challenge is aligning the marked line with the guides of the jig; I had considered adding a laser pointer to illuminate the critical spot, but thought the risk of a stray reflection off the aluminum rails to be too much. Ted, if you are reading this, let's brainstorm...

A recent fin gluing technique I have not mentioned because I do not use it is tacking them into place with CA glue followed by fillets with traditional white or yellow glue. For those who use this technique, the Guillotine would be perfect and that is probably Ted's target audience.

Still, the jig is a well designed and constructed tool and I will continue to try to alter my old habit in small ways to make it work for me.

If you would like to discuss this further, post your comments to the DARS-General Yahoo group at <http://groups.yahoo.com/group/DARS-General> or Ye Old Rocket Forum at <http://oldrocketforum.com> where I like to hang around.

We Can Lick Gravity—Part 2

Words and Pictures By Robert Vanover

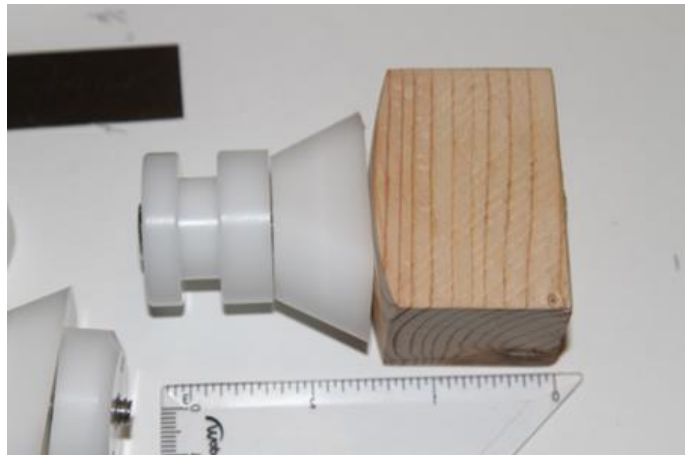
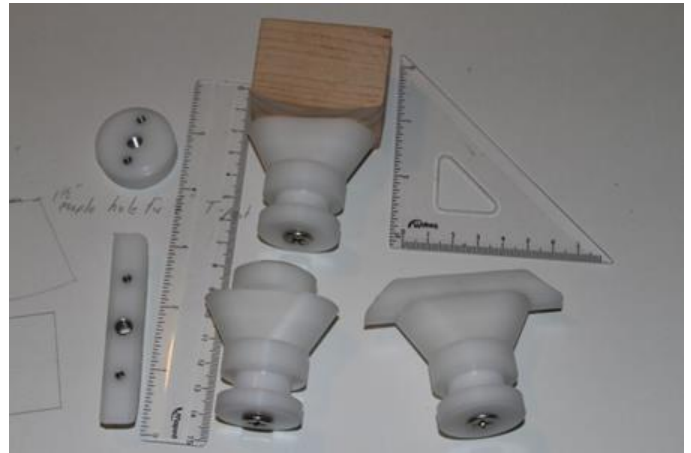
Editors note: This is a continuation from the last issue showing Robert's progress on his level 3 build. Enjoy.

Most of the build pictures don't really convey a sense of scale so I wanted to start with these before I get into the details. I started part one with a quote from Von Braun about paper work but now with this thing taking up the garage and four folding chairs set-up at various stations around it I am kind of channeling Robert Godard . This is the first rocket I have had to beat with a rubber mallet. When I would test fit things that don't quite fit I had to bump it back apart. With a lot of hand sanding and patience I got the fit I wanted, I am kind of proud of the internals nobody will ever see

I need a rail to mount this to the side of the truck for pictures and a short drive around the neighborhood.



These are the uni-strut rail buttons, stand offs, and anchors.



This picture shows the upper anchor and the dual 5/16" U-bolts for Y harness.



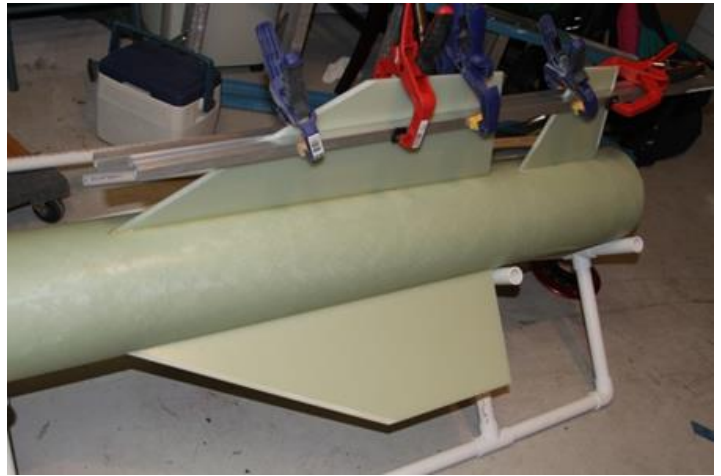
Rail guides, the thrust plate and Aeropack retainer are seen below.



This looks like earlier pictures but here all the fitting and measuring is done and the fin pockets are epoxied in place. Internal fillets were added before final installation.



I started on a plywood fin alignment guide and then realized with the fin pockets inside the fins were self aligning. The front fins are less than 1/16" difference in tip to tip measurement. That is on a 24.5 inch fin span. The aft fins were also perfect when set in place but I still used square tube clamped to the front fins to make sure .



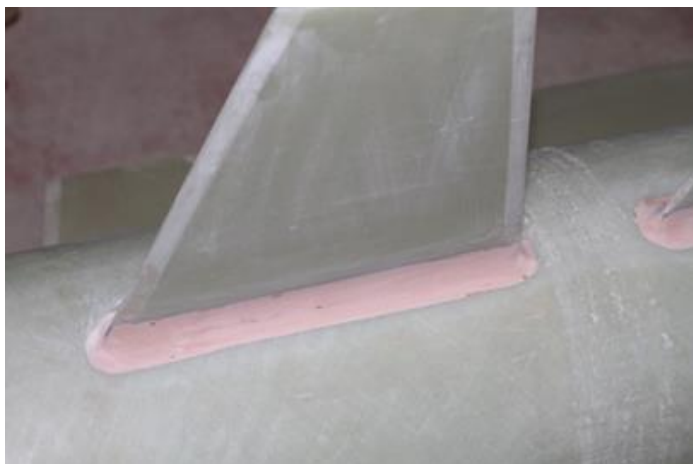
Standing beside a 75mm/6400 case. I decided to get the 75mm/7680 case and the M1850W for the first flight.



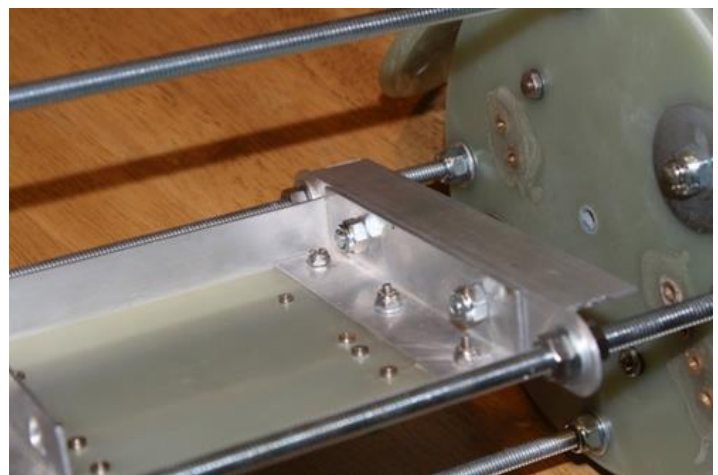
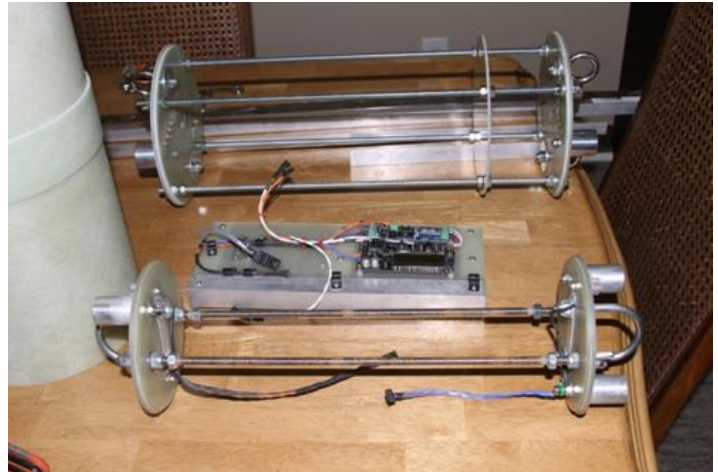
I added the aluminum 1/2" disc to keep the nose centered and a plywood bulkhead behind the washer. The machine screw was replaced with an eye-bolt a tether will connect here.



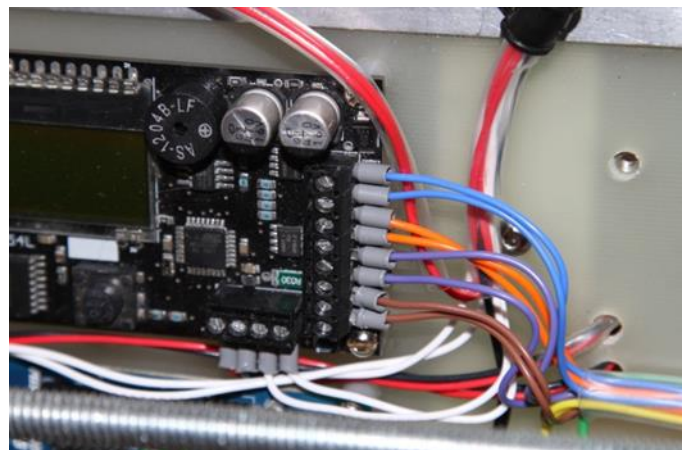
Below beginning to shape and sand the Aeropoxy light fillets, under these is a 1/2" bead of Aeropoxy Structural as the real fillet, the light stuff is for easy sanding and to save weight.



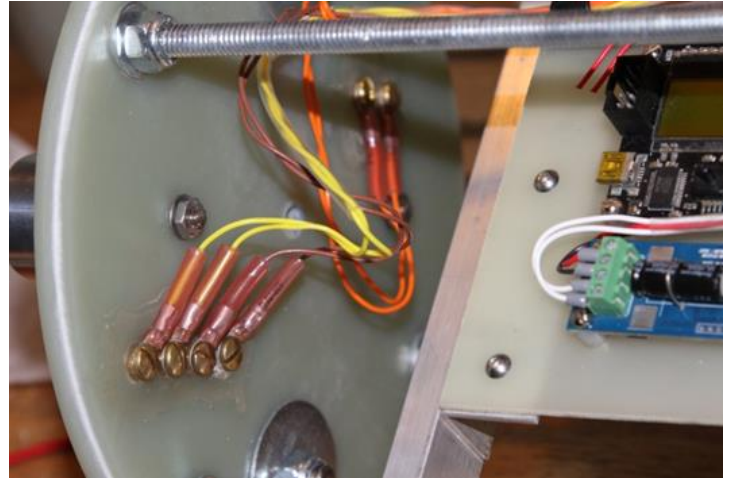
Because the 8" Pike is too heavy to fly on a L2 class motor and I didn't have a way to test fly the 8" av-bay in something I used the sled from the 5.5 Pike . This is the 5.5 donor and 8 inch receiving set-up. The left picture is the "adapt kit bracket" I made to make it fit the much larger bay.



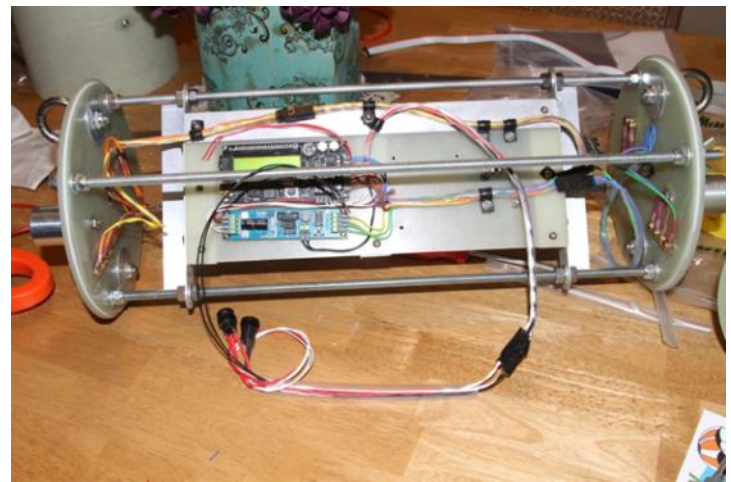
Below are the ferrules I crimped on for all connections to the altimeters. I am using all four channels on this MARSA54L



The connections thru the bulkhead are #8 brass inserts with #8 brass binding screws on both sides. The back-side will get coated with liquid electrical tape and the front side gets a piece of duct tape after the e-matches are connected to keep a quick link from causing a short.



Below is top of nearly finished removable av-bay lid, the 5/16" rods are on 6.5 inch circles and the eye-bolts are only offset 30 degrees to keep the load on the rods and coupler. The fender washers on the rods reach to outside edge of the coupler.



Below is the 36 inch custom drogue setup,



Here is 144" Fruity chute ultra-iris in bag and 48" Crossfire pilot from TFR both sides have $\frac{3}{4}$ " x 35" Kevlar shock cord and Y harnesses for each connection point.



ALL RED rubber bands must be removed before flight, the green ones stay



Where I am at as I write this:

- This thing is almost done except for paint!
- I have everything I need to fly except reload kit for a M1850W to be ordered soon from Robert Watson
- Final descent weight is 75 lbs. with an empty 75mm six grain case and adapter
- Stability margin with weight added for propellant is about 1.75 , CG loaded is 88 inches
- Shear pin holes drilled and tapped for four #4 nylon screws at both ends
- Av-bay vent holes drilled 3 x 13/32"
- Six #6 screws in nose drilled, tapped, and countersunk
- Decals from Mark at Stickershock23 are on the way
- I received my 75mm/7680 case from Robert Watson
- Documentation complete except for checklists
- I plan to ground test at Hearne on July 11
- After ground testing I will prep for paint
- I am close to choosing a color
- Vacation time approved and wife's permission obtained for trip to Balls24 at Blackrock, NV

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Parting Shots

Photos by Various Artists

A few more shots from George Sprague's successful Level 3 flight. The other individual in the pictures is Paul Holmes who was George's Level 3 certifier.



This space intentionally left blank. We need your content.....
See how to contribute below. It's really easy....

How to Contribute to Shroudlines



We all share a love for the rocketry hobby and all have different experiences and expertise to share. You don't have to be a Pulitzer Prize winner to write for this publication. Anyone can do it!

Submissions can be in the form of plain text files, emails, or MS Word documents. Pictures can be of most any format, but .jpg files are generally the norm. Keep the content family friendly and free of political discussion; just rocketry.

We publish every 2 months so we need your content submitted by the 15th of an even numbered month (i.e. February 15, April 15, June 15, etc.). You can submit via the contacts page on dars.org or direct to the editor at garyb2643@att.net.

DARS Officers

President	Jack Sprague
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Treasurer	Suzie Sprague
Secretary	Bill Gee
NAR Senior Advisor	Sam Barone

Upcoming Events

7/11	DARS Business Meeting @ Coppell
7/18	Monthly Launch @ Frisco
7/18	Moon Day—Frontiers of Flight Museum
8/1	DARS Business Meeting @ Coppell
8/15	Monthly Launch @ Frisco

The Dallas Area Rocket Society is a non-profit chartered section of the National Association of Rocketry ("NAR"). Its purpose is to promote the hobby of consumer rocketry in the Dallas/Ft. Worth metropolitan area.

Membership in DARS is open to all interested persons. Membership in NAR is encouraged, but not required. Annual dues are \$10.00 for individuals and \$15.00 for families. The entire family, including children, are welcomed to the meetings. Go to the website, fill out and send in an [application](#), to join or renew your membership.

The club normally meets on the first Saturday of each month at 1:00 p.m. and the current meeting location is in Coppell, just off the Sam Rayburn toll way and Denton Tap Road.

Visit the DARS website for the meeting location: www.dars.org

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