SHROUDLINES

A Dallas Area Rocket Society Production

DARS
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Dallas Area Rocket Society ("DARS")

Member - National Association of Rocketry ("NAR").

Special points of interest:

- "Ignition!" To the WABAC Machine, Sherman!
- Bill's Something Volume Two!
- Dallas Rocketry- November, 1987
- Dallas Rocketry- December, 1987
- How to contribute!!!! Really!!!! Its easy!!!!

Inside this issue:

Ignition!

Carl Feldhaus and Stu Powley watch a launch of….something… in about 1988. I also caught half of Bob Turner to the right. I don't know who those people are in the background, but there should be a law against those shorts… Just sayin'...

In this issue of Shroudlines we are going to do something completely new, by doing something completely old. You see, at this time of year it is only natural to start to look back on years gone by and think, "what the heck happened to all those stinkin' years????" This is especially true when you are the editor of a newsletter who just passed the half century mark...and who also has very little in current content (shameless plug).

Therefore we are turning back the pages of time 25 years….to a time when G's were a HUGE deal, we had really big contests and people actually wrote technical articles. It was a time when the newsletter (then called Dallas Rocketry) was actually monthly. When dot matrix was high tech and black and white photos were all you were going to get so you better not whine about it, mister, or I'll give you something to whine about!

The end result is a newsletter that is bigger than anything we have ever published, and takes care of the fact that I only have one item from a club member for this issue (another shameless plug, with a bit of guilting). That item will be run at the beginning of this issue, with makes it even MORE huge. Cool, huh? (Thanks Bill!)

So sit back, set the VCR to record that new "Simpsons" cartoon (because it will probably only last a season), turn up Bruce Hornsby and the Range, try to forget about that Jim Bakker scandal, and dig into Dallas Rocketry November and December issues, 1987….

Enjoy!

Bill's Something- Volume Two

By Bill Gee

It is more than amazing the advanced onboard instrumentation available to us today. When I flew rockets as a kid, I could not even dream of what we can now do. I bought another Jolly Logic altimeter at NARAM in Michigan this past summer and had plenty of time on the road back to think about how to use and abuse it. The small and lightweight unit can fit within a BT-20 tube and report how high a rocket flies.

DARS has held many contests in its long history. We just finished with the Fall Classic, an informal contest celebrating the history of the hobby. We have several serious competitions each year based on the NAR "Pink Book" for points toward the yearly national championship. From time to time, someone will hold a "fun" contest just for the challenge and entertainment value.

With that third category in mind, I hereby present Rocket Altitude Poker:

Make five rocket flights with an altimeter aboard to report their apogees. The number of hundreds of feet attained determines the value of the "card" for that flight. We will use an extended version of the hexadecimal number system from the computer industry to denote the face value of cards. For example, fly to 155 feet, you have a one in your hand. Fly to 545 feet, you have a 5. Fly to 972 feet, you have a 9. Fly to 1044 feet and you have an A (treat an A as being one larger than a 9.) Fly to 1203 and you get a B. Fly to 1336 and you get a C. Fly to 1492 for a D. Fly to 2013 and you get a J. Well, you get the idea.

If you are consistent, you can fly the model on the same motor every time and try for "five of a kind," a very good hand. If you miss it by a little, you can still have a "four of a kind," or a "full house" (three of one and two of another.) Because it is harder to do, we will deviate from traditional poker rules and make a "straight", five consecutive increasing values, worth more than a "five of a kind." So if you can use different motors and make your model reach 545, 632, 796, 840 and 972 feet, you will have a "9 high straight."

The higher your flights, the more your hand will be worth. Five 9s beat five 8s. But be aware that the higher you go, the more difficult it will be to be predictable or consistent. And keep in mind that you have to recover the rocket and the altimeter after every flight.

So how about it? Would you like to give this game a try in the new year?

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.

And now the gears begin to turn on our time machine...next stop...**1987!**

Dallas Rocketry

The Official Journal of the Dallas Area Rocket Society

November 1987

The Hobby in Dallas

This issue marks a sort of milestone for Dallas Rocketry. It has now become the longest-running, continually-published rocketry newsletter in North Texas. To celebrate, we're going to make a few changes.

First off, the format. With this issue, Dallas Rocketry is going to go from single-sided pages, stapled in the corner, to two-sided pages, stapled on the spine. This will make the newsletter more of a magazine-type publication. We are also going to include the DARS' logo on the front page from now on, in the upper left hand corner.

Another added feature will be photographs. Dallas Rocketry now has the bility to reproduce photographs on its copying equipment, and we will try to include something in every issue. This also opens the door for those of you out there who want to have your photos published. Send in prints only (color's okay, but black and white reproduce the best), along with a brief caption or description of the picture. I'm afraid that prints sent in will probably have to be trimmed down to fit them into the pages, and we like to keep the originals in case we have to reprint an issue in the future, so please send in prints we can keep.

Martin Catt gives us his latest model rocketry computer program in this issue. A very simple program, it deals with calculating air drag for models. For those of you who like a challenge, there is also a problem at the end of the article to work out. Having already worked with the program myself, I can assure you it is fascinating and helpful.

Also included in this issue is Stuart Powley's mini-engine rocket-glider design, the Stuka. And we continue our series on making your own equipment, with an expanded version of the launch controller system.

Spacemodelers in the Fort Worth area are beginning to get organized under the direction of Scott and Nettie Hunsicker, and while we don't have many details yet concerning their planned activities, we have been informed that they are holding regular sport launches at the Northern Crossing Business Park, somewhere in northern Fort Worth. We will publish further news of this group as it becomes available.

As the weather changes, don't forget to excercise a little extra caution and common sense when you fly. The grass and ground cover get very dry, brittle, and flammable this time of year, so when you go out and fly, be very careful to prevent any grass fires. If you have to fly off of the grass, lay a tarp or old blanket under your launching pad, or place it on top of a board. And keep something handy in case a fire does break out (a smoldering ignitor touching the ground after it has been spat out of the engine it ignited has been known to start a fire). Please help keep model rocketry the safe sport it has been for the past twenty-five years.

Calander of Events

November 1 - Texas Twister Survivor's Fly-In, Shiloh Business Park, Richardson, Texas

November 8 - DARS Meeting

November 15 - DARS Launch, Shiloh Business Park, Richardson, Texas

November 21 - Ft. Worth Area Sport Launch, Northern Crossing Industrial Park, Ft. Worth, Texas

November 21 - Turkey Shoot 1, Huntsville, Alabama. NAR Open contest

December 6 - DARS Meeting

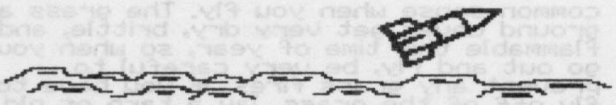
December 13 - DARS launch, Shiloh Business Park, Richardson, Texas

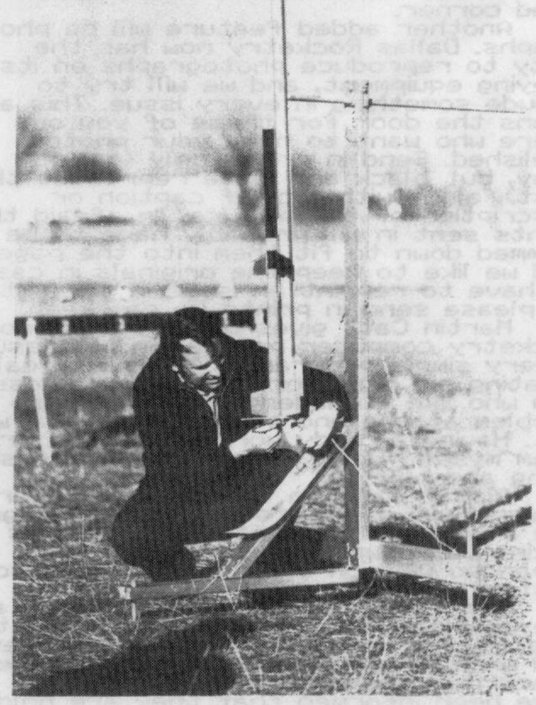
Mid-December - DARS Annual Christmas Party. Location to be announced.

All DARS meetings are held at John Dyer's house at 12619 Promenade in Dallas, unles otherwise noted. While launches are generally held on the second Sunday of each month, weather, special activities, or just plain dis-interest can change this. Launches may also be held on other weekends when the weather is good and enough people want to fly. If you want to be kept informed of what's going on, call John or Nina Dyer at 343-0214. They can answer your questions, and if you give them your name and phone number, they can call you when there's going to be something going on. They can also provide detailed information on events listed in each month's calander.

Photo Session

Can you identify these people? Don't feel too bad if you can't ..... the pictures are about ten years old. Taken on a cool fall day at the Williams' Stadium soccer fields in Garland (the area is now a neighborhood of houses), we have (upper right) Martin Catt, before he discovered beards, (lower left) G. Allen Wilcox, before the grey set in, and (lower right) Robert "Bob" Turner, before he started curling what's left of his hair. Take a bow, gentlemen, and then sit down.





Computers & Rocketry: Dealing with Drag

By Martin Catt

All right. Let's start this series by using a computer program to open a window on the fuzzy subject of air drag.

The three major forces acting on a model rocket during flight are engine thrust, gravity, and air drag. Of these three, air drag is probably the least understood. After all, engine thrust is pretty straightforward -- if the engine doesn't supply an upward push, then the rocket will just sit on the pad. And we all experience gravity every day through the phenomenon of weight and the fact that dropped objects will fall down.

Air drag is a mysterious force to most modelers. We know it's there -- we feel it every time the wind blows against us. We feel it when we hold our hand outside a moving car. Something pushes against us, and it's obvious that the faster the car is moving, the harder the something is pushing back. Ask any modeler who has read G. Harry Stine's Handbook of Model Rocketry or has taken Physics 1 about drag, and they will mutter something like "drag increases as the square of the increase in velocity".

Great answer. It really sheds a lot of light on the subject. Maybe if you had a wind tunnel you could measure air drag on your model at different speeds and make some sense of the situation.

But what about drag during actual flight?

If you dig a little deeper, you'll discover there's no convenient way to measure drag force during flight. All most people know is the faster the rocket moves, the higher the drag, and they leave it at that. After all, why bother with something you can't easily measure during an actual flight?

Of the three forces acting on a model in flight, air drag is probably the one you have the greatest control over.

Surprised? You should be. It surprised me when I thought about it at first.

Look at it this way: you really don't have much to choose from in engines. Spacemodelers buy their engines from a small group of manufacturers. We don't make our own engines. Everyone is forced to choose from a restricted selection of total impulses. In competition events we often end up using the same engines. If you want a total impulse other than what's manufactured, then, sorry, no such item is available. You have to use what is available.

As for gravity, it's pretty much constant, trying to accelerate objects downward at 9.8 meters per second squared. If you know of a way to vary the force of gravity on a local scale, then you have a brilliant future awaiting you, and almost certainly a Nobel Prize in Physics.

The final amount of air drag is almost totally up to the modeler. There will always be some air drag as long as the rocket remains in the atmosphere. With the present weight and impulse restrictions, I don't think we'll have to worry about one of our models leaving the atmosphere for some time. So, as long as we are down here in the weather, let's use some software to feel out the situation, so to speak.

If you want to know the absolute drag on a specific model, the best way to find it is to put the model in a wind tunnel and measure the drag force directly. I don't have a wind tunnel, however, so I settle for having my computer calculate the drag force on a hypothetical rocket having the same dimensions as the actual rocket I want to fly.

Calculating drag force is so simple, it's almost ridiculous. Drag is found by the formula:

$$D=0.5PCdV^2S$$

That's all there is to it -- only simple multiplication and one number squared. D is the drag force, P is the density of air, V is the velocity of the model, Cd is the drag coefficient of the model, and S is the frontal area of the model. All you need to figure the drag is these four pieces of information.

Take a closer look at the information needed. The only familiar values in the formula are V, the model's velocity, and D, the drag force, since that's what you're trying to find anyhow. What about P, Cd, and S?

P is the density of air, or how much a given volume of air weighs. A quick look in Van Nostrand's Scientific Encyclopedia at the public library shows that air weighs .001293 grams per cubic centimeter. For practical reasons, we want the density in kilograms per cubic meter. Sparing you the in-between conversions, to convert from g/cm3 to kg/m3, multiply by 1000:

$$.001293 * 1000 = 1.293 \text{ kg/m3}$$

So air weighs 1.293 kilograms per cubic meter. This is the value to use for P.

S is the frontal area of the model. It's simply how much of the model is visible looking at it head-on. Think of it as standing the model on a sheet of paper, tracing around it with a long pencil, and then measuring the area of paper inside the outline. For a typical rocket with identical fins, the frontal area can be found by adding together the area of a circle the diameter of the body tube plus the fin front area times the number of fins. Since we've measured the air density in terms of kilograms per cubic meter, the frontal area needs to be in square meters for enerything to work out to the correct value. For most models, the frontal area in square meters will be a small fraction less than one. The example programs expect S in square centimeters, making it easier to enter the value during execution, and then converting the square centimeters to square meters by dividing by 10,000.

But what about Cd, the drag coefficient?

The drag coefficient is the variable that takes into account just how well your model has been streamlined and finished, whether the fins are on straight or crooked, whether your nosecone is rounded or pointed, and so on. A poorly-finished, high-drag model will have a large drag coefficient. A smooth, slick-finished, low-drag model will have a small drag coefficient.

So how do you know exactly what value to use for Cd for your model?

You don't know exactly unless you

measure the drag force at a given velocity and work the equation backwards to solve for Cd. You'll need a wind tunnel to do that. Fortunately, past research has shown that the average model rocket has a drag coefficient of 0.8. For the moment, this is the value we will use. Later on, I'll discuss ways of how to come closer to the actual Cd of a particular model.

Take note: the drag coefficient, Cd, is a dimensionless number. The drag coefficient has no dimensional unit like meters or pounds associated with it. This also means that the drag coefficient is the same regardless of the size of the model. If you were to water your model and have it grow magically to five times its original size and diameter, the drag coefficient would be the same. This can sometimes be handy if you are working with a scale model of an existing rocket, and can find the drag coefficient of the original rocket.

With everything taken into account, our program for calculating drag is shown below.

```
 100 REM DRAG VS. AIRSPEED PROGRAM
 110 REM DEFINE AIR DENSITY, KG/M^3
 120 P=1.293
 130 PRINT "INPUT DRAG COEFFICIENT"
 140 INPUT CD
 150 PRINT "ENTER FRONTAL AREA IN SQ.
CM."
 160 INPUT TS
 170 REM CONVERT FRONTAL AREA TO SQ.
METERS
 180 S=TS/10000
 190 PRINT "ENTER STARTING VELOCITY,
M/SEC."
 200 INPUT VSTART
 210 PRINT "ENTER MAXIMUM VELOCITY,
M/SEC."
 220 INPUT VMAX
 230 PRINT "ENTER VELOCITY STEP SIZE"
 240 INPUT VSTEP
 250 REM TABLE GENERATION LOOP
 260 FOR V=VSTART TO VMAX STEP VSTEP
 270 D=(P*V^2*CD*S)/2
 280 PRINT V, INT(D*1000)/1000
 290 NEXT V
 300 END
```

REMark statements were included to help you figure out what each section does. The program asks for five items of information. P, the air density, is already defined in line 120. Enter 0.8 for the drag coefficient right now. Lines 150 and 160 ask for the frontal area in square centimeters, and stores it in the temporary variable TS. Line 180 converts the value in TS to square meters and places the result in variable S.

As written, the program generates a tble showing the airspeed in meters per second, with the drag force at that velocity beside it. The starting and ending velocities for the table are entered in lines 190 through 220. Lines 230 and 240 allow you to set the amount the velocity is increased for each table entry over the previous velocity. After all five items are entered, the program prints the table on the screen and halts. Most computer screens can show a maximum of 24 lines. Pick your starting and ending velocity and the velocity step size carefully so that the first table entries aren't scrolled off the top of the screen and lost from view. I usually set things so that only twenty table entries are shown, since my computer gives me a systems message when it completes executing the program, which eats up two more lines below the table.

Lines 250-290 do the drag table calculations one line at a time and write them to the computer screen. Line 270 does the actual drag calculation, using the formula shown previously. Line 280 write the velocity and drag force to the screen. The drag force is set to three decimal places by the function "INT(D*1000)/1000".

The table shows the drag force in Newtons, a particularly useful unit to use, since engine thrust is usually expressed in newtons as well. This lets you subtract the drag force directly from the engine thrust to see just how much engine thrust is left to propel the rocket through the air after overcoming drag. You might prefer the drag in some other units more familiar to you. To get the drag force in kilograms, change line 270 to:

```
270 D=((P*V^2*CD*S)/2)/9.8
```

From here, it is a simple matter to convert from kilograms to pounds, if you want english units instaed of metric.

This is a fairly simple program, only twenty-one steps long (including REM statements), but it can be used to reveal a lot of useful information. With some modifications and some careful measurements, it can be used to find the drag coefficient for any model. That will be the subject for next month's installment.

For right now, though, let me toss a situation at you, so you can use the program to help you solve a problem. An Estes Industries C6-5 engine has an average thrust of 5.88 newtons. Assuming that this engine will produce this thrust continuously, without ever running out of propellant and burning out, what is the fastest it can ever push a rocket with a frontal area of 5.17 square centimeters and a drag coefficient of 0.8? Remember, the velocity of the rocket will keep increasing until the drag force equals the engine thrust.

Until later,

Martin

Hobby Hints

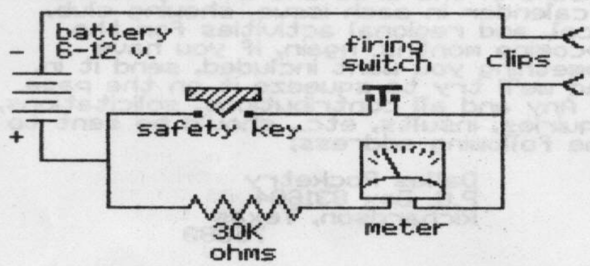
If you have your own launching pad, or are building one for yourself or for a club, you are going to need launch rods. Not trying to say anthing bad, but the two-piece rods that Estes sells are not very sturdy and bend easily, besides which they are outrageously expensive. Any good hobby store sells 1/8 inch diameter piano wire (it's used for model airplanes and other things), which usually is less than a dollar, and comes in 36 inch lengths. Being very strong, piano wire makes the perfect launch rod.

Making Your Own

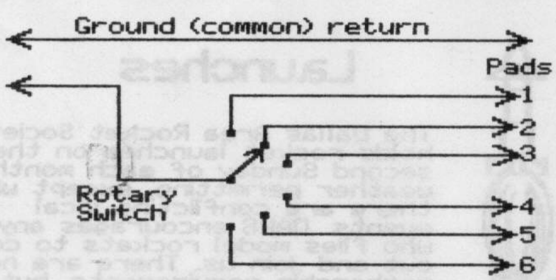
Part Two : Expanded Launch Systems

Last month we showed you how to make your own launching system. This month we will show you how to expand that launch system into a multiple-pad system suitable for club or contest use.

The heart of any launch system is the firing circuit, which was covered in last month's column. To make a simple multi-pad system, simply add enough components to switch from one pad to another. In addition to the components used for last month's system, you add a pad-selection switch, and enough leads to go to those pads. For referance, this is what last month's circuit looked like;

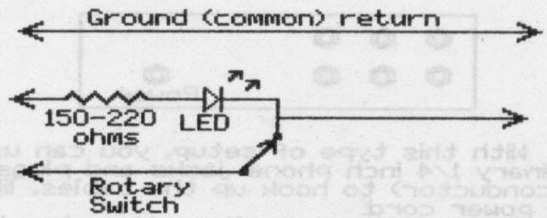


Now, to make this into a multi-pad system, attach the following circuit where the clips are attched;



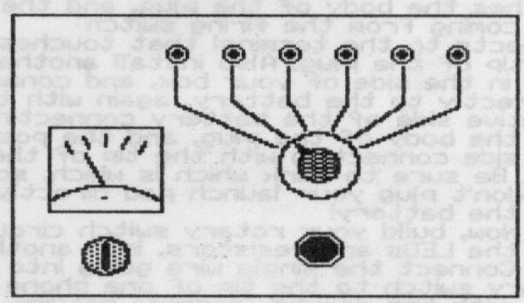
The rotary switch selects which pad the firing system will use. Notice that while there are seperate lines going out to each pad, there is only one return line. This is because you only need to switch the electricity going out, not coming back in(make sense?). When the pad is selected, the firing circuit reads the continuity of that pad, and that pad only. Arming and firing are the same, and the system will only fire the pad selected.

The only thing wrong with this setup, is that you have to work the rotary switch to see if a pad has continuity. If you have several pads (like 6 or 12), and several people all want to check the continuity of their models all at once, things can get pretty busy. Accidents have been known to happen in such confusion, so the best solution is to give each pad its own continuity indicator, which need only consist of an LED and a resistor of 150-220 ohms. You would connect it up like this;

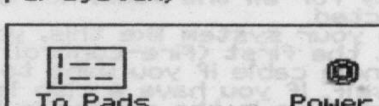


The resistor gets its power directly from the positive side of the battery, bypassing the safety key, just like the continuity indicator in the firing system. There needs to be one resistor and one LED for each pad you have, and be sure to test the circuit to see exactly what value the resistor needs to be. If you allow too much current through the system, you will set off the ignitor, so use the resistor with the highest value (most ohms) that you can get by with, while still letting the LED be bright enough to see. Now, how about housing all of this?

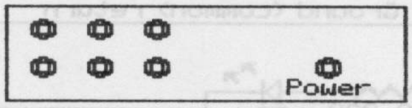
The best thing to put a launch system like this in is a metal box with a sloping face. The biggest consideration when deciding what size box to buy should be having enougn area on the face of the box to hold all the controls and indicators without it getting too crowded. 7 inches by 5 inches would be the minimum for a 6-pad system. You will also need enough room on the back side of the box to mount the connectors for your cable(s). A suggested layout would be something like this;



The arming (safety) key is mounted below the continuity meter, and the rotary switch, which is mounted between the firing button and the LEDs, is used to select which pad you are using. Lines are drawn on the face of the box going from the rotary switch position to the LED of the corresponding pad. The back of the box can look like this, for a single cable (rack-type) system;



Jones' plugs are good for this type of system. They are heavy-duty and made so that they can only be plugged in one way. If you want a satellite system with a different cable for each pad, it could be laid out like this;



With this type of setup, you can use ordinary 1/4 inch phone jacks and plugs (2-conductor) to hook up the cables, like the power cord.

Each of these configurations has its own advantages and disadvantages. The single line system means you need only one cable, and one set of connectors, and the launching pads can be built on one saw-horse-type rack. While great for club and contest flying, it's not really suited for one person who wants to fly by himself sometimes (remember, that was the original argument for the launching system in the first place), and heavy gauge, multi-conductor wire is somewhat expensive. A satellite-type system will let you run a single cable out to a single launching pad, or if you have a crowd, hook up cables to all the outputs and have a mass launch. Its disadvantages are that you need a lot of cable (at least 15 feet for each pad), plus jacks and plugs for all of them. Storing them also invites the chance that they will get tangled up. There is, of course, a compromise between the two.

Let's take the launching system we discussed in last month's column. Where the wires come out of the box to go to the launch pad, put a 1/4 inch, 2-conductor phone jack. Attach a plug to the end of the wires going to your launch pad, making sure that the negative side of the battery is connected to the terminal that touches the body of the plug, and the wire coming from the firing switch connects to the terminal that touches the tip of the plug. Also install another jack in the side of your box, and connect it directly to the battery, again with the negative side of the battery connecting with the body of the plug, and the positive side connecting with the tip of the plug. Be sure to mark which is which, so you don't plug your launch pad directly into the battery!

Now, build your rotary switch circuit, with the LEDs and resistors, into another box. Connect the single wire going into the rotary switch to the tip of one phone plug, with the ground (common) return from the pads connected to the body of the plug. This plugs into the jack on your first box where the cable going to the launch pad went. You have now effectively "multiplexed" your launching system. The wire going into the resistors and LEDs are connected to the tip of another phone plug, and this is plugged into the jack that is connected directly to the battery. This allows the LEDs to indicate continuity for all the pads, not just the one selected.

With your system like this, you can use just the first (fire-control) system with a single cable if you want to go fly by yourself. If you have a club launch or a contest, plug in the expansion box, and you have the ability to control however many pads your rotary switch can handle.

There are of course many more things you can add to a launch system, such as an auto-countdown, but that gets complex. Try this for now, and change it if will make you feel comfortable. Always be sure to test your system before you use it, and fly 'em safe.

About the Newsletter

Dallas Rocketry is published monthly by the Dallas Area Rocket Society for area model rocketeers. It will contain plans, construction tips, articles, editorials, cartoons, art, or whatever we can think of to throw in it. While produced by the Dallas Area Rocket Society, we will try to gear this newsletter towards all rocketeers, in hopes of expanding interest in the hobby for all of those who participate. Any contributions are welcome, and we will print just about anything, so long as it does not include nudity, profanity, or remarks intended to incite riot. We will also include news about other groups in the area and will try to include a calender in each issue, showing club, local, and regional activities for the upcoming months. Again, if you have something you want included, send it in, and we'll try to squeeze it on the page.

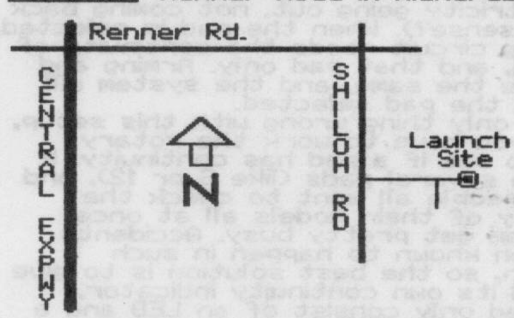
Any and all contributions, solicitations, inquiries, insults, etc., should be sent to the following address;

Dallas Rocketry
P.O. Box 831604
Richardson, Texas
75083

Send your name and address on a postcard, and we'll put you on our mailing list. Right now its free. Hurry, we may change our minds.

Launches

The Dallas Area Rocket Society holds rocket launches on the second Sunday of each month, weather permitting, except when there are conflicting local events. DARS encourages anyone who flies model rockets to come out and join us. There are no membership requirements, but we insist that the NAR/HIAA model rocket safety code be followed. Our launch site, the Shiloh Business Park, is located on Shiloh Road just south of Renner Road in Richardson. Just take Central Express-way north from LBJ Freeway, turn east on Renner Road to Shiloh Road, Then south on Shiloh for about 1 block. Come on out and join us. We would enjoy having you there to fly.



The Stuka

By Stuart Powley

The Stuka is a mini-engine rocket glider that flies quite well despite its rather strange appearance. The wings and tail are patterned after the JU-87 dive bomber of World War II. The tail, however, has been inverted to optimize the performance of the rocket glider. Construction, as outlined in the following paragraphs, is easier than it might seem at first.

First, cut the glider pieces from balsa sheet using the full size templates provided. Make sure grain direction is as indicated on the template. After cutting all the pieces, sand them carefully. The wing should be sanded to an airfoil, but the rudder and horizontal stabilizers need only to have their leading and trailing edges rounded. The rest of the parts should remain squared.

After sanding, glue the engine pylon onto one end of the fusalage as shown in the drawings. While this is drying, assemble the wing-slide box. The top and bottom pieces should be glued in between the two side pieces. Note that the bottom piece is shorter than the top piece. This leaves approximately one inch open for the box to slide over the horizontal stabilizer, placing the wing as far back as possible.

While the wing-slide box is drying, glue the wing inner sections to the outer sections, being careful to get the airfoil going in the same direction on both pieces. To get the correct angle at this joint, lay the outer wing section flat against the table, and then elevate the inner wing section until its root edge is 1/4 inch high. Super glues like Jet or Hot Stuff come in handy at this point, but you will need to apply at least one coat of aliphatic or white glue before the model is flown, to make the joint sufficiently strong.

Back to the fuselage/pylon. After it has dried, glue the 3 3/4 inch section of BT-5 to the top of the pylon, with the back of the tube flush with the trailing edge of the pylon.

After the wing panels have dried, glue them to the slide box at the angle shown on the drawings. Remember that the slot in the box goes to the rear bottom, and be sure to get the angle of both wing panels perfectly level, otherwise your model will fly in an erratic manner. Also, be sure to reinforce the wing-box joint with a strong glue joint.

After all of this has dried, you can test fit the wing/slide box assembly onto the fuselage. Check to see that the box slides freely. If it does not, lightly sand the boom with fine sandpaper until it does. Once it fits correctly, slide it up to the engine pylon, again making certain that the slot for the horizontal stab is at the bottom rear (engine pod is on top). Glue the horizontal stab onto the bottom of the fuselage, taking care to center it. The trailing edge of the stab should be flush with the end of the fuselage. When this has dried, glue the rudder onto the bottom of the stab, checking to see that the slide box does not hit it. The slide box should just barely fit under the front of the rudder.

The next step is to cut two holes in the BT-5 tube, one on either side, about 3/8" from the front of the tube. This gives the ejection gases someplace to go. After cutting these holes, glue on the nosecone. Also, glue the launch lug against the engine tube-pylon joint.

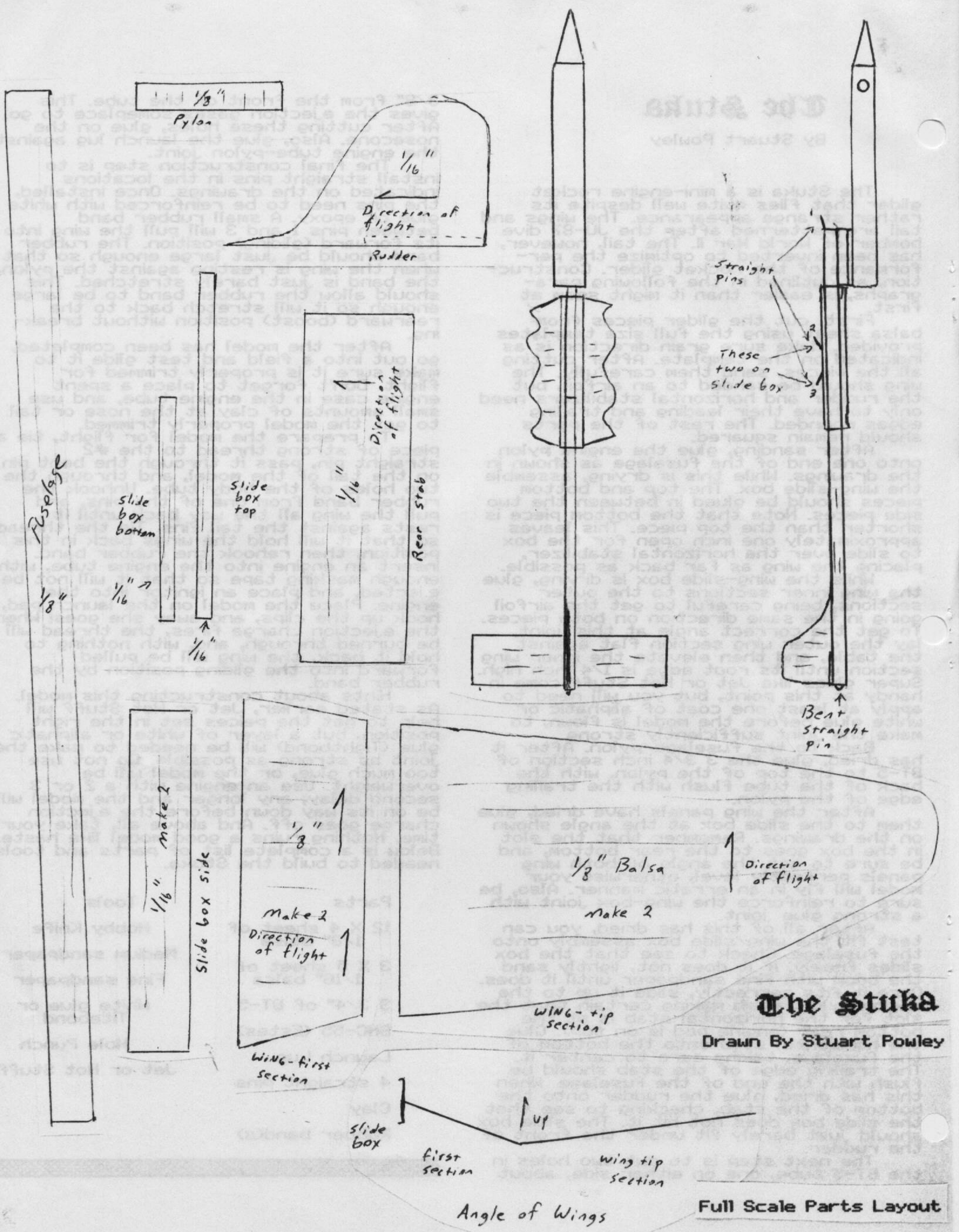
The final construction step is to install straight pins in the locations indicated on the drawings. Once installed, the pins need to be reinforced with white glue or epoxy. A small rubber band between pins 1 and 3 will pull the wing into its forward (gliding) position. The rubber band should be just large enough so that when the wing is resting against the pylon, the band is just barely stretched. This should allow the rubber band to be large enough so it will stretch back to the rearward (boost) position without breaking.

After the model has been completed, go out into a field and test glide it to make sure it is properly trimmed for flight. Don't forget to place a spent engine case in the engine tube, and use small amounts of clay at the nose or tail to get the model properly trimmed.

To prepare the model for flight, tie a piece of strong thread to the #2 straight pin, pass it through the bent pin on the tail of the model, and through the two holes of the body tube. Unhook the rubber band from one of the pins, and pull the wing all the way back until it rests against the tail fins. Tie the thread so that it will hold the wings back in this position, then rehook the rubber band. Insert an engine into the engine tube, with enough masking tape so that it will not be ejected, and place an ignitor into the engine. Place the model on the launch pad, hook up the clips, and away she goes! When the ejection charge fires, the thread will be burned through, and, with nothing to hold it back, the wing will be pulled forward into the gliding position by the rubber band.

Hints about constructing this model. As stated earlier, Jet or Hot Stuff will help to get the peices set in the right position, but a layer of white or aliphatic glue (Tightbond) will be needed to make the joint as strong as possible. Do not use too much glue, or the model will be overweight. Use an engine with a 2 or 3 second delay; any longer and the model will be on its way down before the ejection charge goes off. And above all, take your time. Nothing ruins a good model like haste. Below is a complete list of parts and tools needed to build the Stuka.

Parts	Tools
12 X 4 sheet of 1/8" balsa	Hobby Knife
3 X 5 sheet of 1/16" balsa	Medium sandpaper
3 3/4" of BT-5	Fine sandpaper
BNC-55 (Estes)	White glue or Titebond
Launch Lug	Hole Punch
4 straight pins	Jet or Hot Stuff
Clay	
Rubber band(s)	



The Stuka

Drawn By Stuart Powley

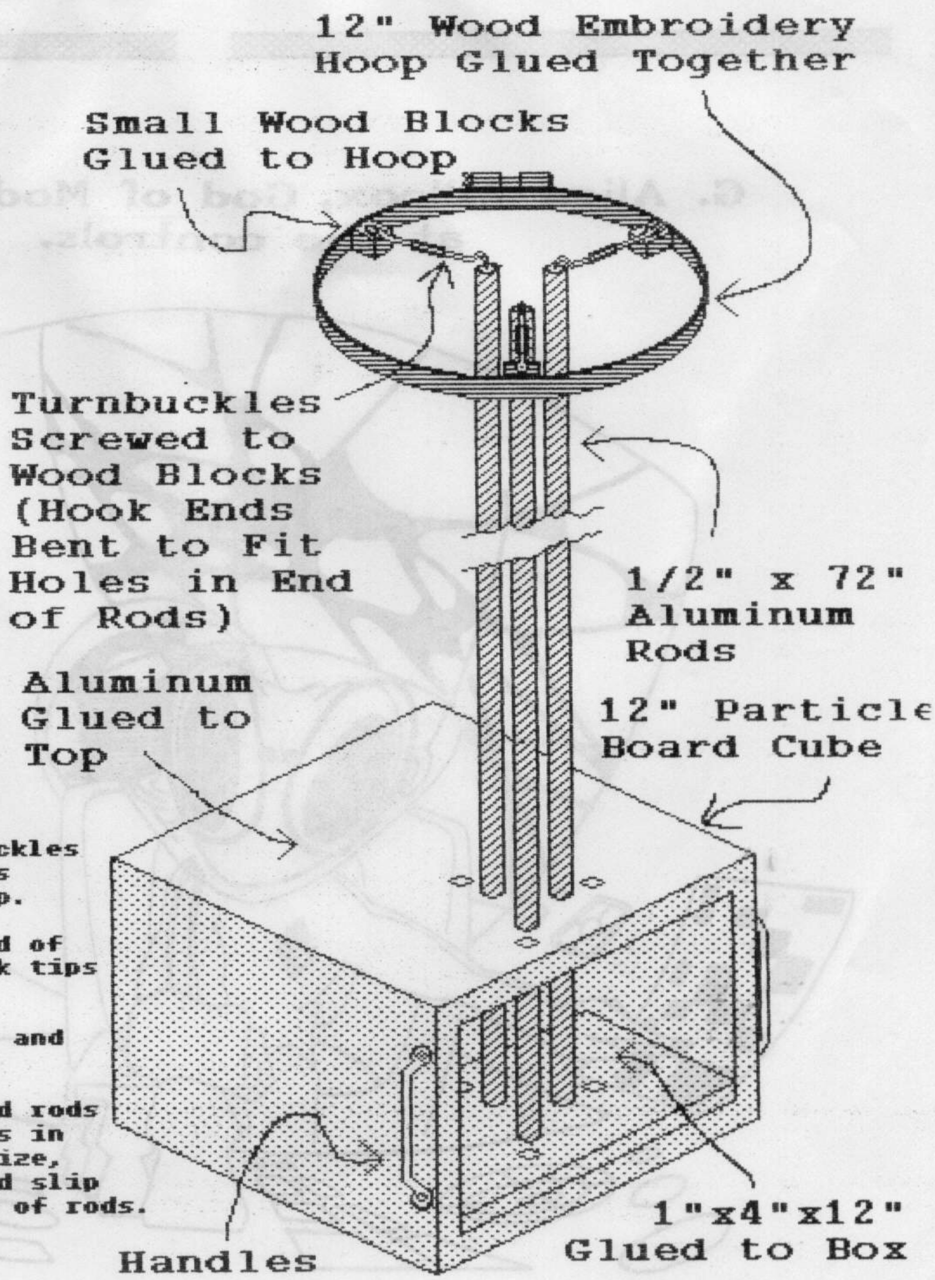
Full Scale Parts Layout

Note: Originally drawn on 8 1/2 X11 paper.

E-Z Tower Launcher

by Joe Rowe

1. Make hole pattern on paper for holes to fit all body tube sizes to be used.
2. Cut 1" x 4" to fit inside of box. Tape pattern to it, center punch and drill 1/2" holes for rods.
3. Contact cement some aluminum roof valley to top of box as a blast deflector.
4. Clamp 1" x 4" to top of box and use as a drill guide to drill matching holes.
5. Glue 1" x 4" to inside bottom of box in line with holes in top.
6. Glue sections of hoop together and glue on small wood blocks at 120 degree spacing.
7. Bend hook ends of turnbuckles so tips are at right angles to the shafts.
8. Screw and glue turnbuckles to wood blocks so tips meet at center of hoop.
9. Drill holes in one end of each rod to match hook tips of turnbuckles.
10. Paint box if desired and attach handles.
11. Carry hoop in box and rods separately, slide rods in holes for body tube size, adjust turnbuckles and slip hooks in holes in end of rods.
12. LAUNCH!



Where to Buy

Well, not really anywhere. For large motors, that is, nowhere local. Lots of people want to know where they can get E and F type motors, and right now you have to mail order them, because no one local carries them. If you would like to be able to buy large engines right out of the hobby shop, talk to your local hobby dealer. At least one hobby shop (Stew's, in Plano) has expressed an interest in carrying large engines, and if enough people ask, he just might do it. Support your local dealer, and he'll help you.

G. Alien Willcox, God of Model Rocketry, at the controls.

Dallas Rocketry

The Official Journal of the Dallas Area Rocket Society

December 1987

On the cover;

Bob Turner doing what he does best, smiling for the camera, and flying his big models. An Aerotech F80 sent this one quite a ways up.

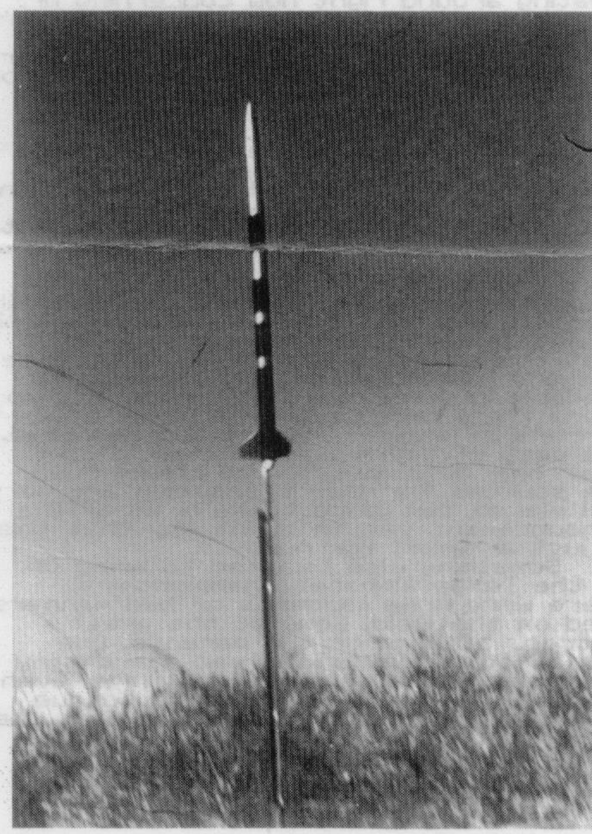
In this issue;

News you can use;

First in a series on building digital flight data recorders;

Plans: The Scamp, a 1/2 A – A PD/SD model;

Plus much more ...



The Hobby in Dallas

The envelope, please. (Sound of rustling paper). And, ladies and gentlmen, the winner is ......

(Drumroll)

..... no one.

That's right, there was not one single entry in Dallas Rocketry's art contest. Of course, that means that I get to keep the $50.00 worth of prizes, but it also brings to light a problem inherent with many model rocketry clubs around the nation - member participation.

Very often, club functions are often made possible only by the concentrated efforts of a few people. Club-sponsored contests require people to organize the events, publicize the meet, keep track of entry forms and flight cards, and reduce all of the data to get the final results. People are also needed to set up the range at contests and launches, keep the equipment in good working order, and store and transport the equipment. What this all boils down to is people giving their time to help. How about you?

Now, this doesn't mean you are wanted to sign a four-year enlistment. What it means, is, if you are at a club event, ask around and see if you can help set up or take down the range. If there is something that you are good at, like repairing ignitor-clip wires or cleaning the rust off of launch rods, then don't be bashful. Step right up and volunteer to help. Your time will be well spent, and your efforts will be greatly appreciated.

There's a heavily-supported rumor floating around right now concerning Mr. Lee Piester. For those of you who weren't in the hobby ten years ago, Mr. Piester was the president and founder of Century Model Rockets, the primary competition for Estes. When Damon Industries took over both companies and phased out Century, Mr. Piester sort of faded into the woodwork. Well, now he's aparently coming back, and with a vengence. Mr. Piester started a company called Enertek Inc., and word has it that come the first of the year, they will unveil a new line of kits. It has also been learned that Aerotech, the supplier of just about the only NAR-approved high-power engines, is entering an agreement to sell engines only through Enertek, and that the engines and kits will be sold primarily through retail outlets. What this all means is that, if true, large kits and high-power engines will soon be available in your local hobby shop. It also means that, because of the higher numbers of engines shipped and delivered, the cost of high-power engines, which is their only detriment, will be coming down. The sources for this information are very well placed, but since there is no official announcement yet, I'm gonna say that this is just a rumor, for now.

Something else I wanted to bring up. At the Texas Alphabet Championships, there were some incidents of bad manners used on the field, some to the great distress of some of the parents. One out-of-town contestant was heard many times using some very foul language, even after he was asked to curb his tongue. While some of us rocketeers are past the age of consent, the majority of people involved in the hobby are very young. The use of four letter words on the launch field is not appreciated, especially when it is done without regard to how loud it is said, or who is within hearing distance. If you sometimes make use of such words, please make an effort to keep them off of the launch field.

Another point of field etiquette. Tower launchers are great devices that are almost essential to winning an event. Not everyone has one though, and so sometimes they are shared. If you are wanting to use a tower launcher that doesn't belong to you, find the owner first, and make sure it is okay. More than once someone spent a considerable amount of time adjusting their tower, only to have someone come along and start messing with it once their back was turned. Don't settle for the word of any-body except the owner himself. It'll save some tempers.

Another point of good news for the hobby. For many years it was against the fire chief's policy to allow model rocket engines in the city of Mesquite. Allen Wilcox has informed us that the ruling was recently changed, and now modelers in that city can take advantage of the wide open spaces they have without risk of being harassed by city officials. This will also allow Mesquite hobby stores to sell engines along with the models that have sold well despite the ban on the motors.

Oh yeah. From the staff of Dallas Rocketry, Merry Christmas to you all. have a Happy New Year, and fly 'em safe.

Mike Calhoun

Calander of Events

December 6 - DARS Meeting
December 13 - DARS Launch, Shiloh Business Park, Richardson, Texas
January 10 - DARS Meeting
January 17 - DARS Launch, Shiloh Business Park, Richardson, Texas

All DARS meetings are held at John Dyer's house at 12619 Promenade in Dallas, Texas, unless otherwise noted. While launches are generally held on the second Sunday of each month, weather, special activities, holidays, or just plain dis-interest can change this. Launches may also be held on other weekends when the weather is good and enough people want to fly. If you would like to be kept informed of what's going on, call John or Nina Dyer at 343-0214. They can answer your questions, and if you give them your name and phone number, they can call you when there's going to be something going on. They can also provide you with detailed information on events listed in each month's calander.

If you belong to a group other than DARS, and would like to have your group's activities listed in Dallas Rocketry, send your list of events to us, and we'll be glad to include them. The address is;

Dallas Rocketry
P.O. Box 1604
Richardson, Texas 75083

High Power ......
High Price

In the week that followed the Texas Alphabet Championships, some questions were raised by some of the competitors, specifically, questions about the high-power motors used in some of the events. The person talking was pleased with the performance of the composite engines, but was appalled at the price.

The high-power engines of choice among the competitors were, of course, those manufactured by Aerotech. Though offering top-end performance for each class, these engines are not cheap. The least inexpensive engine made by them is their E-28, at $5.95 each. F's, and their new D-8's, begin at $9.95, while the G-25, the only G engine certified by the NAR, sets the buyer back $14.95 a pop. Compare this with $6.00 for three Estes D-12's, and you start to get the picture.

The Texas Alphabet Championships events were not exclusively high-powered, in fact, there were only three official events, and one provisional event, that required engines of more than 10 Newton-seconds. But, if you flew two flights for each of these events using Aerotech motors, you'd be set back $81.60. Quite a bit of money for one contest.

The person who was telling me this stated that most modelers he knew couldn't afford to buy such expensive engines to fly all the time, as a serious competitor would do. He surmised that contests would soon be taken over by those who could afford the high-tech motors. To prevent this, he said, and to promote competition, Contest Directors should be given the option to exclude composite engines, at least from Section and Open contests, much as they can exclude flexy gliders, or the use of radio-controlled gliders.

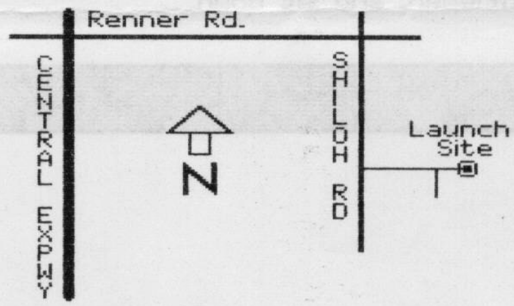
This sounded plausible, except for one thing which was pointed out later in a discussion involving others - if you start banning the use of these engines, the manufacturers might decide to stop making them. Then the hobby would be right back where it was ten years ago, depending on two manufacturers (Estes and FSI) to supply engines that are inferior in technology and performance.

The solution to this delimma? Find some way to lower prices of these composite engines, so that more people can afford them. To cause this, modelers need to start buying more of these engines. Once the manufacturers have recovered their initial investments in materials and equipment, they might start lowering prices.

Another solution may already be in the works. There's a rumor that Aerotech may start selling through a new company that's springing to life called Enertek. Word has it that this new company will sell not through the mail, but directly through hobby stores, making high-power motors and kits for them available to just about everyone. If this rumor comes to pass, it will mean a new chapter for the hobby of spacemodeling, and the ability of more modelers than ever to use the latest technology available to them. That'd be great to see!

Launches

The Dallas Area Rocket Society holds rocket launches on the second Sunday of each month, weather permitting, except when there are conflicting local events. DARS encourages anyone who flies model rockets to come out and join us. There are no membership requirements, but we insist that the NAR/HIAA model rocket safety code be followed. Our launch site, the Shiloh Business Park, is located on Shiloh Road just south of Renner Road in Richardson. Just take Central Expressway north from LBJ Freeway, turn east on Renner Road to Shiloh Road, Then south on Shiloh for about 1 block. Come on out and join us. We would enjoy having you there to fly.

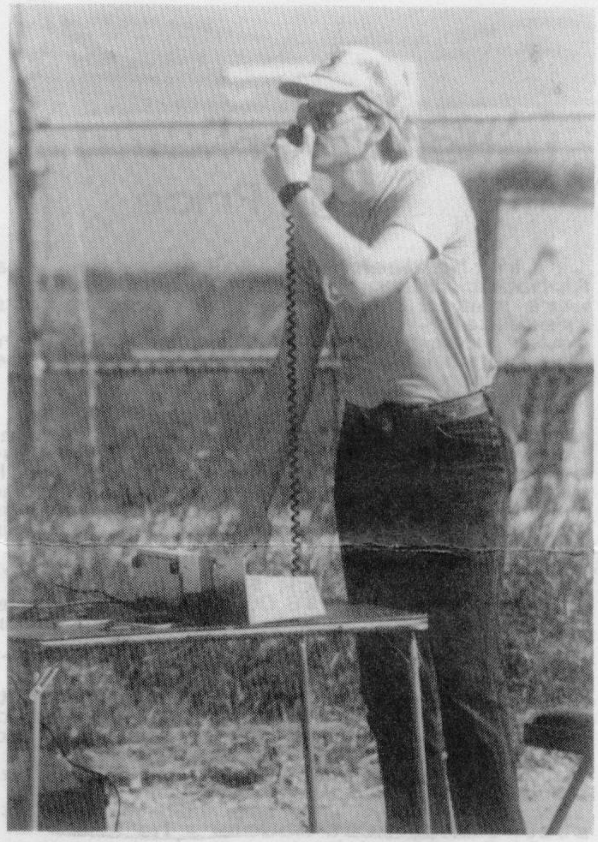


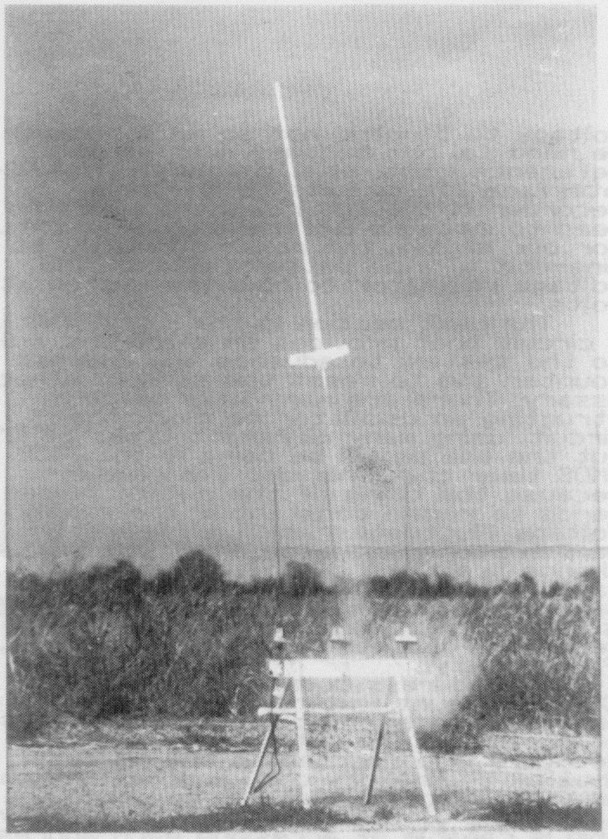
DARS

The Dallas Area Rocket Society is a non-profit, chartered section of the National Association of Rocketry. Its purpose is to support and promote the hobby of model rocketry in the Dallas area. DARS membership is open to any person living in the Dallas area, and although membership in the National Association of Rocketry is recommended, it is not necessary, except for participation in NAR sanctioned contests. If you would like to learn more about the Dallas Area Rocket Society, contact John Dyer at 343-0214, and he'll give you all the information you want.

Photo Session

A typical launch. John Dyer, right, taking control of things, while Martin Catt, below, makes one of his rare flights. The folks on tne facing page are somewhat new, so I don't know their names. Take a bow, gentlemen, and sit down.



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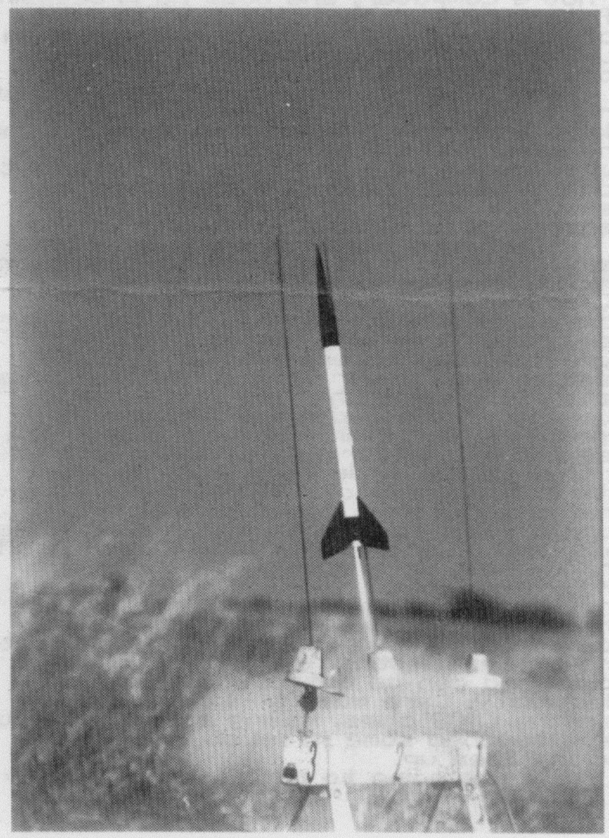


Electronic Data Recording Payloads

Part One: Theory of Operation

This is the first in a series of articles on building an electronic payload that will store data in a digital form. Digital rocorders are not new, as I built one for the Research and Development event at LUBWIN, a contest held in Lubbock, Texas, over the New Year's holidays in 1980-1981. And since then, several people have built and flown digital data recorders, so we will not be making any tremendous scientific discoveries here. We will, however, explain how such gadgets are built and operated, so that the interested modeler can construct his own, if he chooses.

A note here, before we procede further. This series of articles will cover the theory of operation, construction, and use of this device. While we will try to cover every pertinent point, it would still be helpful for the modeler to be aquainted with the operation of digital electronics, as well as having some experience in the construction of electronic circuits. Most bookstores sell books about electronics, and Radio Shack has a fine series of Engineer's Notebooks which help explain how electronics work, as well as containing many projects to build.

A digital data recorder, simply stated, is a device which converts raw data into a binary number, and stores that number in its memory for later retrieval. This device is not a computer, and does no processing of its own. It simply holds onto the data it collects, until that data is removed from it. The actual processing of the data is done on the ground.

The data recorder itself consists of only a few sections: the power supply, a clock generator, an address counter, and the memory chip. The sensor unit can be built directly into the recorder unit, but would probably be best if built into a removable module, so that different sensors could be used.

The power supply is basically a battery and some sort of voltage regulator, which keeps the supply voltage at a steady level. In building this recorder, consideration must be given to the power requirements of the system. The prototype that was entered in R&D at LUBWIN used so much power that a nine-volt NiCad battery, freshly charged, lasted an average of two and a half minutes, very impractical for flight considerations. The reason? TTL integrated circuits were used in that device. While being easy to work with in some respects, TTL IC's are somewhat picky when it comes to electrical supply. TTL's require 5 volts, no more, no less, and draw an awful lot of current. To change this, we are going to switch to CMOS integrated circuits. CMOS will digest anything from 3 to 15 volts, and draws only a miniscule amount of current. They do have drawbacks, however. CMOS circuits are extremely sensitive to electronic noise, and can be detroyed by static electricity. Care must be taken when handling CMOS chips, making sure that you have touched some metal object before picking them up.

We are going to regulate our supply voltage to 5 volts, not so much because we need to, but because it is a handy reference point. Also, should you need to interface TTL circuits to the data recorder in the future, there will be no need to install a different power supply. For our circuit, the power supply will be a nine-volt alkaline battery, with a 7805 voltage regulator to hold the system at 5 volts.

The next section is the clock. This is a circuit that provides an electronic pulse to the system, to advance the address counter and to reset the sensor, if necessary. There are many ways of constructing an oscillator to clock the circuit, using many different types of IC's, but the one we will be using is the 7555 CMOS timer chip. This chip was chosen because the timing of the output pulses tends to remain constant if the supply voltage fluctuates, which will probably happen sooner or later. Also, you can change the timing of the pulses very easily, allowing you to sample and store data at different speeds. A second 7555 is used to provide a delayed pulse to reset the counter in the sensor circuit, if necessary.

The address counter is a series of IC's that count upwards from zero in binary numbers, one count for each pulse of the clock. The output of these counters is connected to the address lines of the memory chip, and tell the chip which location, or address, to store the next piece of data. Although the memory chip is capable of accessing each address in a random order, we are going to address it in proper numerical sequence, so that reducing the data will be easier. Once the data is retrieved from the data recorder, we can access the data randomly, if necessary. The address counter will simply start counting at zero, and will stop when it reaches a predetermined point. The clock speed will control how fast the address counters actually count, and thus also controls how fast the memory is filled. A sensor, such as a roll-rate sensor, would suffice to have data recorded once a second, while an accelerometer should sample data many times each second.

The heart of the whole circuit is the memory chip. There are many different types of memory IC's on the market, with capacities ranging from 1k (1024 x 1) up to a megabyte. You should know, however, that the memory IC's with the most capacity are not suited for this recorder. The really high-density ones require refreshing circuitry, as well as "strobed" address lines (where the first part of the address is given, then the next part, and so on, along the same circuit lines). This makes for a complicated circuit, which we are trying to avoid. We'll save those for later.

A good memory chip to start out with is the 6116 CMOS memory chip. It is capable of storing 2048 different numbers ranging from 0 to 255. For applications, such as a roll-rate sensor, that require slow clock rates (once per second), this chip gives enough capacity for roughly 34 minutes. Even raising the sample rate up to 20 times per second, you have enough room for 1 minute, 42 seconds worth of data. Being a static RAM, it requires no refresh circuitry to keep the data stored away. Also, the data will remain in the chip as long as there is at least 2 volts of power supplied to the it, and during peak usage, the chip only draws a maximum of 70 milliamps, dropping down to a maximum of 100 microamps in its standby mode (data taken from Harris Semiconductor data sheet for HM-6116-2). And, all address lines are directly accessible, eliminating the need for complex strobe-circuitry. In short, it is an easy-to-use memory chip with plenty of room for data.

The sensor unit can be anything the modeler wants it to be, but for this project there are a few limitations. The unit must operate off of no more than 5 volts, and must input a binary number of from 0 to 255. The address-advance clock pulse and the delayed clock pulse will be available to reset the sensor counter, if necessary. For this particular project, we are going to utilized a roll-rate sensor to test our system with. It will count the number of times the model rolls in flight and exposes the sensor to the sun. In future articles we will cover other sensors.

The whole thing works like this;

At the moment of launch, the clock is allowed to start running, advancing the address counter at a predetermined rate. The sensor collects data, converts it into a binary number, and stores it at the address location presently selected. The next clock pulse advances the address location one place, then resets the sensor counter back to zero. This allows the sensor to give a fresh count for each timing cycle. This cycle repeats during the course of the flight until the address counter reaches its maximum address location, at which time the counter stops. When the unit is retrieved and returned to the launch area, the address counter is reset, and the data is reviewed. For our project, a ground unit similar to the airborne data recorder will be built. This ground unit will contain the same basic circuit as the airborne unit, but will also have a display so that address locations and data can be viewed. This unit will also have a means to manually access each address location, either in numerical order or randomly, with the option of using an adjustible clock or manually stepping the address.

Now, before you start rubbing your hands together, thinking about interfacing this into your personal computer, let me say something. Interfacing airborne data recorders into IBM's and Commodores has been done, but not by me. The hardware and software problems extend a little beyond my experience, so if you want this thing to talk to your computer, you'll have to figure it out for yourself. Not that I would mind, I like to see people take things and improve on them. For this project, I am going to advocate manually deciphering the data. It's not that hard.

As you may have noticed, I'm not going into too many specifics in this installment. This project, while not very complicated, is somewhat involved, and trying to cover it in one or two articles would just get everyone confused and into trouble. So, we are going to build the digital data recorder in sections, starting with the power supply and clock circuitry. We will cover each section as thoroughly as possible, so that when the last section is finished, you'll have a completed unit, ready to fly. I do have some suggestions.

If you are not too familiar with digital electronics, start reading up on them now, primarily about CMOS digital circuits. To complete the project, you will also need some specific tools, such as wire cutters, wire strippers, a 15 watt soldering iron, and some solder (very thin). It is also best if you first set up the circuit on a solderless breadboard, such as Radio Shack part number 276-174. This will allow you to construct the circuit and make changes easily, without having to solder and de-solder wires to correct mistakes. At the beginning of each article I'll provide a list of parts needed to finish that section, and explain how the section is built. Stick with me, and slowly, but surely, you'll have a working digital data recorder that'll allow you to perform all sorts of neat experiments. Until then, fly 'em safe.

Mike Calhoun, NAR 27647

G-engine Events

As most of you know, G engines are now allowed by the NAR. Now, how about some ideas for G-engine events? G Monsteroc has already been thought of, but we'd like to hear from you about what events you would like to fly with G motors. Send your ideas, along with a simple set of rules. The best ideas will be published in Dallas Rocketry, so start thinking!

About the Newsletter

Dallas Rocketry is published monthly by the Dallas Area Rocket Society for area model rocketeers. It will contain plans, construction tips, articles, editorials, cartoons, art, or whatever we can think of to throw in it. While produced by the Dallas Area Rocket Society, we will try to gear this newsletter towards all rocketeers, in hopes of expanding interest in the hobby for all of those who participate. Any contributions are welcome, and we will print just about anything, so long as it does not include nudity, profanity, or remarks intended to incite riot. We will also include news about other groups in the area and will try to include a calender in each issue, showing club, local, and regional activities for the upcoming months. Again, if you have something you want included, send it in, and we'll try to squeeze it on the page.

Any and all contributions, solicitations, inquiries, insults, etc., should be sent to the following address;

Dallas Rocketry
P.O. Box 831604
Richardson, Texas
75083

Send your name and address on a postcard, and we'll put you on our mailing list. Right now its free. Hurry, we may change our minds.

The Scamp

The Scamp is a high-performance model designed to compete in 1/2A and A parachute and streamer duration events. It utilizes Estes' 13mm "mini" engines, and is built around a section of Estes BT-5. The parts list for the Scamp consists of;

* Body tube, Estes BT-5, 8 1/2 inches long

* 2 inch X 2 inch sheet of styrene, .035 - .040 inches thick

* Nose cone, Estes BNC-5E

* Carpet thread or nylon casting line (NOT monofilament fishing line), available at most fishing tackle stores

In addition to the above items, you will need some fine sandpaper (400-600 grit), a hobby knife, some kind of cyanoacrylate glue (Hot Stuff, Jet), and some baking soda, as well as whatever kind of recovery device you want to put in it.

The design is really very simple to build. Simply cut three fins out of the styrene, sand the leading and trailing edges into an airfoil shape, and glue them onto the body tube, 1/4 inch from the bottom edge of the tube. This gives you room to wrap a small piece of masking tape or adhesive mylar around the engine and body tube to hold it in place. Placing the fins above the bottom edge also is supposed to increase efficiency, but I'm not sure how.

If you can't get your hands on any styrene, 1/16 inch balsa will do, although for best results you have to put a really good finish on them.

The shock cord is a 28 inch length of carpet thread or casting line. An elastic shock cord is not necessary on this model because it is not heavy enough to create a lot of force on the cord. Monofilament fishing line could be used, but would be susceptable to melting if not enough chute wadding were used in the model. The shock cord is attached along one of the fin roots using Hott Stuff and baking soda. First, lay the cord against the root, and secure it there with a drop of glue. Then, place a small fillet of baking soda on top of the line, and add another drop of glue. The Hott Stuff or Jet will seep into the baking soda, and will set almost instantly. This will hold the shock cord in place. Put a small loop in the other end of the shock cord for attaching the nose cone.

The balsa nose cone will need to be finished, using one coat of sanding sealer, and three coats of balsa fillercoat, sanding the nosecone between each coat with the fine sandpaper. Once the nosecone is finished, very carefully hollow out the inside of the cone to reduce weight. Be careful, though, because it is very easy to cut through to the outside of the cone. Once this is done, take another piece of casting line or carpet thread, and make a loop about three inches in diameter. Using a piece of wood dowel or the handle of your hobby knife (minus blade, of course), push one end of the loop down into the nosecone. Once it is in, put some baking soda down inside the cone, enough to cover the line. A few drops of Hott Stuff will harden the baking soda, firmly affixing it to the nosecone. When this is done, pass the nosecone through the loop in the shock cord, then back through its own loop. This attaches it to the rocket.

I did not list the recovery device in the parts list for several reasons. The first is that this model is well suited for both parachute and streamer duration. Another reason is that size and material of the recovery device varies from one modeler to the next. As for myself, a ten inch diameter parachute made of 1/4 mil thick mylar fits in perfectly for parachute duration, while a five inch wide by four foot long streamer made of 1/4 mil or 1/2 mil mylar suffices for the streamer duration events. Some modelers like to use Mica-film, a heat-shrinkable covering available in some hobby stores, for their streamers, while other modelers prefer to use ordinary crepe paper. I have yet to see conclusive evidence that any one material is better than another.

Something else I did to my model to make it perform better is to remove some layers of the body tube. I did this by cutting a slot in one end of a length of 1/8 inch aluminum tubing, and using a hobby knife, gently peeling away a layer of paper from the inside of the tube. Once I got a corner of paper away from the tube, I put the aluminum tube into the body tube from the bottom, and placed this corner of paper in the slot in the tube. I then gently rotated the aluminum tube, peeling away the layer of paper from the inside of the tube. A word of warning, though. If you try to peel too much paper away from the tube at one time, the tube will collapse and crimp. The best method is to remove very thin layers each time. Also, if you remove too many layers, the tube will collapse at liftoff or burst when the ejection charge fires. A good rule of thumb is to only remove two thin layers. Once these layers have been removed, coat the inside of the tube with some Hott Stuff or Jet. This will keep the end of the tube from tearing or fraying, and will strengthen the tube without adding any appreciable weight.

The Scamp was oringinally designed to be launched from a tower, but the addition of small, low-profile launch lugs is acceptable if you don't have access to a tower. Build this model neatly and make it aerodynamically clean, and you'll have a serious competition model.

Mike Calhoun

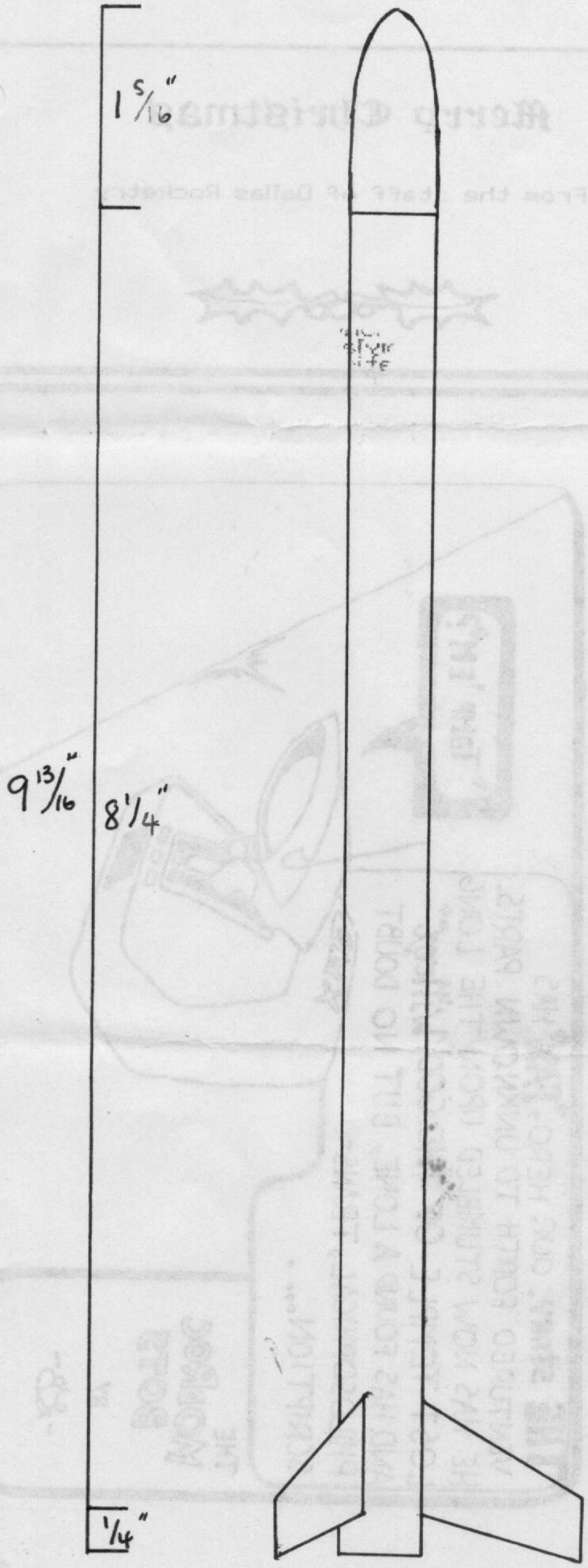
Where to Buy

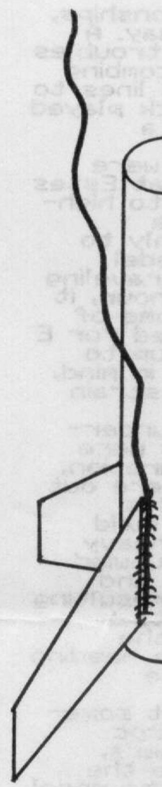
Where to get mylar for parachutes and streamers? Competition Model Rockets, P.O. Box 7022, Alexandria, Virginia, sells 1/4 and 1/2 mil mylar. $1.00 will get you a catalog. Also, The Scout Shop, at LBJ and Midway, sells "space blankets", which are made of 1/2 mil mylar, silver on one side and gold on the other. $4.99 apiece, they are 76 inches by 45 inches, approximately. That'll make a lot of 'chutes.

The Scamp

By Mike Calhoun
NAR 27647

Scale – 1" = 1"





If you don't have a tower to launch the Scamp from, cut two low-profile launch lugs, as shown above, and glue them to the body tube.

Shock cord attached at fin root, held in place by baking soda and Jet or Hot Stuff

Merry Christmas

From the staff of Dallas Rocketry

Observations .....

At the Texas Alphabet Championships, luck was, as they say, far, far away. A vast majority of competitors had troubles with their flights, with models succombing to everything from broken shroud lines to airframe failures. And although luck played a part in it, some of it was simply a failure of common sense.

Many people, including myself, were quickly introduced to the fact that Estes body tubes simply will not hold up to high-power engines. Several models were launched with composite motors, only to fall apart during boost. When a model tries to make a hard right turn traveling at a couple of hundred miles per hour, it doesn't stand up too well. Even some of CMR's body tubing that was designed for E and F Eggloft events, didn't hold up to the new engines. Designed with FSI in mind, these tubes would not stand the strain of Aerotech's E-50's and F-80's.

Another common problem was under-powering models. Aerotech's E-28's were used extensively for E Eggloft Duration, and most models ended up "somewhere out there". The low initial thrust of this engine and relatively long time to build peak thrust caused many of the heavy egglofters to tip over and point upwind before the engine really kicked in and sent the model far uprange. The resulting low altitudes caused many models to disappear into the weeds before the chute came out, or to deploy while heading down, stripping the chute from the rocket.

Even the long-awaited G's left something to be desired. My G Monsterroc model looked just like the egglofters, slowly lifting off, and pointing into the wind. The ballistic flightpath put the model going down when the ejection charge went off, and the air pressure against the nose cone could not be overcome by the engine's charge. As a result, my model is now about half as long as it was.

Though there were some mistakes by modelers, a lot of problems had to do with plain bad luck. Proven, veteran models coming apart suddenly. Oft-flown gliders not wanting to pull put of a dive. Parachutes not opening until after the model had landed. Such are the events that make a memorable contest. The Texas Alphabet Championships will be remembered, though perhaps not cherished by some. Next time, everyone's luck has got to change!

How to Contribute to Shroudlines

And now for the “last page begging part” of our publication. As I have made clear in the past, without you, we have no newsletter. We all have differing interests and areas of expertise, and that is exactly what this newsletter needs!

Once again, I’d like to thank all of those who have contributed material so far. You are very much appreciated! Still, we need more! Therefore, if you have any kind of article, picture, cartoon, rambling, etc., just send it to stu29573@yahoo.com. I usually work best with Word documents, and JPEG files, but I can make just about anything work if I have to. I can also handle stuff that is written down, but that means I have to type and that can be a bit touch and go… But I’ll take it anyway!

You can also give me things at the meetings (which I almost never miss...almost), and I promise to try my best not to lose them. I can return stuff at the next meeting if need be.

As I have said many times in the past, I really want this newsletter to be by the club and for the club. You guys can think up much better stuff than I can (as is evidenced by the articles we’ve been getting lately). So, stop just thinking about maybe writing something and actually do it! You’ll be glad you did! (as will everyone who reads it!)

DARS Officers

President	Jack Sprague
Vice President	John Dyer
Treasurer	Suzie Sprague
Secretary	Bill Gee
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 List (* DARS member discount—confirm before ordering)

Aerospace Specialty Products	Aerotech Consumer Aerospace
Apogee Components	Art Applewhite Rockets (* 20%)
BRS Hobbies	CLE ENterprises
Dr. Zooch Rockets	Excelsior Rocketry
FlisKits, Inc	Hawks Hobby
Hobby Town USA (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	Rocketarium
Semroc Astronautics Corporation	Sirius Rocketry
Sunward Aerospace Group Limited	The Squirrel Works Model Rocketry
RC Zone (*10%)	

Dallas Area Rocket Society ("DARS")

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SHROUDLINES

A Dallas Area Rocket Society Production