

Shroudlines

A Dallas Area Rocket Society Production

DARS
NAR Section #308
Mar / Apr
2001

Rocket Widows Unite!

By Beth Sapp

Most women complain that their husbands don't spend enough quality time with them. Are you one of them? Most women want their husbands to enjoy shopping with them. Are you one of them? Well, as a wife of a rocket man let me give you some suggestions. Try the hobby of rocketry. Building a rocket requires shopping and talking to discuss and buy the perfect rocket for you. It also requires hours of time and conversation in order to build the rocket properly. Now, when it is time to launch the rocket you get to see first hand the proud look on your husbands face. Also, you get a feeling of accomplishment. Just knowing that the time and effort you put into your relationship with your husband and into your rocket was worth it. Rocketry is not the answer to a good marriage. But, taking part in something that your husband enjoys is a start to a better marriage. Rocketry is fun, and exciting, it gives you a sense of accomplishment. Don't be a Rocket Widow, be a Rocket Wife. Just try it once, if you don't like it at least your husband will know that you tried, If you do like it you will have a blast! Literally!!!

I know that not every woman is going to be interested in the hobby of rocketry. So, I would like to make a special mention to all of the wives that are not interested but, are very supportive of their husbands that are.

Being supported in something that you enjoy is very important. On behalf of everyone who enjoys the hobby of rocketry we say,

Thank You.

A Letter from the Editor

By Beth Sapp

Working on a newsletter is something that I have not done before. However, taking on the Shroudlines is something I would like to try. Having Tim as Co-Editor will be a great help.

As a team we have many ideas we hope will make the newsletter an even bigger success.

In the future you may be asked to fill out a questionnaire. This is an easier way for you to contribute an article. I know that the officers in the club will be happy to help out in this area. I hope you will too. I look forward to hearing any ideas that you have for the newsletter.

DARS Now Offering New Service

By Stewart Lilley

To all, please be informed that the Dallas Area Rocket Society is offering a new service. For a small fee we will plan to hold a launch at your location at a specified date and time. We will obtain FAA waivers, get all our launch equipment in good shape, build many new rockets, and purchase much propellant for this event. Our food vendors will prepare many meals. Our motor vendors will stock up and be prepared to bring many extra motors in addition to those pre-ordered. We will promote the event with flyers, bulletin boards, community outreach, and word of mouth. We will invite many non-rocketeers and community organizations to join us for this fun event. We will even have T-shirts made to commemorate this special occasion.

Please note that an actual flying field is not necessary, as no actual launch will be performed. The aforementioned preparations will virtually guarantee a deluge that will turn your field into a marsh. We have an untarnished record since last fall of being able to predict the rain with uncanny accuracy. Our services can be obtained for far less than traditional irrigation methods involving pipe, pumps, wells, etc. Please let your agriculturally-minded friends know of our new and cost-effective service.

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NAR Offers Scholarships, Educational Grants

The NAR is proud to announce two new educational programs.

The new NAR Scholarship Program awards college scholarships to NAR members.

For the 2001 academic year, \$1,000 has been allocated to this program. Dependent on the number of applications received, this amount may be split and awarded to several individuals.

The applicant must be a NAR member in good standing between the ages of 17 and 22 who is planning to attend, or is currently enrolled in a college, university or technical school.

Full requirements and application instructions are included on our online application form at:

www.nar.org/cabinet/scholarship.pdf.

In addition, to recognize science educators, grants are now being offered as part of the Robert L. Cannon Educational Program to teachers who use rocketry, in either a structured program during the school day or as an after-school activity.

Robert L. Cannon was the educational director for Estes for many years. He promoted the hobby by taking it directly to teachers, schools and youth groups. He realized that a safe program of rocketry in schools would enhance the learning experiences of youth and his efforts resulted in a great number of teachers using model rocketry in the classroom, which continues today.

The NAR board, in its spring 2001 meeting, approved the implementation of this award, which is funded with a part of the proceeds of our annual NARAM auctions.

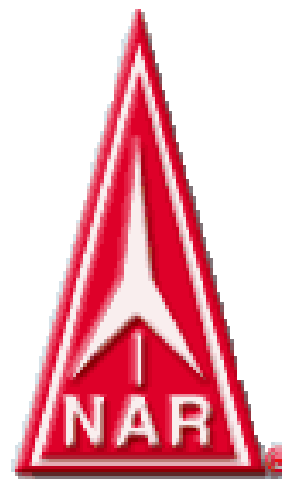
Initially, the Board approved two \$500 grants to be awarded annually to educators who currently have a rocketry learning activity. Any educator in an elementary, middle or secondary school may qualify for the grant. One of the primary requirements for receiving this award is to submit an article (preferably with photographs) for inclusion in *Sport Rocketry*.

The grants will be announced at NARAM-43 in Geneseo NY.

If you are a teacher interested in the Cannon award, or know of one who would qualify, obtain an application from:

Stew McNabb, NAR Treasurer
12574 Timberline Drive
Garfield, AR 72732.

An online application for a Cannon Grant is expected to be available soon.



For the 2001 academic year, \$1,000 has been allocated to this program. Also approved was two \$500 grants to be awarded annually to Educators

NAR Call For Board Nominations

In accordance with the By Laws, the NAR holds annual elections to fill three of its nine positions on the Board of Trustees. The three positions to be voted on in July 2001 will be for three-year terms.

If you wish to run for the board, or know someone you feel is qualified and will accept, the NAR is soliciting nominations. If you nominate someone other than yourself, you must include a letter from the nominee indicating his or her acceptance.

Nominees themselves should provide a resume and statement no longer than 300 words to be published with the ballot material. Be sure to include your name, address, and NAR number on your resume. By NAR policy, *Sport Rocketry* magazine will not publish any other campaign-related material, either paid or unpaid.

All nomination material (letters and resumes) must be received no later than May 1, 2001 by the NAR secretary.

George Rachor, NAR Secretary
33380 NW Bagley Road
Hillsboro OR 97124

Rocamole Launch Report

When the AARG graciously stepped up to host a February Regional, we saw this not only as a chance to try out their new field, but an opportunity to try our hand at a spectrum of events not often flown.

A considerable range existed between maximum performance designs and the "safe & sane" flight making this more of a thinking persons contest. Compounding this challenge for us was that our practice time to test out new designs was extremely limited. The amount of thought we spent ranged from considerable study on a couple events to only passing moments on some of the others. The results varied and this is sorta how things went for the Flaming Fins...

Sport Flying - Showing up Saturday, we were greeted with bright blue skies and kite fliers. Not wanting to risk destroying a contest ships just yet, we loaded up a Jeff Butcher built upscale Vulcanite on an I161. This was the 11th flight on this ship and I hope Jeff enjoyed it.

40 Second Set Duration - We prepared little for this event and it showed. Without any test flights to see what would come close, we reviewed our log books and found that a 1/2A streamer duration bird with a mediocre streamer came in close to the 40 second target.

Unfortunately, that ship was long gone so we took a chance with the same motor but a heavier model (scale ASP) and a better streamer. Not wanting to disfigure the ship, we started off by breaking one of our basic rules and left off the motor hook, relying on a taped kevlar shock cord loop for motor retention. Bad move...

At apogee, the motor ejected and proceeded to drift nicely under streamer while the body streamlined into the soft mud. Looking over the preliminary contest results, the Flaming Fins had the dubious distinction of being the only entry in set duration to have been disqualified. Good grief...

F Streamer Duration - We spent lots of time on this event mostly running RocSim. On contest day, we had five different models lined up for this event. Should low clouds be the case, we had a stretched Fat Boy built light and ready for an F12. The stretch was to keep weather vaning to a minimum as well as to contain a 12" wide streamer. As it turned out, the skies were good and we didn't use this entry. On the extreme end, we had two 24mm ships crafted from 18" tube, 12" x 120" micafilm fully pleated streamer, all weighing in at 60 grams without the F32-10 motor.

We wanted to avoid mach which would've meant called for special treatment on the fins but gave in and broke out the epoxy anyway. The streamer weight to carcass (rocket with burnt out motor) weight ratio was 4:5 which we were very pleased with. Considerable cpu time was spent adjusting fin sizes and Cp/Cg margins to best resist weather vaning tendencies in a 10mph breeze. The final design had very good simulated wind resistance and would eject at a comfortable 17fps. Not bad for a ship expected to hit Mach 0.99.

Still, we braided 2 strands of 120 pound kevlar, four-foot long for the shock cord. Because we were too cheap to buy a motor with a 15 second delay, we left about 1200 feet of altitude performance on the table. The flight profile was pretty much as simulated except for the spin caused by the taped up motor hook. The 10 foot long streamer looked awfully little but the ship worked well. One thing I noticed was that the hang time looked good early in the decent but more streamlined as time went on suggesting that the pleats were not holding. Regardless, it carried way past the fields, past the pig farm, past the goat yard, past the hen house, and possibly past the pond before we gave up on the recovery effort. This was one expensive fly away.

On Sunday, we watched BT-55 ships float way past the gravel pit so we decided for our second flight to back off from the BT-50 ships. We could have played the wind by adjusting the launch angle but chose not to in order to keep the recovery stresses low. Our middle-of-the-road streamer ship was an 18 inch length of BT-55, basic Stine fin dimensions. The motor was an F20-7 Econojet, and 3' of 1/4" elastic shock cord. For the streamer, we used 12"x120" of moderately pleated metallic mylar that we got from Michaels out of the discounted Christmas wrap pile for \$0.75 a roll. With this ship, we left even more performance on the table but scored an important return.

Overall, there were quite a variety of ships entered for this event ranging from Big Daddy's to minimum diameter mach buster class ships.

What was surprising was to see only a few ships strip their recovery systems which was not what we were expecting. I think that if this event were to be held two more times with similarly clear skies, that the competition would start bunching up and the time differences will get much tighter. Hopefully, higher impulse streamer duration events will become regular events at PPP and Windom contests.

D Super Roc - For this event, we did absolutely no prep work and it showed. The ship was crafted on the field out of 24mm tubing with external balsa stringers for stiffeners. Boost on a D12-5 was solid with good altitude but a rigging error (kevlar shock cord too short) caused the chute shroud lines to snap and separate. The chute also suffered consid-

erable heat damage. On the second attempt, the recovery system rigging was modified and additional wadding was wrapped around the chute. Unfortunately, this kept the chutes from completely unfurling and we ended up with a dismal but qualified flight. I wish we had spent more time getting ready for this event but in hind sight, perhaps this was a good thing for had it properly deployed, long drifts appeared to be the rule and recoveries difficult. Excuses, excuses... :-)

D Helicopter - About a year ago, we started playing around with upscale helicopters including a Rotoroc design to handle 24mm motors. Our goal was to fly them on F and G motors. As it turned out when AARG announced D-HD, we knew we were no where close to being ready with these designs as there were still some bugs to work out. So for the first time ever in our competition (craftsmanship events excluded) history, we broke down and bought a kit - a 24mm Rotoroc from QCR built stock with the exception of adding a motor hook.

Our backup was an Estes Skywinder modified for 24mm motors. To keep the Skywinder together, we had drilled and pinned the various pieces. However, this ship was getting tired from high-speed E & F motor deployments and we really didn't want to risk another flight on this airframe and blades.

Because we never had a chance to try the 24mm QCR Rotoroc designs under power, we watched to see how other folks were doing. Two other people entered similar models - Ernest Struther flew his for a nice 84 second flight and Ken Baker who for some reason had a wayward flight leaving us with mixed feelings. Anyway, we took the plunge and scored two qualified flights on D12-3 motors. Had the winds been lighter, we may have used a full impulse D9.

One thing I wasn't happy with was the wobble during decent which I believe hindered hang time by maybe 20%, gut feel. I've seen James Duffy flying Rotorocs before and his turned nice and true. According to *Bob Wilson*, this wobbling is caused by the horizontal breezes blowing on the spinning fins. This would sort of make sense as I watched Ernest Struther's second ship with the fins affixed to the ends of the rotor blades turn pretty true. I'll test this theory someday when we get a nice calm day.

Regardless, I think that this ship may be able to handle an E15 as well as an F12 which should make it a potential record entry design. It seemed that the 18mm Rotorocs had lots of potential but often came apart on the D21 motors or would wander wildly with

the D3 motor in the wind. I don't recall any flying on D10 motors. Also, many Skywinders DQs probably would've qualified had their owners drill and pin the various sections together. I wished Mark Scheevel's entry wouldn't have busted a shock cord and Steve Rogers pinned on his nose section as I would've liked to have seen these ships work. I can say that because they're both in a different division. ;-)
An interesting event and one I hope to see more of in the future.

C Boost Glider - In short, getting ready for this event was the craziest for us in that we changed horses midstream.

On event day, we had a total of six ships built, broke one during hand tossing, and only one had flown under full power. We had never seen PPP but judging from the satellite photos, we knew the place was big. Our experience was that we knew we could safely boost smaller spanned gliders nice and high but if trimmed well, these ships would often disappear while still at a respectable altitude. So early on, we opted for gliders with larger spans. This would make the timer's job easier and maybe better catch a thermal. At the same time, we knew in our three years at this game that we've never seen such ships leaving the pads under power with their wings still attached. So for us, we were in uncharted territory.

We set about building a total of five Gregorek/McKiou style ships with spans varying between 24 to 28 inches. The first ones were tanks at 0.7 grams/sq. inch. These used using big strong fillets, silkspan wings, and beefy fuselages. By the time we were done, we got these models to weigh in around 0.35 grams/sq. inch which we felt was suitable for glider. However, of the five ships, only one was tested under C motor power, the tank, which did keep its wings on but only reached a pathetic altitude.

In the midst of building these five conventional ships, we happened upon an interesting design best described as a high wing load, 0-0 tandem "skeeter-wing" offered by R.M. Richardson. On a whim, we put one together for a 1/2A motor and was impressed with its stability during hand tossing. Intuitively, this loong ship would boost well.

Unfortunately, on the first and only test flight, the 1/2A motor was accidentally CA glued in causing the forward end of the fuselage to blow off. This caused the test ship to nose dive into an asphalt parking lot. Not good. Nonetheless, we assembled another "skeeter-wing" ship upscaled for a C motor boost. Weighing in at 1.3 grams/sq. inch, this ship was definitely outside our envelope of familiarity.

On Sunday, we were in a pickle -- Six ships on hand, only one had been tested under power. The competition would be tough with the Even Angrier Beavers present with a score to settle from their previous day glider attempts.

Also, while in the other division, *Jack Sprague* was going to show us no mercy breaking out his TWIRB design and Mark Scheevel who was due for a breakthrough. Hand tossing the Gregorek/McKiou style ships under the gusty conditions was not going well suggesting more trim work was needed. However, the Richardson "skeeter-wing" design tossed nice and stable. So we prepped it up and went for it -- An official as well as maiden flight with an unproven design all in one. I normally wouldn't recommend this to folks but we were burning daylight.

Much to our delight, the ship boosted cleanly and appeared to transition nicely into a flat glide. Suddenly, the ship nosed over and started the long dive into the ground. On the way down, I was able to see something on the nose that didn't look right. At first, I suspected the 0-0 design but upon inspecting the ship we discovered that it flew into and speared a large piece of Estes wadding, enough to throw off the trim. Weird... The next half hour was spent in a conundrum where we seriously considering swapping out ships with one having better dive recovery.

Finally, we deciding to stay with the "skeeter-wing", only this time we tore our recovery wadding into tiny little pieces. For all of our efforts, we were rewarded with a nice flight that was easy to track despite the small wing surfaces. I'll be getting back with the designer of this ship to go over some details and will continue to work with this design.

Recalling the various glider flights that weekend, there were some interesting shreds as well as some extremely close battles. The only flyaway was Mark Scheevel's who was rewarded this after an extended range duty stint. I was pretty amazed with the Manta flight with it's tight turn as well as hearing the Flat Cat's buzz on the way up. In the future, maybe an all glider event would an interesting event.

The Flaming Fins team once again had an enjoyable trip to Austin.

We found the events to be challenging, really enjoyed the PPP, and got to know some new faces. Our thanks to the AARG for hosting the event as it got the NHRC out of a jam.

All in all, an interesting ride...

Regards,
Andy

Calendar of Events

Sport Launch \ NTHP 18

DARS
<http://www.dars.org>
McGregor, Texas
Apr 14th and 15th

April Madness

DARS
<http://www.dars.org>
Justin, Texas
Apr 21st and 22nd

Sooner Boomer

Tripoli Oklahoma
<http://members.home.com/tripoli-oklahoma>
Sayer, Oklahoma
Waiver: 23000 MSL
Contact: John Bolene
Email: jbolene@home.com
Apr 28th and 29th

Founders' Day

DARS
<http://www.dars.org>
McGregor, Texas
Apr 16th and 17th



Suzy Sprague's Mini Magg and Kindergarten rocket on display at NARCON 2001.

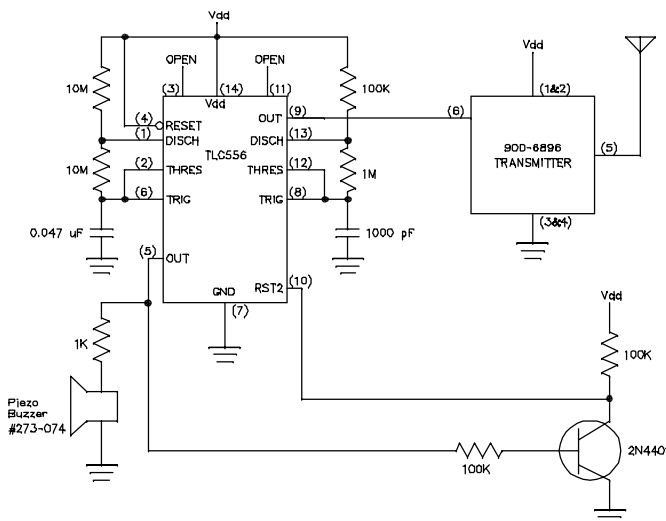
I was fortunate to get one of the last Machbuster kits from Rocketvision before their untimely demise. Due to their small size and extreme altitudes, Machbusters are well known to be hard to find after flights on anything more than D power. I, of course, wanted to fly it on a G55, and do it more than once. I had been wanting to experiment with radio location, and this seemed like a good excuse. With a radio location system, finding the rocket should be a snap. The only problem was, how to cram the required electronics into such a tiny space? The Machbuster is not a large rocket, and most of the space is occupied by motor when a G55 is loaded. The only really available space is in the nosecone, so that's where the transmitter has to go.

Here's where off-the-shelf electronics design comes to the rescue. I'm a big believer in using commonly available parts wherever possible. Thankfully, suitable transmitters and receivers are available off-the-shelf, because they're used in automotive keyless entry systems. That little black thingy with the "lock" and "unlock" buttons that's on the ring with your car keys is a bona fide radio transmitter with decent output power. Since these circuits are made in large quantities for automotive applications, they're available and cheap. Generally, they operate at 433.92 MHz with less than 10 mW of radio output power. The 433.92 MHz is in the 70 centimeter ham radio band, but FCC regulations allow limited use of the 433.92 MHz frequency without a ham license as long as the power is low.

This was important, as I don't have a scanner or 70 cm ham radio handie-talkie (at least, I don't have one yet....) to receive the signal. The postage-stamp size receiver is not as sensitive as a handie-talkie, but it's also about 20 times cheaper for those of us on a budget. I found the circuits I wanted on Radio Shack's web site (www.radioshack.com). Look for part numbers #900-6896 (transmitter) and #900-6895 (receiver). They're about \$10 each. The modules Radio Shack sells use AM modulation and can run off of 1.5-15 volts DC. As I discovered, the transmitter output power increases with the voltage, so I ended up using a 12V battery in the circuit.

Now, how to build a complete circuit that fits in the Machbuster nosecone. The transmitter module is 14.5 mm high and 16 mm long. This has a chance of fitting in the nosecone, but it will be a tight fit. The Rocketvision nosecone is molded plastic and is quite thick for a rocket nosecone, almost 1/8" thick at the base. The internal diameter is almost exactly 0.9" at the base, so that gives an idea how much space we have to work with. Another thing to contend with is the pin that Rocketvision uses to connect to the shock cord. The nosecone shoulder has a hole in it that you insert a plastic pin through. If our transmitter isn't very short indeed, it will interfere with the pin and we'll have to figure out what to do about it.

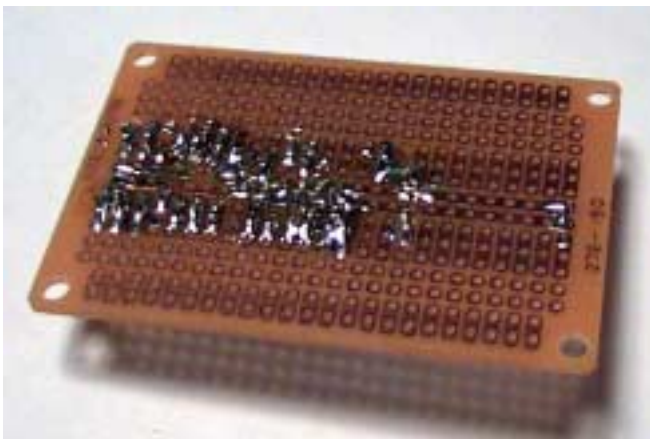
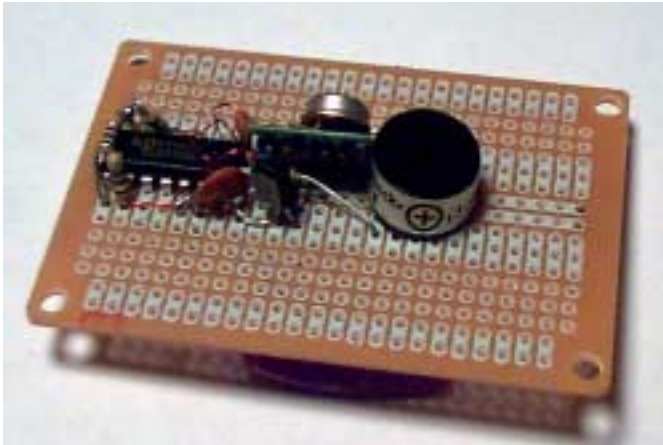
The circuit itself has three essential components: an audio oscillator to generate a tone you can hear in the receiver, the transmitter module itself, and a battery. For the battery, I used a 12V "N" cell battery. I discovered on the first test flight that a constant tone isn't the best for recognizing the signal from the noise, so the "second generation" transmitter has two oscillators: one to generate the audio and another one to switch the transmitter and audio tone on and off every second or so. This also has the advantage of increasing the battery life, because the transmitter isn't on all the time. The other thing I learned from the first test flight, when I was within feet of the transmitter but couldn't find it in the grass, was to put a beeper of some kind on the circuit. It doesn't have to be loud, just something to help you when you're too close for the radio to work effectively. The two oscillators are handled by a single TLC556 chip, which is a dual version of the popular 555 timer chip. Also, the TLC556 is CMOS, so it draws less current and is more suited for low-power applications like this one. I had to throw in a transistor to act as an inverter, because the 555 can't produce a duty cycle less than 50% and I wanted a duty cycle of about 33%. The only other parts are various resistors and capacitors. All the parts can be ordered from Radio Shack's website. The schematic diagram is shown in Figure 1.



After researching on the net, I found several different suppliers of similar modules. The modules are usually slightly larger than postage stamp size, and there is a corresponding receiver module that works with the

Tiny Tracking Transmitter Cont.

To assemble the circuit, I used a Radio Shack prototype PC board (#276-150, \$1.19) and with a few jumper wires and creative solder bridging, I had a workable circuit that actually does fit in the Machbuster nosecone. In order to keep the width down, I had to resort to stuffing some of the holes of the PC board with more than one component lead. After soldering, I used a Dremel with an abrasive cut-off wheel to trim the PC board down to size. If you're not trying to fit this circuit into a 24mm airframe, you can be a bit less cramped with the component layout. Even better would be to design and etch a PC board for this circuit, which I might do if there is enough interest. Figures 2 and 3 show the board after soldering the components but before trimming to size. The battery holder also has not yet been attached.



Next time, I'll go into more detail on building the receiver and antenna.

Parts List (Transmitter Only)

1	Multipurpose PC Board	#276-150	\$1.19
1	UHF Transmitter	#900-6896	\$9.85
1	TLC555-DIP Dual CMOS 555 Timer	#900-6264	\$1.42
1	PC Piezo Buzzer	#273-074	\$2.99
1	2N4401 Bipolar Transistor	#900-5447	\$0.08
2	10M 1/4W 5% Carbon Film Resistor	#900-0313	\$0.07
1	1M 1/8W 5% Carbon Film Resistor	#900-0137	\$0.07
3	100K 1/8W 5% Carbon Film Resistor	#900-0113	\$0.07
1	1K 1/8W 5% Carbon Film Register	#900-0065	\$0.07
1	0.047 uF Ceramic Disc Capacitor (2)	#272-134	\$0.59
1	1000 pF Ceramic Disc Capacitor	#900-2216	\$0.07
1	Battery Holder	#27-405	\$0.79



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www.digitrain.com

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Shroudlines

A Dallas Area Rocket Society Production



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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 the 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.

The club meets on the first Saturday of each month at 1:00 pm. Meetings are held in Plano, TX at

Plano Late Night Bingo.
1805 Ave K (18th and K St.)
Plano, TX 75074

For information send e-mail to:
Info@Dars.Org

