SHROUDLINES

A Dallas Area Rocket Society Production

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Dallas Area Rocket Society ("DARS")

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Special points of interest:

- "Ignition!" gets things going for the first time in fifteen years.
- Chuck Goldsmith has a fantastic article on building an electronics bay for rockets that may at first seem too small for them.
- Stuart Powley has the first part of his upscale Estes Pegasus build. It was a long, hard process, but it was worth it!
- Laurie Powley adds some photos she took at the January 17th DARS launch in Frisco
- How can you contribute to this fine publication? Ask no more! The answer is within!

Inside this issue:

Ignition!

By J. Stuart Powley

James Gartrell (in foreground) in a very candid moment during a Saturn IB build session at Jack and Suzie Sprague's house. Ten IB's were built in record time to commemorate the 40th anniversary of the Apollo 7 flight. Photo by Suzie Sprague

Hello and welcome to another installment of "Shroudlines." For those of you who may not know, many of the editorial duties have been handed over to me due to James Gartrell's health issues. James is still in the picture, however. He is now in charge of the technical stuff, such as, putting the newsletter in PDF format and imbedding links and such.

One really can't say enough glowing things about James and his support of DARS and rocketry in general. He has produced this newsletter for many years (often with little help) and has done a spectacular job. He has built relationships with vendors and modelers from all over the country that are invaluable to both the newsletter and to DARS. On top of all of that, he is one of the nicest guys I've ever met! We continue to wish him well in all things.

I suppose I should tell you a little about my background and how I became the new editor. I have been in rocketry for more years that I care to (or often can) remember. In 1988, I started producing "Dallas Rocketry," which was the DARS newsletter that Mike Calhoun started the year before. I put in about six years on it before the club went in a different direction, and "Shroudlines" was born. I guess when James was looking around for someone to help, I was kind of an obvious choice. He asked, and I agreed, and that was that. So, after fifteen years, here I am again.

Although things have changed quite a bit, I still am dedicated to producing the best newsletter possible. James has set a high standard, and I intend to keep it. Now, on with the show! ◄

Electronics Bays for Small Model Rockets

Chuck Goldsmith

For many rocketeers, the excitement of model rocketry includes tracking and/or simulating their rocket flights. A modern model rocket altimeter provides excellent information, enabling the rocketeer to measure his flight from launch pad up to apogee and back to terra firma. However, the expense of an altimeter also places more emphasis on mechanically protecting the electronics within the rocket body. For this purpose, a mechanically strong electronics bay is necessary to protect that investment. In high-power rockets, there are ample locations and space to securely bolt both altimeters and assorted electronics in an electronics bay. However, in mid- or low-power rocketry, space is at a premium and firmly mounting electronics to the rocket is a challenge. While pressure fitting an altimeter with foam may be sufficient for many flights, a crash due to a failed parachute or shock cord will often provide enough g-force to destroy the electronics. As such, a strong, lightweight means of firmly attaching electronics to small model rockets provides a real challenge.

This article describes one solution to mounting electronics within small rocket bodies for instrumenting rocket flights. It involves mounting a removable metal brace down the centerline of the body tube. The brace has very low mass, yet is very effective at holding electronics in place. Another feature of this mount is that it is simple to disconnect and econnect the electronics bay, so that it can be easily and quickly moved from one model rocket to the next. A photo of this electronics bay, with a PerfectFlite ALT15K/WD altimeter and modified Baumeister XFM1 transmitter installed in an Apogee Aspire rocket (29mm body tube), is shown below.

All required materials for mounting electronics in your model rocket can be obtained at the local R/C model store. The materials consist of 1/8 inch hollow aluminum rods, a package of 1/8 inch nickel plated brass wheel collars, a sheet of 1/16 inch balsa wood, and some 5-minute, two-part epoxy. Required tools are toothpicks (for mixing and applying the epoxy), sandpaper, and a drill with a 1/8 inch drill bit.

Electronic circuit boards are mounted to the electronics bay brace by the brass wheel collars. With their steel set screws, the wheel collars and their circuit boards can be easily assembled or disassembled into the electronics bay with the simple turn of a screw. The wheel collars are mounted onto the back side of each circuit board. For longer or heavier circuit boards, such as the altimeter, two collars provide a solid mounting. For smaller or lighter boards, a single collar is sufficient. To ensure that the collars do not short out any electronics, the backside of the circuit boards must be protectively coated with an insulator. The ALT15K altimeter is already protected with a conformal coating on the back side. Unprotected electronics can be protected by applying a good coating of polyurethane or varnish. Before the collars can be epoxied to the back side of the circuit board, their surface must be roughened. Course sandpaper works fine. If the surface of the collar is not roughened, the epoxy will not have sufficient adhesion to hold onto the collar, and the collar will easily become unglued from the electronics. Be sure to glue the collars with their screw holes aligned outwards, and be careful not to get epoxy inside the collar recesses.

Wheel Collar

Mounting the electronics and brace to the rocket nose cone requires epoxying a collar on the nose cone. To fit the electronics properly within the body tube, and ensure that the rocket flies straight, offset the collar

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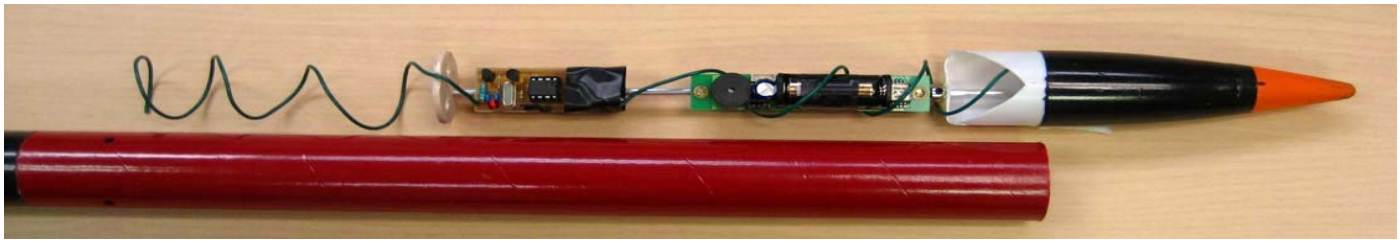

Apogee Aspire with a mounted PerfectFlight ALT15K/WD altimeter and Baumeister XFM1 transmitter
All Photos: Chuck Goldsmith

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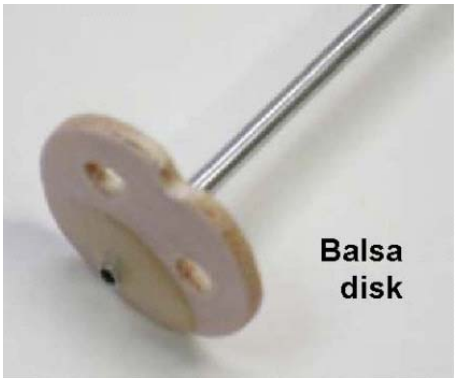
on the nose cone such that the bulk of the electronics is centered along the main line of the rocket body. Epoxy the wheel collar in place. Once the epoxy has cured, take a 1/8 inch drill bit and drill through the collar to remove any epoxy or nose cone material.

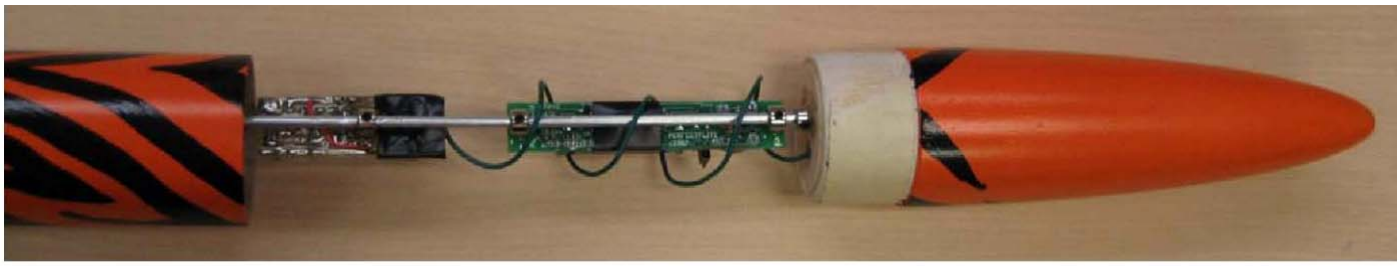
At the oposite end of the electronics brace, a small disk of 1/16 inch thick balsa is attached to provide stability within the rocket body. A circular disk is cut and sanded to be a tight fit within the body tube. This disc ensures that the rod and electronics are held securely within the body tube, and the electronics do not rattle around. This is especially important for hollow nose cones, where the flexibility of the plastic nose cone does not completely secure the electronics and rod in place. Be sure to remember to drill a couple air holes into the balsa disk so that the altimeter can properly measure the outside air pressure. Epoxy the disk to the bottom of the hollow aluminum tube. For more flexibility, mount a wheel collar onto the balsa disk so that it can be connected and disconnected as desired. This is especially useful for mounting different diameter balsa disks to accommodate different body tube sizes.



Final assembly consists of installing the electronics to the aluminum rod, and installing the aluminum rod into the nose cone. First, secure each circuit board securely onto the aluminum brace with the collar set screws. Be careful not to tighten the screws too tightly, or the aluminum brace may bend or deform. Ensure that the electronics are mounted such that they will be centered along the axis of the rocket body. Next, the aluminum brace and electronics are mounted into the nose cone. After securing the nose cone wheel collar screw, the assembly is complete and ready for launch. Be sure that all batteries are secured with tape so that you do not lose electrical connection during the acceleration of launch.

This article describes a useful means of mechanically mounting electronic circuitry into small diameter rocket bodies. The total cost of the mounting hardware is less than $5, and the total added weight is about 5 grams. This assembly provides a secure means of attaching flight electronics to small rocket bodies and ensuring they return to earth in sound operating condition.

May you have many successful flights!



Same electronics bay installed in a Red River Rocketry P-Chuter Extreme

The Maxi-Pegasus– Part One

J. Stuart Powley

The story of my latest upscale has its roots in tragedy. About a year ago at a DARS meeting I won a Squirrel Works Ajax as a door prize. I was excited to get it, since I hadn't built any of their retro-sci-fi birds before, and I promptly went home and put the unopened kit on my kitchen table. I left it there, planning on opening it and checking out the parts at a later time.

There is a truism that states that no two people see the same thing in the same way, and I guess this holds even truer when it comes to two different species. For example, while I saw a really cool rocket that I was mentally bumping up in my build queue, my daughter's new black lab puppy saw a really wonderful new chew toy. When I returned to the table, I found my kit in shreds all over the kitchen floor. I explained to the dog, quite rationally I thought, that this was not acceptable. The dog explained to me that she had no idea what I was talking about, and then she ran off to destroy other bits of my life that happened to be laying about the house**.**

So there I was, frustrated and saddened, looking at the once proud kit. Upon further inspection I found that although the nose cone and body tube were history, the fins, motor mount, chute, and decals had somehow survived unharmed. A resolve began to grow within me. This bird would be built, if for no other reason than to spite that blankety-blank dog.

I went to the computer and looked up replacement parts at Semroc. Squirrel Works doesn't use off-the-shelf parts in most of their models, but I was looking for something similar. I found that I could replace the nose cone and body tube for a very reasonable price (you gotta love those guys at Semroc). However, I also found that the order didn't quite come to the required minimum amount, so I needed to pad it a bit. I decided to order a BT-60 tube and pointed ogive nose cone. I had no clear idea of what I was going to do with them, but knew they would probably come in handy later.

The order was at my door in a couple of days (again, you gotta love those guys at Semroc), and I put my new Ajax nose cone and body tube with the rest of the kit. All was right with the world. I then started looking at the extra body tube and nose cone that I ordered. They were really cool, but I still couldn't figure out exactly what to do with them. I decided to look in my old 1977 Estes catalog and see if inspiration struck. It was there, on page 18, that I saw the destiny of those parts.

The Pegasus in the 1977 Estes Catalog

1977 was the year that Estes added a couple of new kits to their "Super Mini-Brutes" line. On the top of page 18 was a model that I had actually bought and built when it first came out way back then. I loved it at the time and had always planned on cloning a new one. The Estes version had only lasted two years, which is strange because it's a really cool design. Now I had the parts to not only clone it, but to go that one better. Now I could blow that sucker up! (not literally….I hope).

The Pegasus is a winged rocket that is described in the catalog as a "U.S. Air Force Mach 3 reconnaissance missile of the near future." It was 14 inches long and took mini A's (1/4 A through A3). The airframe was BT-20. When I ran the numbers, I found that if I upscaled it to my BT-60, it would be an increase of about 222%. Cool. I figured D's and E's would be about perfect for it. It was time to start modeling.

The first thing I did was to work on the decals. The model actually has quite a few for its size. I scaled them up in Paintshop (after downloading them from Jimz) and then sectioned them off so they would fit on Testors decal paper. I also went in and cleaned them up a bit. The combination of mid-seventies printing technologies and the fact that blowing them up made any errors much more apparent meant that I needed to straighten lines, and retype some wording. All in all they came out pretty well in the end, but due to a contemptuous printer, they were not as good as I would have liked. Therefore, I ended up e-mailing Tom Baker at Tango Papa decals. He said that he had drawn up the Pegasus decals already and he would be glad to upscale them for me. I promptly ordered them and moved on to scaling up the fins.

One thing I knew when I started this project is that this bird has a lot of wood in it. There are 19 different balsa parts on the original (not including a toothpick "antenna"), and since I was scaling it up, I was going to have to do some parts in sections. When I was done, I had 27 parts (again, not including the antenna).

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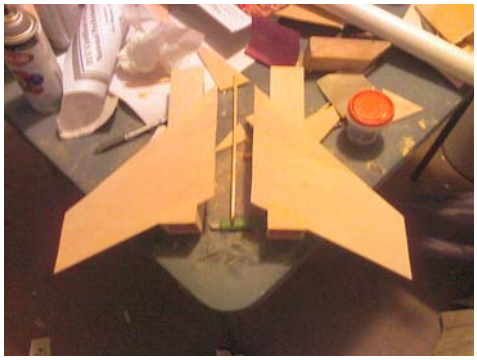
These parts are not small. It actually took four sheets of 1/8X4X24 inch basswood to. make them all, and it was close even then. The wingspan works out to over 15 inches. I bought my wood and started to cut and glue. It was only at this point that the true size of this beast began to show. Although it's not as big as most high-power birds, for a mid-power rocket it has heft. It's over 30 inches long with the before-mentioned 15-inch wing span. Due to the dorsal and wing tip fins, it stands 7¾ inches high when in horizontal display mode. On the whole, I feel that it is large enough to be impressive, but not so large that it requires its own room for display. The angular swept lines of the original model get even "meaner" looking when blown up 222%. From pretty early in the build, it became clear that this was going to be one of my favorites.

I started building with the wings. Eleven parts, including the "engine pods," comprise each wing. In addition to these stock parts, I added a 1/8X1/8 inch strip to the top and bottom root edge on each wing. The reason for this is that even with using the epoxy rivet method of attaching the wings, I felt that there needed to be a wider root to anchor the wing to the body tube. These things are big, and I didn't want any wobbling in flight!



The Wings Prior to Attaching

I used a square to keep everything straight and…well…square and used CA reinforced with epoxy throughout. I was really pleased with the way everything turned out, even though putting F&F and sanding all that wood was a PAIN! I did all the parts before attaching them to the body tube to make them easier to handle.

The engine mount was next. I knew that I wanted to mainly fly this bird with Estes E-9's (this was a mistake, but more on that later), but I didn't have any long engine hooks. Therefore, I took a regular hook and clipped one of the ends. I then attached it to the BT-50 engine tube with tape and LOTS of epoxy. I put an engine block in, using an E-9 as a guide. I then cut two centering rings out of leftover 1/8 inch basswood. I slid them over the BT-50 and coated them with epoxy. Then I glued the mount into the body tube, again using epoxy.

Attaching the wings to the body tube was an adventure unto itself. I was a little nervous, since any error would be glaring with only two wings directly across from each other. The size of the wings (and all the fins and engine pods hanging off of them) made it intimidating as well. I printed off a BT-60 two fin pattern from my fin wrap program and went to work. I marked the tube at the top and bottom and connected the lines using my favorite door frame. I then punched holes along the area that the wing would contact the body tube, so that the epoxy could squish through and form the rivets. Then came the tough part; I mixed up a bunch of epoxy and applied it to the root edge of one wing. I held the wing in place for five minutes, sighting down the tube to make sure that it was straight.

Five minutes seemed more like 30, but finally the epoxy set up, and I repeated the procedure with the other wing. I sighted across the back of the model to make sure that it was straight in relation to the first wing. After five minutes, I set the model aside to completely dry, making sure to support it so that nothing would droop while it cured. After several hours, I applied epoxy fillets to the top and bottom of both wings, and I was done…with that part.

Next I applied the conduit that runs the length of the top of the body tube. In actuality, my nose cone is close, but not perfectly scale. It is a bit longer than a true scaled up nose cone would be. In order to keep the model the proper length, I simply cut the body tube about an inch shorter than true scale. The only issue with this plan is that the conduit runs almost the whole length of the original body tube. Therefore, a small part of it had to overlap my nose cone. I used a 1/4X1/4 inch square basswood stick for the conduit and cut it where it needed to separate between the nose and the body tube. I shaped both ends by sanding them into a curve and then applied it. All in all, it works pretty well.

Next I turned my attention to the "antenna" that sticks out of the conduit. The original simply used a toothpick, but I needed something larger. I purchased a 1/8 inch wooden dowel, cut it to size and sharpened one end by sanding it. I then drilled a hole in the conduit and used the guide from the original model to set the angle. Epoxy was used to hold it in place, since I figured it would get banged around a lot.

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Well, that's about all the space we have for this issue. Please stay tuned for our next exciting episode of "The Maxi-Pegasus" or "Fun With Paint and Figuring Out Thrust Curves!" ◂

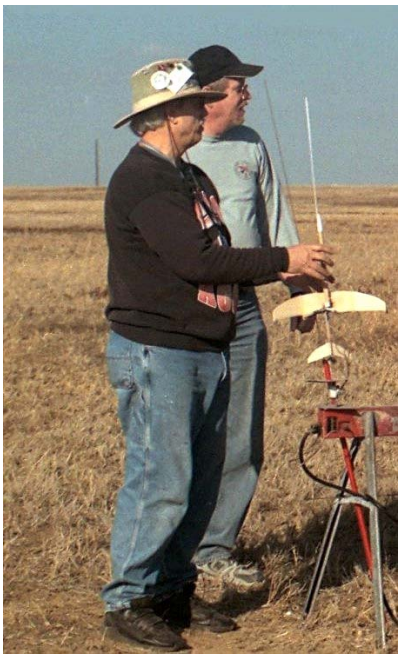
Launch Pics!

Pictures from the January 17 Frisco Launch

George Sprague with his Space...People..

Stuart Powley's Semroc SLS Laser-X on 4 C6's.

Scott Cook's large silver and gold model takes flight.



Jack Sprague and John Dyer ready a glider.

Photos by Laurie Powley

How Can I Contribute?

It is now time for the ever popular "begging for articles" part of the newsletter. Every editor since the dawn of time has had to do this, so we might as well take yet another turn at it. We are pretty much out of articles, so we need your help. Therefore, if you have anything that you would like to see in the newsletter, now is your moment of opportunity!

Simply e-mail anything to me at stu29573@yahoo.com. I prefer Word documents and JPEG pictures, but I can work with just about anything. I can also scan in any negatives, prints or documents you may give me at meetings. I'll do my best to get them back to you at the next meeting.

Some ideas for things to contribute might include technical articles, build articles, pictures, launch or contest reports, history of rocketry stuff, old Dear Abby clippings, or pretty much anything. Our motto is "Everything that fits, we print." And right now, it pretty much all fits.

I guess what I'm trying to say here is that I want this to be a newsletter that is written by the club for the club. James has always done a fantastic job of that, and I want to continue the tradition! Remember, if you don't contribute, you don't get to gripe– so grab your griping rights now!

Seriously, though, anything you can contribute will be most appreciated. Thanks in advance!

DARS Officers

President	**Royce Frankum**
Vice President	**Don Magness**
Treasurer	**Tony Huet**
Secretary	**Terri Magness**
NAR Senior Advisor	**Sam Barone**

DARS

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 and fill out and send an application to join or renew your membership.

The club normally meets on the first Saturday of each month at 1:00 p.m.

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

Stay connected! All of us will reach greater heights with your attendance at the club meetings.

Vendor Links (* DARS member discount—confirm before ordering)	
Aerospace Specialty Products	Aerotech Consumer Aerospace
Apogee Components	Art Applewhite Rockets (* 20%)
BMI Hobbies (* 10%)	BRS Hobbies
CLE Enterprises	Dr. Zooch Rockets
Excelsior Rocketry	FlisKits, Inc.
Hawks Hobby	HobbyTown USA— Dallas, Walnut Store (* 10%)
JonRocket	MadCow Rocketry
Mercury Engineering Co.	Pemberton Technologies
Public Missiles Ltd	Qmodeling
Quest Aerospace, Inc.	QuickBurst
Red Arrow Hobbies	Red River Rocketry (* 8.25% on field)
Roadrunner Rocketry	Rocket.Aero
Semroc Astronautics Corporation	Sirius Rocketry
Sunward Aerospace Group Limited	The Squirrel Works Model Rocketry

Dallas Area Rocket Society ("DARS")

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