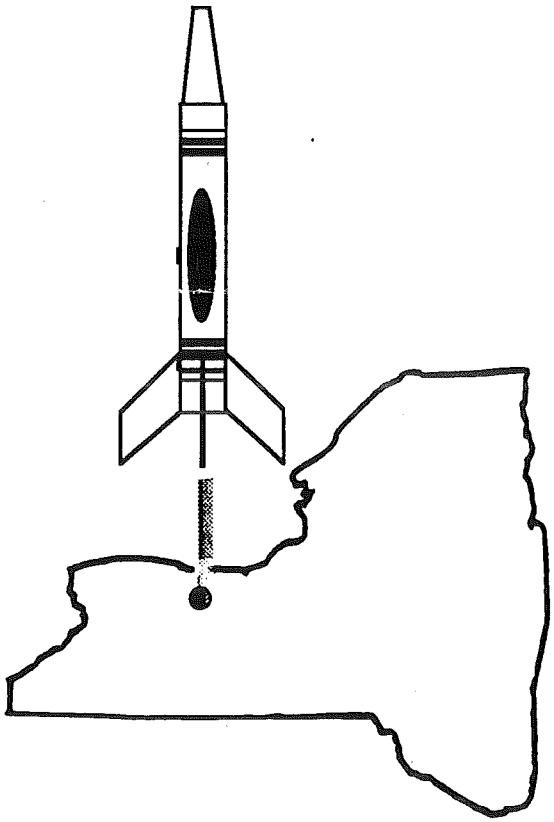
THE UPSTATE ROCKETEER

The Official Newsletter of MARS
NAR Section #136

Volume 3, No. 6 Published by the Monroe Astronautical Rocket Society December 1990



In This Issue

The *Upstate Rocketeer* is published six times a year by the Monroe Astronautical Rocket Society as a service to its members and NAR members in Western and Central New York. Subscriptions are $2.50/year. The *Upstate Rocketeer* is edited by Dan Wolf. Send all comments, complaints, letters, plans, subscriptions, etc. to him at the following address: *Upstate Rocketeer*
c/o Dan Wolf
235 Kislingbury St.
Rochester, NY 14613

MARS Membership - December 1990

Dan Wolf - President
Jeff Ryan - Vice President
Ferenc Roka - Secretary/Treasurer
Roy Metz - Senior Advisor

Mike O'Brien	Mark Doty
Jay King	Rob Landis
Merrell Lane	William Springer
Mary Wolf	Sarah Wolf

Blowin' In the Wind

Hello everybody, welcome to another edition of *UR*. Sorry this issue is so late. Part of the reason for it being late was the busy December holiday season and another part is the arrival of your editor's second daughter and MARS newest member, Sarah Wolf. Sarah was born on January 5th and in honor of the event, this issue has a pink cover as I'm sure you've noticed by now.

This issue is our so called high power issue and I hope you will enjoy it. Leading off is a report of the Danville 1990 II advanced high power launch that some of us from the upstate area attended as well as a scratch-built how to article. Also this time is as an *Upstate Rocketeer* tradition for the December issue, an "Oddball" plan. While the last two years "oddballs" have been Christmas oriented (Frosty the Snowroc last year and the Flying Elf the year before) this year's plan is a high powered "oddball". Hope you like it. Lastly, make sure to read the letter by Pat Miller (downloaded from Compuserve) on the results of the special Board of Trustees meeting held in St. Louis in October regarding the NAR and its entry into the Advanced High Power arena. That meeting has generated lots of "rhetoric" and activity in both the NAR and Tripoli.

The high power activities going on have certainly captured a lot of attention in rocketry circles this year. Aerotech continues almost monthly to announce new developments in its high power model rocketry line and in the class "B" sport rocketry area as well. This is important as they are trying very hard to push the HPR model rocketry products into the main stream of the hobby industry. No longer is mail order the only way to obtain large rockets and motors. Many hobby stores are starting to carry the Aerotech products (including Dan's Crafts & Things in Rochester finally). Other companies are working to get their products in hobby stores as well.

The NAR is changing in this area too. A few years back it was the upping of the weight limits for model rockets to 3.3 lbs. and expanding motor sizes to include G engines. This year the NAR is doing even more with the Board "throwing out" the old 3/48 rule and putting in place a science and education program for class "B" type rockets.

Also, in spite of "growing pains", the Tripoli Rocketry Association continues to grow, with estimates of over 1200 members. Last years Tripoli national launch, LDRS, is reported to have 2 to 3 times as many participants as last years NARAM.

Why so much activity in this area? The answer most frequently given is the increasing number of "BARs" or "Born Again Rocketeers". This is a person who was a model rocketeer in the 60s and early 70s (probably as a teenager or pre-teen) and has now rediscovered the hobby. Sometimes this is because the BAR now has children and wants to use model rocketry as a father/son, father/daughter, etc. activity and sometimes the BAR just does it on his/her own, recalling the fun it was before.

The BAR is also an ideal candidate for high power for two reasons. First, now that he is an adult, the BAR has more money than he had as a kid when that pack of B14s took all of his allowance or lawn mowing money. Second, as an adult, he wants to fly something bigger to help eliminate the "playing with kids toys image." They may still be rockets, but a North Coast Phantom 4000 or Aerotech ARCAS does a lot to dispel the "kids toys" image in the BAR's mind (and the minds of his wife and friends, although his wife may feel it's just a bigger and more EXPENSIVE toy!). Thus the BAR can have fun with the hobby he enjoyed as a kid but not feel "embarrassed" about it.

It may well be that today, the majority of rockets flown (or at least the majority of dollars spent on the hobby) are flown by adults. Most of those adults were kids during the Kennedy administration and during the height of the space race. Our countries interest in the space program was at an all time high. Many kids of that era wanted to be a part of this by building and flying their own rockets just as kids in the early part of the century enjoy model aviation during the days of Charles Lindburgh and such. The fact is, model rocketry and sport rocketry are hobbies that people who grew up during the "space race" enjoyed then and enjoy now.

However, a concern I have is the lack of

interest in the hobby by subsequent generations. My own experience has been that many of today's youth find the hobby boring. Several years ago I took my nieces and nephew out to fly some rockets and discovered that they had almost no interest whatsoever in the activity. After two or three flights they were ready for something else. I have noticed the same phenomena at contests I have attended. Some parents often have to leave launches early because their teenage or pre-teen kid are bored or want to go home. In contrast, I remember attending launches as a kid and staying at the launch until the last rocket was flown and still yearning to see and fly some more.

To be fair, there certainly are many "scientific" and "educational" activities that today's youth can participate in that didn't exist in the 60s and 70s. Perhaps the would be model rocketeers of today are now involved in computers in a way that was impossible back then. Today, parents can buy their kids a computer that is more powerful than many of the NASA computers of the early 60s. The ability to write sophisticated programs or just having "fun" with computers is something kids today can do. In addition, "mindless" technological inventions are also available today that can consume a would be model rocketeer including the ever popular Nintendo and MTV (In the "old days" we could listen to rock and roll on the radio and build rockets at the same time but today you have to watch the music too!). The fact that there is no major focus on space exploration and the recurring shuttle problems do not help the matter either.

Thus I have been pondering the following questions: Is model rocketry only a serious hobby for the "baby boomer" generation? Will the hobby and the NAR experience a "graying" of its membership in the future as the AMA is experiencing now? Are the days when 13-15 year olds would build and finish rockets with balsa fins and nose cones in a quality manner a thing of the past? Will the future bring ARF(Almost Ready to Fly) G & H motor rocket kits that my 3 year old daughter could build? Will the use of model rocketry as a scientific and educational tool for future aerospace, mechanical, and electrical engineers be forgotten? Will we ever again see a 250+ contestant NARAM, a technical journal of model rocketry published by students at an engineering school(i.e. *MIT Tech Journal*), or any other evidence that another generation has "taken the torch" and will continue to advance the hobby? These are the questions and concerns I have as we witness a rebirth of the hobby.

In order for the hobby to continue to be strong, I believe that we must put more emphasis on bringing youth into the hobby and to support and encourage them to get the maximum enjoyment from it. Comments I have heard from some parents are that model rocketry is often just one of their son's or daughter's interests. We must try to help them enjoy the hobby to its fullest, and in this way hopefully make it one of their more important interests. Believe me, I know this is not easy. I have been working to get several kids whose parents I work with more heavily involved in the hobby with little results to date. MARS has not been very successful at recruiting younger members. In fact, virtually all of our members are from the "Baby Boomer" generation. What potential younger members that we do attract to our sport launches usually do not come back. Hopefully this spring we can turn this around. I hope that we can work with area schools in their "rocket day" activities as a way to both support them and help make these activities successful while at the same time, use these events as an opportunity to inform the teachers and students about MARS and hopefully recruit some younger members. As an example, I learned recently that in the Hilton Central School, every student builds a rocket that is flown on "rocket day." In this one school alone, there is a potential of 600-700 new members for MARS. Many area schools have similar activities including Fairport and others.

In closing this rather long editorial, I believe that the BARs are being well served, by both the rocketry organizations (Tripoli and the NAR) and the manufacturers. The future of the hobby is still with the youth and in spite of the recent emphasis on high power (what I like to call "adult rocketry") we must not forget that Estes Alphas with A8-3 engines are how most of us got started. My concern is that this entry level segment is starting to be ignored both by the manufacturers and the NAR. With continued work with local schools, science teachers, etc. hopefully we can keep the "dream alive."

Until Next Time,

Dan

Dan

How to Scratch Build a Large and Impressive 4" Diameter Rocket Inexpensively
By Dean Giblin

(Editor's note: The following article is a somewhat edited version of an article that originally was published in the February 88 edition of ASCENT FROM MIDGARD, the newsletter of the Viking Rocket Society. This article describes how to construct a rocket suitable for flights with F through H motors as well as clusters of same. It is being presented here as an alternative for those of you who want to try larger and higher powered rockets. The instructions are complete except for the matter of fin design, construction, and attachment. This was handled somewhat by the author in a related article in the same issue although he left the final fin design, size and shape up to the modeler. After having built a rocket per these instructions I will add some additional comments about them, particularly in the area of fin design. Overall, this is an excellent article and the resulting rocket is a very versatile and "impressive" launch vehicle. One last note: The author of the article, Dean Giblin, is one of the owners of Rocket Research, a discount distributor of Aerotech and T.H.O.Y. rockets and motors.)

Of the high power rockets I've flown, my favorite has been a five to six foot tall, four inch diameter model with a cluster of seven 29 mm motor tubes. Because of it's large size, it attracts a lot of attention and facilitates construction since you can put your hand (and arm) inside the body tube. All those who have worked on Estes BT-5 and BT-20 kits understand how difficult it can be to glue the shock cord mount in the proper location without gluing it to everything.

With a seven 29 mm motor mount assembly there are many possible motor configurations. You can fly your model on a single motor, or on a cluster of 3, 4, 5, or 7 engines. Remember, this is 29 mm tubing, not 24 mm (D engine size) tubing. With 29 mm tubing not only can you use D and E engines (with an adapter), you can also use an F, G and even H motors. You can make inexpensive small field flights on either a single G motor or a cluster of 5 or more D engines, to expensive and impressive large field flights on 7 H motors. Seven full H motors would be equivalent in total thrust to 122 D engines! To build one of these rockets you will need the following parts: *(Dean originally specified a BT-3.90P which is a 12" section of tubing for the payload section. LOC no lists this item in their catalog so to build this rocket a full length tube must be purchased and cut. The prices shown on the price list below are from the current LOC catalog with the price of the BT-3.90P being about a third of the cost of a full tube since only a third of a full tube is used.)*

Parts from LOC Precision

1 BT-3.90	4" body tube	6.25
1 BT-3.90P	4" payload tube	2.10
1 BA-3.90	4" bulkhead assembly	3.35
1 CR-3.90-1.14	4" to 29mm centering ring	.90
2 MMT-1.14	29mm motor tube	5.60
1 PNC-3.90	4" plastic nose cone	13.00
1 LL-50	1/2" diameter launch lug	.40
1 SCM-2	Shock cord mount	.75
		32.35

Parts from Rocket Research

1 XPRR-40	X-FORM parachute	9.95
1 QL-1	Quick link	.95
		10.90

Parts obtained locally

4-5 yards of 1/2" wide braided elastic shock cord
Plywood for fins

Scratch building this rocket with the above parts will cost you about $45. Similar kits retail for $65.00+! If you're interested in building this model, assembly is as follows:

1) Mark the 29mm tubing so that you can cut out 6 eight inch pieces and 1 nine inch piece. Next, wrap a piece of paper (that has a straight edge) around the tube so that the straight edge overlaps. Draw a line around the body tube at each mark by running a pencil along the edge of the paper. Cut the tubes by pressing lightly with an x-acto knife on the line as you turn the tube. With a sharp blade you should cut through in 5-6 turns. When finished you should have 6 eight inch pieces and 1 nine inch piece of 29mm tubing. Sand the cut ends until the eight inch tubes are the same length and the edges are clean. Epoxy 2 eight inch pieces together side by side on a flat surface. When dry, fillet both sides of the joint between the tubes. Make sure the ends are even. Epoxy two more eight inch tubes side by side

for a total of two sets 2 eight inch tubes.
2) Mark the nine inch 29mm tube 1/2" from each end. On a flat surface, lay an eight inch 29mm tube on each side of the nine inch tube centered between the marks drawn on the nine inch tube. Epoxy the tubes together. When dry, fillet both sides of the joints between the tubes with epoxy. Let dry.
3) Epoxy both sets of 2 eight inch tubes on each side of the nine inch tube assembly, making sure that the ends of all the eight inch tubes surrounding the nine inch tube are even. When dry, fillet the 6 exposed joints with epoxy. Let dry.
4) Put the centering ring on the nine inch tube and push it firmly against the ends of the eight inch tubes. Fillet the joints between the centering ring and the motor tubes with epoxy. Be careful not to get any glue on the sides of the centering ring (the edges that will come into contact with the body tube or you will need to sand the glue off to get it to fit). Let dry. If you only want the center motor to be ejection active, then the motor mount assembly is complete. If you would like to have more than one motor tube ejection active, then drill a 3/4" diameter hole in the plywood disc directly above those tubes (I would suggest making two opposing motor tubes ejection active for a total of 3).
5) Wrap 3/4" masking tape around the motor mount assembly 1/2" from the rear of the eight inch tubes until the motor mount assembly fits snugly inside the body tube (the body tube is the longer of the two 4" tubes). When test fitting test fitting the motor mount look at the bottom of the body tube and make sure you do not distort the body tube.
6) Using a generous amount of epoxy, glue the motor mount assembly into the main body tube so that the ends of the eight inch 29mm tubes are even with the body tube. When dry, fillet the plywood centering ring/body tube joint with epoxy.
7) Cut out fins of your design. *(At this point Dean referred to an article on fins that appeared in the same issue of Ascent from Midgard. Rather than reprint that entire article, here are some quick suggestions. For all but very high powered configurations, 1/8" plywood fins should be used. Use a fin plan of your own design. One of the nice things about this plan is that since no fin design is offered, each rocket built from it is different. Since this is a high powered rocket however, high aspect ration fins should be avoided. Good fin designs for this type of rocket include trapezoidal types, swept back types and clipped deltas. Dean prefers a trapezoidal type that he calls "a tapered fin with a 2.5:1 ratio." To attach the fins use the through the wall technique. To make these types of fins, a fin tab is added that is 1/4" short on each end. To attach the fins, 1/8" slots the length of the tab are cut into the tube. The slots should be aligned with the joints of the motor mount tubes. Three or six slots are cut depending upon whether 3 or 6 fins are used. When the fins are mounted, epoxy the fins in place by epoxying the fin tabs to the motor mount tube joints as well as putting epoxy on the fin/body tube wall junction. After the fins are in place, apply epoxy fillets to the body tube/fin joints. If the above process sound confusing to you, take a look at or build a kit that uses this type of fin attachment first such as the LOC Graduator.)*
8) Assemble the bulkhead assembly and insert the shock cord mount according to the directions supplied with both of them.
9) Friction fit with masking tape or epoxy 1/2 of the bulkhead assembly into the payload tube. Friction fit or glue the nose cone into the payload tube. If you wish to glue both the nose cone and the bulkhead assembly in place it would be wise to drill a small vent hole in the plywood disc first otherwise when you glue in the last piece, the air will have no way out and it will be difficult to glue it in place. If you forget, you'll see what I mean.
10) Epoxy a two inch piece of the 1/2" diameter launch lug at the base of a fin near the rear of the tube, and a two inch piece 24" above the first. Placing the launch lug at the base of the fin will increase the aerodynamics of the model and strengthen the attachment of the launch lug since there is more surface for it to bond to.
11) Tie a 1 or 2 inch loop into each end of the elastic shock cord. Attach the shock cord to the shock cord mount by looping it back onto itself. Holding all of your parachute's shroud lines as if they were one, tie a 1-2" loop at the end furthest from the chute. Attach the parachute, the shock cord, and the payload section together using the quick link.

Flying: This rocket will require a 1/2" x 6' launch rod for initial guidance. For safety, you should be at least 100' from the rocket at launch.

Each motor used will require the application of a masking tape thrust ring. The thrust ring is what the motor pushes on to move the rocket. It is

(continued on page 11)

DANVILLE 1990 II
HIGH POWER LAUNCH

Danville 1990 II was a Tripoli Sanctioned Advanced High Power Launch held near Danville, IL on October 26th and 27th. The second AHPR launch held in Danville this year, Danville has emerged as the only regularly scheduled high power launch in the eastern half of the US. The field is adjacent to I-74 at the Illinois-Indiana state line and is large enough for most H, I, and J powered rockets.

Upstate New York was well represented at this launch with Bruce Farrington, Dave Pringle and Dan Wolf making the trip. It was still dark early Friday morning when the group gathered at Dan's house for the long drive. All of us were looking forward to an enjoyable and fun filled weekend of rocketry although each of us had his own personal reason for making the trip. For Dave it was a trip to his first AHPR launch and a chance to get "confirmed." For Dan it was to move up the high power ladder as Dan planned to fly at least an I motor and maybe a J if the weather was good. Bruce had the most ambitious plans of us all however. Bruce was making the trip out to help a team from Pittsburgh launch a 3" diameter rocket with a K motor. This team, headed up by Bruce's long time friend Ken (Bruce and Ken grew up together and were high school classmates in Baldwinsville), had spent over eight months preparing this rocket for flight (more on that later).

The drive out, even though a long one, was enjoyable as a wide variety of rocketry topics were discussed. After a quick stop at Dan's parents house in Indiana to pick up a camcorder to record the weekend's events, the group arrived at the hotel about 12 hours after leaving Rochester. As we were unloading the car, who should walk up but Merrell Lane of Niagara Falls who was out in the midwest visiting relatives as well as to take in Danville as an observer (and to video tape it as well) It was good to see Merrell again and he helped to keep us informed as to what was going on around the launch site each day while we were sometimes busy prepping rockets.

Friday night's activities consisted of getting registered, the flyer's meeting and most important, visiting the room's of the manufacturers and their reps. The hotel at Danville is a set of individual buildings or chalets, each with two hotel rooms in it. Each room has a carport adjacent to keep your car out of the weather (and pranging rockets)! As we traveled from room to room, most of the other 100+ attendees were doing the same. Many had plastic bags to carry the items they purchased. On this last weekend in October, it looked like a bunch of Trick or Treaters on Halloween going from house to house.

The first room we stopped at was that of Rocket Research, the Virginia based Aerotech distributor. Besides John Stanley and Dean Giblin of RR, Gary Rosenfeld from Aerotech was also there. Besides the Aerotech wares, RR is also a distributor for THOY and had one of their large scale Phoenix models on display. In the Aerotech line they were well stocked. One bed was covered with class B motors from sizes H through J with more motors on the floor at the foot of the bed. The other bed and center table were covered with kits including the Initiator, Mustang, Arreux, etc. The dresser along the wall was covered with the new reloadable motors and reload kits for them. In the opposite corner were boxes and boxes of class "C" motors. Business was brisk in this room as many people were taking advantage of the opportunity to stock up on Aerotech class "B" motors without the hassles of going to an airport to pick them up not to mention paying the expensive shipping charges. The discount pricing that RR offers didn't hurt either. Dave talked to John Stanley about motor selection for his confirmation flight while Dan and Bruce looked around and watched a video tape that Gary Rosenfeld brought along that had been shown at the RCHTA show in Chicago just days before. The tape introduced Aerotech's composite motor powered R/C glider. The tape showed the prototype glider being launched and flown and it also showed some of the Aerotech kits being launched. While this was going on John had Dave talked into making his confirmation flight with an I motor rather than an H because for starters, Dave's NCR Phantom 4000 HD had a 38mm motor mount instead of a 29mm and also because it would be a lot more exciting! When all was said and done, we managed to drop about

$500.00 between the three of us at Rocket Research which was nothing compared to what others were spending there.

Dan and Dave visited several other vendor's rooms that night including LOC/Precision, Commonwealth Displays and North Coast Rocketry. The purchases were much smaller at these places (we needed money for gas on the way home).

While Dan and Dave were busy "trick or treating", Bruce was helping his friend Ken prep "Skeeter I", the K powered rocket for Saturday's launch.

(It is hard to remember what events/launches occurred on Saturday so the next several paragraphs are not in any particular order except the order I remembered them)

As we arrived at the field on Saturday, the skies were blue but it was quite windy. The wind made recovery difficult and most of the flights that day were with H or smaller motors. Notable flights included a "Crayola Crayon" powered by a Ravenna Research H180 (see plan for Dan Wolf's version of same in this issue). Also of note was an Estes Mean Machine labeled the "Meanest Machine" that was flown with a Rocketflight G100. Several clusters were flown, some successfully and some not so successfully. On the successful side was a rocket that was styled like a Phoenix and flown with 5 G100s by the team from Rocketflite. All 5 motors ignited and pushed this rocket up on a large white billowing smoke cloud. At ejected the model deployed all 3 chutes for a pretty decent after an equally nice flight. On the not so successful side was a rocket with one G100 motor and 12 D12s. At liftoff the G100 didn't ignite. As the model arced over into the wind it was pointed slightly less than horizontal when the G100 fired sending the model to a power prang on the front side of the nearby prison. Also of note was a rather large Saturn 5 (8" diameter, 7'+ tall) that had an absolutely flawless boost on 4 I motors. Unfortunately, no ejection or chute deployment caused it to prang in on the field, fortunately landing sideways.

Few people were flying the reloadable motors, but those who did were not disappointed as they all worked flawlessly. They also seem to produce a louder sound than conventional composites or at least a different sound, possibly due to the aluminum case. Gary Rosenfeld teamed up with Chris Pearson to demo them in the NCR demo rockets and the flights were impressive.

Dave had a very nice confirmation flight with his Phantom 4000HD. Because of the high winds, Dave elected to fly it with an H120-6. While "trick or treating" Friday night Dave had found a 38mm to 29mm adapter in the midst of the boxes of rocketry "stuff" that Commonwealth was selling. The flight was picture perfect with the Phantom weather-cocking slightly. The chute was ejected near apogee however and Dave had a long walk to retrieve his rocket. Dan flew his "Xtra Special" with an H motor as well for a successful flight. Dan uses one of Aerotech's new "Blue Thunder" line of motors and the blue/violet flame was great but didn't show up as nice on the video.

The flight we were all waiting for of course was that of Ken and the rest of the Pittsburgh crew (sorry I forgot your names). This rocket, dubbed the "Skeeter I" was an interesting piece of work. The 3" diameter rocket stood about 7' tall and the body tube and fins were made from phenolic. The fins and body tube were machined such that the fins "locked" into place in slots in the body tube. The fins had a low aspect ratio and were small. So small in fact that we wondered if the rocket would be stable with the K motor in place. In fact we learned that initially it wasn't or at least it didn't pass the string test (Ever try to string test an 8 lb. 7' tall rocket?). However because computer simulations showed that the rocket's altitude would exceed the waiver for the launch (10000 feet) weight was added to the nose cone to keep it below that ceiling and it also allowed it to pass the string test. Knowing the difficulty in retrieving a rocket from that altitude, the "Pitt crew" had put other "goodies" on board. First was a complex recovery system. The system used a timer to cause ejection to occur at apogee but at this point, only a streamer would be deployed. Then, an on board altimeter/barometer would fire a second charge at an altitude of 4000 feet that would cause a parachute to be deployed. (Hopefully in the future we can get an article from Bruce on how to make a programmable timer ejection charge system. The anecdotes Bruce relayed to us on how he perfected it are hilarious). Using a vacuum chamber, the entire sequence had been simulated on the ground successfully. Lastly, Bruce had brought along an FM transmitter that would be used as a homing beacon to help locate the rocket once on the ground. There was a lot riding on this flight. The "Pitt crew" had put a lot of time and effort into designing and constructing the vehicle. Second, Bruce hoped the

flight was successful as it was his electronic timer and FM transmitter on board Skeeter I! Ken and his colleagues seemed quite confident that the flight would be successful. We had to admit that they had done a lot of good work in design, construction, simulation, and testing. Our main concern as the bird was prepped for launch was the engine selection, a Reaction Labs motor (To be heard over and over again before and especially after the launch: Bruce, why do you think that High Sierra sells Aerotech and Vulcan K motors for over $200.00 each while they sell (or sold) the Reaction Labs K for $80.00?).

As it turned out, our fears were correct as the rocket made it to an altitude of only 25 feet when the engine stopped burning. The rocket crashed down in the launch area, breaking the brittle phenolic fins and body tube. A disappointing end to be sure. After getting over the initial disappointment however, the "Pitt crew" vowed that there would be a "Skeeter II". This time possibly with a J motor for the first flight, and probably one made by Aerotech or Vulcan.

For whatever reason or reasons, it seemed at this launch and the last Danville launch that the jump from J to K motors is a difficult one to make. Overall, both launches saw many successful flights with J motors and below but the success rate for K powered flights seemed to be much lower. The only other K powered flight at this Danville was also a failure. A large and nicely finished rocket powered by 2 Vulcan "Hellfire" motors caused a lot of excitement when apparently one of the two motors catoed on ignition. This action caused the rocket to separate at its ejection point and then under the power of one motor, did pinwheels across the sky about 30 feet up. Fortunately for all of us watching, the chute was fully deployed and acted as a break and kept the rocket from traveling far from the launch pad. The excitement was not over, as one of the K motors tore loose when the rocket hit the ground and started off across the field under power and a two foot long purple blue flame. It stopped under another launch pad with a rocket with a "live" motor directly above.

In general however, the success rate at this Danville seemed higher than the one last spring. Motor reliability seemed better and there seemed to be few separations and recovery failures.

There were few "true" advanced high power rockets. That is, rockets with on board electronics, delayed staging, radio control, etc. seemed to fair poorly. Most of the electronic upper stage ignition systems seemed to fire too late and other advanced rockets had problems as well. There were a couple of 35mm camera rockets that worked well however.

Saturday night a Tripoli meeting was held in the hotel lounge. Several board members were on hand to field questions from the members present and a wide variety of issues were discussed. The crowd was much less hostile than at the spring Danville although things did get "hot" on occasion. One interesting item was the report on LDRS-10 being held in Ohio next summer. The proposed launch site is near Cambridge, Ohio which is about a 6 to 8 hour drive from Rochester. Much of the meeting was not terribly interesting as we waited for the door prize drawing. Bruce was the lucky one in our group, winning himself a SynerJet G motor. SynerJet is basically the former Ravenna Rocket Research company but with a new motor line that features motors above G that are class C shippable (see "As the ModRoc World Turns" column for details).

Speaking of other motor vendors, Jerry Irvine of US Rockets was there as well and a number of rockets were flown using his new "Fire Starter" motors. These motors were pretty impressive to watch as they spit sparks and flames in a sputtering action for a very nice effect. It is said that this effect is achieved by placing small aluminum filings in the grain and is not a good design technique. Whatever the method those flights were sure fun to watch and the motors all performed well much to the surprise of many of us there.

Sunday's weather was about the same as Saturday although the winds had subsided a bit. This brought out more and bigger rockets. With the lower winds, Dan had hoped to get his Phantom off with an I95 motor but ignition problems forced the launch to be scrubbed just before the range closed for lunch and we had to head back to Rochester. Dan had ignition problems throughout the weekend as had others as apparently the Tripoli launch system had not been serviced since LDRS. In particular, copperhead igniters did not seem to work well with the launch system.

Several confirmation flights were made all weekend. Success rate was high for them. Probably the most spectacular was Bob Hegwood's "NAR*GUN" flight. This rocket, a beautifully built and finished rocket that was a somewhat smaller version of the LOC "TOP*GUN". Bob flew it with one I-220 and two G80 motors. The liftoff and boost were spectacular although it did weathercock a bit

were spectacular although it did weathercock a bit much. There were a few suspense filled seconds as well as we waited for the chute to open up on the bottom section of the "GUN" which it finally did. It had to have been the most spectacular confirmation flight of the weekend.

As we headed eastward, only Dave had successfully accomplished what he had set out to do at Danville. In spite of this, we all felt pretty good as we headed home. The weather had cooperated, we had seen lots of rockets flown, and in general had a great time. It seemed like a more successful and safer launch than in the spring. Also, the range was setup further away from the hotel than in April and overall it seemed as though the safety procedures were better this time around (although later we learned, not always good enough). The ride home was without incident as we discussed and recapped the events of the past 2 days.

"The Accident"

Thus it was somewhat of a surprise when we learned about the mishap that occurred after we had left. Merrell Lane had stayed for the duration of the launch and relayed the information to us Monday night (which we later viewed on Merrell's video tape). A rocket with a central I motor and 3 strapon boosters each with an H motor did not work properly. Apparently, the 3 strapons were to be ignited first, with the central I motor ignited by some delayed ignition method. At T minus 0, only one of the 3 strapons ignited. As the rocket moved up the launch rod, the remaining two strapons fell off the rocket and then ignited. One of the two headed away from the launch area into the wide open field beyond. The other one headed straight for the rangehead where several people were standing. Injury reports vary widely, but at least one person suffered burns and others were "scorched" from the H motor while another person suffered a bloody nose/upper lip (for those who have seen Merrell's tape, this is the young man in the red-orange jacket). At first it was thought this was caused directly by the strapon but it is now believed that he was hit by someone's elbow as people ran to get out of the way of the wayward booster. In the meantime, the rocket, being boosted by the off-center thrust of only one H motor, arced over and headed horizontal until hitting the wall of a nearby hotel. This was not the host hotel but another hotel on the other side of it from the launch field. Reports are that the rocket landed only a few feet from a woman exiting the hotel. At this moment, the central I motor ignited but fortunately the rocket stayed on the ground (and the woman quickly ran away). Incredibly, the launch continued after this incident although spectators were moved off of the field at this point to the grass (about 100-150 feet farther from the range than before).

Much discussion occurred on Compuserve's Modelnet Sport Rocketry forum about this event. The most revealing thing about these discussions were that neither the safety code or the conditions of the FAA waiver were being followed. The range was setup closer to the hotel than the waiver or the safety code allows. Also, the spectator line was too close to the range. General consensus seems to be however that in spite of these safety violations, the main reason for the incident was the poor design of the vehicle and that the RSO should never have allowed this rocket to be flown. The RSO is basically "taking the fall" THIS time.

(Strictly opinion: While generally I agree with the "consensus above" I'm glad I was not the RSO as not having seen this rocket and the strapon configuration I don't know if I would have been "on the ball" enough to prevent it from being flown. As I recall, there were other rockets being flown that did work that seemed to me to be as potentially dangerous as this one. I've also seen crazy things flown at various NAR launches, some of them competition flights. This incident also helped me to realize the high level of responsibility the RSO has at a launch like this. Fortunately, no one was seriously hurt in the mishap but it did show how easily someone could have been. If so, the liability risk seems to fall heaviest on the RSO. It makes me hesitant to volunteer for this duty in the future.)

In summary, I would like to thank Tripoli Chicago and Ken Vosacek for another fun weekend of flying the big ones. While sorry that the launch ended the way it did, hopefully this incident will serve as a "wake up call" and prevent a more serious incident in the future that could have far more serious repercussions.

Meeting Notice

The next meeting of MARS will be held on Friday, January 18th at 7:30 PM. Contests and other planning for the new year as well as discussions regarding insurance will take place at this meeting.

As the ModRoc World Turns...
(news and rumors heard 'round the hobby)

Manufacturers News... Old timers may remember the Estes catalog of the early 70s during the days of President Nixon's wage & price freeze with the picture of a rocket in a block of ice and the caption "Why is this rocket frozen?" If you remember that then you may be feeling dejavu as *Estes* has recently made some pricing adjustments on the new Little Joe II kit as well as on the Saturn V. Prices have been lowered! The Little Joe II is now priced at $11.99 rather than $16.49 and the Saturn V price has also been lowered to under $50.00.

SYNER-JET is sort of a new manufacturer in the composite motor business. The company is Wayne Shaefer's new company, replacing Ravenna Rocket Research. Syner-Jets's motor line is all new however and features 5 class "C" and 2 class "B" motors. The class "C" motors are a the E43, F64, F32, G101, and G41. They are sold in packs of 3 with the E selling for $12.00 for 3, the Fs at $15.00 for 3 and the Gs at $21.00 for 3 making them far cheaper that most other composite motors. In the class "B" line are two "H" motors. One is a 200 ns H150 and the other is a 270 ns H192. The H150 sells for $60.00 for a pack of 6 and the H212 is $90.00 for a six pack. All motors are 29mm in diameter and have black phenolic casings. These motors feature "rich clouds of tracking smoke" and "no-body-tube-scorch ejection protection" according to the company's flyer. Another unique feature is that they also have field adjustable delay times. In addition, **the class "B" motors are unique in that they are shippable via normal UPS** because they are shipped as kits. When the motors are shipped they have the legal limit of 62.5 grams of propellant already installed in them. The remainder of the propellant in the form of "fuel cartridges" is then installed by the user along with the delay/ejection system. The remaining step is to epoxy in place the rear closure. The flyer states that six motors can be assembled in about 5 minutes. These motors are similar in one respect to the new ISP/Aerotech reloadable motors in that the end user must assemble them but the similarity ends there. Once assembled these are one time use only motors and casings. None of these motors (F,G or H) are NAR certified which means that to purchase them one must be a Tripoli member (and a confirmed member to purchase the H motors). For more information write to: Synergistic Jet Propulsion, Inc. P.O. Box 1094 Rootstown, OH 44272.

Speaking of **ISP/Aerotech**, here is a quick analysis of pricing on the ISP Reloadable motors versus comparable Aerotech conventional motors. Note that this comparison is not exactly apples vs. apples because the total impulses between H & I motors of the two types are not the same but they are fairly close. For this comparison, prices from the Rocket Research catalog were used which are discounted from Aerotech list prices. For H motors, the conventional motor, H120 (170ns) is compared to the reloadable H128 (180 ns). In the 38mm class, the conventional I95 (405ns) and I210(420 ns) are compared to the reloadable I161 (360 ns). In the 54mm class, the conventional J355 (1280 ns) is compared to the reloadable J415 (1280 ns). The table below shows the comparisons. As can be seen, the payback for H motors is the longest taking nine flights before the reloadables are cheaper than standard Aerotech H motors. If the Syner-Jet H180s were compared, the pay back would be even longer since they are only $10.00. In the I & J classes the payback is much quicker with the reloadables costing less after 5 flights for the I motor and only 3 flights for the J motor. Another factor to consider when deciding which motors to buy is the inconvenience and shipping costs of purchasing class B motors by mail. They can only be shipped FedEx to a select number of airports around the country (none in Upstate NY). Reloadables up to size I are shippable via UPS. On the other hand, if you only fly class B motors at Tripoli launches such as Danville, LDRS, etc., motors can usually be purchased at the launch site. Thus the choice for many will depend upon the frequency of flying and personal preference.

Motor Size	Price Per Flight			
	3 flights	6 flights	9 flights	12 flights
Standard H120 (170 ns)	15.95	15.95	15.95	15.95
Reloadable H128 (180 ns)	29.27	19.10	15.72	14.03
Standard I95/1210 (405/420 ns)	44.95	44.95	44.95	44.95
Reloadable I161 (360 ns)	57.10	39.78	34.00	31.11
Standard J355 (1280 ns)	116.95	116.95	116.95	116.95
Reloadable J415(1280 ns)	110.43	84.44	75.77	71.45

As mentioned before, above prices are based on **Rocket Research** pricing in their new catalog supplement. Besides the ISP reloadable motor line, the new supplement also features the T.H.O.Y. line of kits including the 4" diameter, 46" tall scale Phoenix at a price of $38.95.

Sentell Enterprises is yet another company that we have received literature from recently. Sentell manufactures and sells parachutes and streamers made from ripstop nylon including their "Thin Mill Chutes" that they say are "great for small body tubes and competition models." There chute line includes regular and "thin mill" in sizes from 10" to 90" diameter and streamers from the same materials in 2", 4", and 6" lengths. Custom shroud line lengths on chutes and custom widths on streamers are available at no extra cost. For more information write to: SENTELL ENTERPRISES, 104 Linden Drive Hendersonville, TN 37075.

The 1990-91 edition of the **North Coast Rocketry** catalog was shipped out over the past few months. Most of the new items were mentioned in past issues of *UR* including the R/C RG, Shuttle Magellan, etc. However, some kits that were in the previous catalog did not appear in the new one including, surprisingly, the Star Spangled G Bird.

The '91 edition of the **FSI** catalog features the "return of the Thunderbolt" this time labeled as a G60 (the original Thunderbolt was designated as an F32) motor. No indication in the catalog as far as pricing, availability, or NAR certification however.

Also in the area of NAR certified motors, **Apogee Components** is planning on bringing back the Estes A3-2T and A3-6T mini engines. Although manufactured by Estes, they would be sold by Apogee in a similar manner as they have been available the last few years from HO Sales. As reported in the October *UR*, these motors lost contest certification this fall when HO sold its remaining stock. Apparently Apogee has contracted with Estes to make another production run (5000 engine minimum per run) and they may be recertified for contest use by next spring. In the meantime, North Coast is still working on importing Russian made 11mm A motors. No word as yet to pricing or availability.

There continues to be much activity out there in the "sport rocketry" marketplace. More new companies are starting to surface as well as new product introductions from the old companies but time does not allow me to go into them now.

(SCRATCHBUILT 4", cont. from page 5)

made by wrapping the nozzle end of the motor with 1/2" or wider masking tape until the tape ring is the thickness of the 29mm tube wall. Without the tape thrust ring the motor will go straight up through your rocket. The center motor must be installed first. It is held in place at ejection by both friction fitting the motor and by wrapping a single layer of masking tape around the thrust ring/motor tube joint. To friction fit the motor add small amounts of masking tape to the motor casing until a snug fit is obtained. Be careful when friction fitting - Too loose and the motor will kick out at ejection instead of opening the rocket, too tight and you may never be able to get it out. If you do not insert the center motor first, you will not be able to place a single layer of masking tape around the thrust ring/motor tube joint. Next friction fit the remaining motors (the motors that are placed into non-ejection active tubes do not need to friction fit tightly, since there will be no force other than gravity to push/pull out). If you made your motor mount assembly so that more than one motor tube is ejection active, and they are not going to be used for a flight, then you must plug these open tubes. Otherwise the ejection charge gases will exit though these tubes instead of opening your rocket (old engine casings with the ends sealed up with epoxy work quite well).

The motors that are placed into non-ejection active tubes needs to be a plugged motor. A plugged motor is a motor that has no ejection charge. A good motor for that purpose is a booster since it has no ejection charge. If you use a motor with an ejection charge, then you must first remove the ejection charge (Don't attempt this unless you know what you are doing!) Once a motor without an ejection charge is at hand, epoxy should be placed over the rear of the motor to prevent it from scorching the inside of your motor tube.

Use a substantial amount of wadding to protect your parachute. If you're clustering and have more than 1 motor tube ejection active, make sure you put some wadding in the ejection active motor tubes above the motors. This way, if one of the motors fails to ignite, the wadding directly above the unlit motor should prevent ejection charges from the other motors from back igniting the unlit motor. I have seen this happen before. You would be surprised at what a backlit motor can do to the inside of a rocket.

(continued on page 12)

The "FLYING CRAYON"

I have had the idea for the flying crayon for some time now. It is hardly an innovative or unique idea either. Any rocketeer who has been to a "Toys 'R Us" toy store in the past few years has probably had the same thought. They sell a crayon bank (as other toy stores probably do as well) for around $8.00. This bank is about 3 foot tall and is 4" in diameter. Its composition just begs for it to be flight converted. The top and bottom portion are made of plastic while the main part is a very thick cardboard tube. The top part or tip functions perfectly as a nose cone. I first thought of the idea of converting it to fly 3 or 4 years ago but finally got around to doing it last month.

The crayon actually stands 35" tall. The body tube portion has an OD of 4" and an ID of 3.75". As you can see, that means the tubing is 1/8" thick. A little on the heavy side and indeed this rocket will not be a light one, probably weighing around 25-30 oz. As I said, the idea is hardly original and I did see someone turn in a nice flight with one on an H motor at the Danville launch.

I recommend this rocket only for experienced high power builders. In particular, experience with through the wall fin mounting and working with 1/8" plywood is suggested. If you've built a few LOC kits like the Graduator, Starburst, or Heavy Duty Beauty you should be able to handle this one with no problem.

Construction is pretty straightforward. Start by cutting off the end of the bottom plastic cap. Then cut a section of the scrap plastic and insert it into the coin slot in the nose. Seal the area around the slot with epoxy from the inside.

Cut the fins and motor mount centering rings next. Cutting the centering rings is the most time consuming task. Note that the OD of top centering ring is smaller than the OD of the bottom one. This is because the cardboard tube's ID is smaller than the ID of the plastic end cap. Epoxy one of the centering rings onto the motor tube 1/2" from the end. Before the second centering ring is glued on, the end cap must be positioned around the motor tube. Make sure it is pointed in the proper direction. Now epoxy the remaining ring on, 1/2" from the opposite end. Now epoxy the motor mount assembly and plastic end cap all into place. For best results, rough sand the area of the plastic where it will be glued with 220 grit sandpaper and the clean the area with alcohol.

Now, using one of the fins as a reference, cut four slots in the cardboard tube/plastic endcap for the fins to be inserted in during the thru the wall fin mounting. Prepare the plastic as before and glue the fins in place. After all four fins are in place, add epoxy fillets to the fin/body tube joints.

Complete the assembly by adding the launch lugs and shock cord mounts and shock cord. Some sanding of the nose cone shoulder will be needed so that the nose cone slides off easily.

Little finishing is needed as the body tube and nose cone are already done. Fill the grain on the fins and paint to match the rest of the crayon.

Since this is a heavy rocket for its size, it will require a high thrust engine to fly. Mine is still waiting for good weather before I fly it but initially I suggest an F80-5, G80-4, or H120-6.

All in all, this is a pretty fun rocket to add to your high power fleet. The price is cheap for a rocket of this size and the result is a nice looking bird that has a unique appearance but whose finish doesn't require a lot of effort. Anyone out there who builds one, please let me know how it went as well as comments or suggestions on the conversion as well as how it flies. Have fun with this one and I hope yours draws only straight vertical lines.

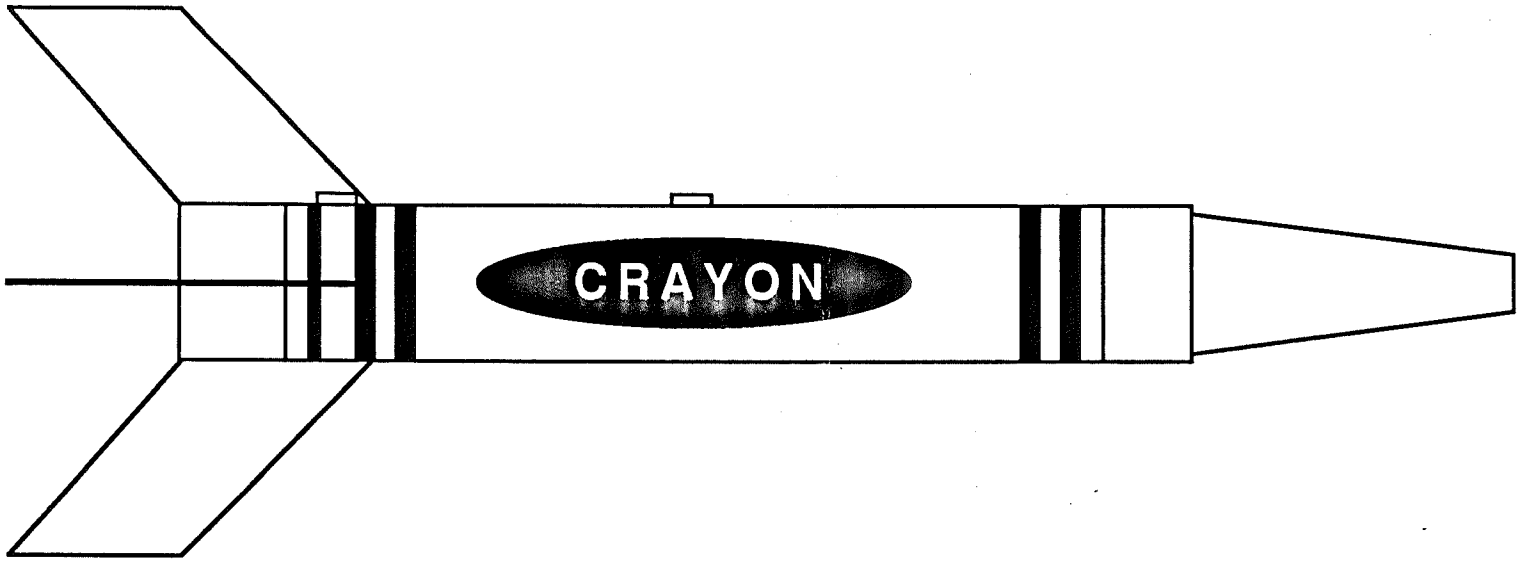
(SCRATCHBUILT 4", continued from page 11)

Some proven motor combinations are:

7 D12-3	7 G25-10	1 G125-5
7 F10-4	7 G80-10	7 F25-9
7 H70-10	3 G80-10	7 F80-10
7 H120-10	3 H70-10	7 E30-7
1 F80-5	1 G40-4	

(Editor's epilogue: I made some changes to the above motor list to reflect changes in the Aerotech motor line since the article was written. From personal experience I have found that the rocket works well on a single F80-5, a single G25-5, and a single H120-6. The size and the 7 engine motor mount make this a most versatile rocket. Flying with an F or a G it fits the NAR definition of as model rocket. Flying with a single H motor it works well for a Tripoli confirmation flight rocket. Finally, the payload section and possible 7 engine configuration will let this rocket serve as a payload launching vehicle for still camera, movie camera, altimeter and other payloads to respectable altitudes.)

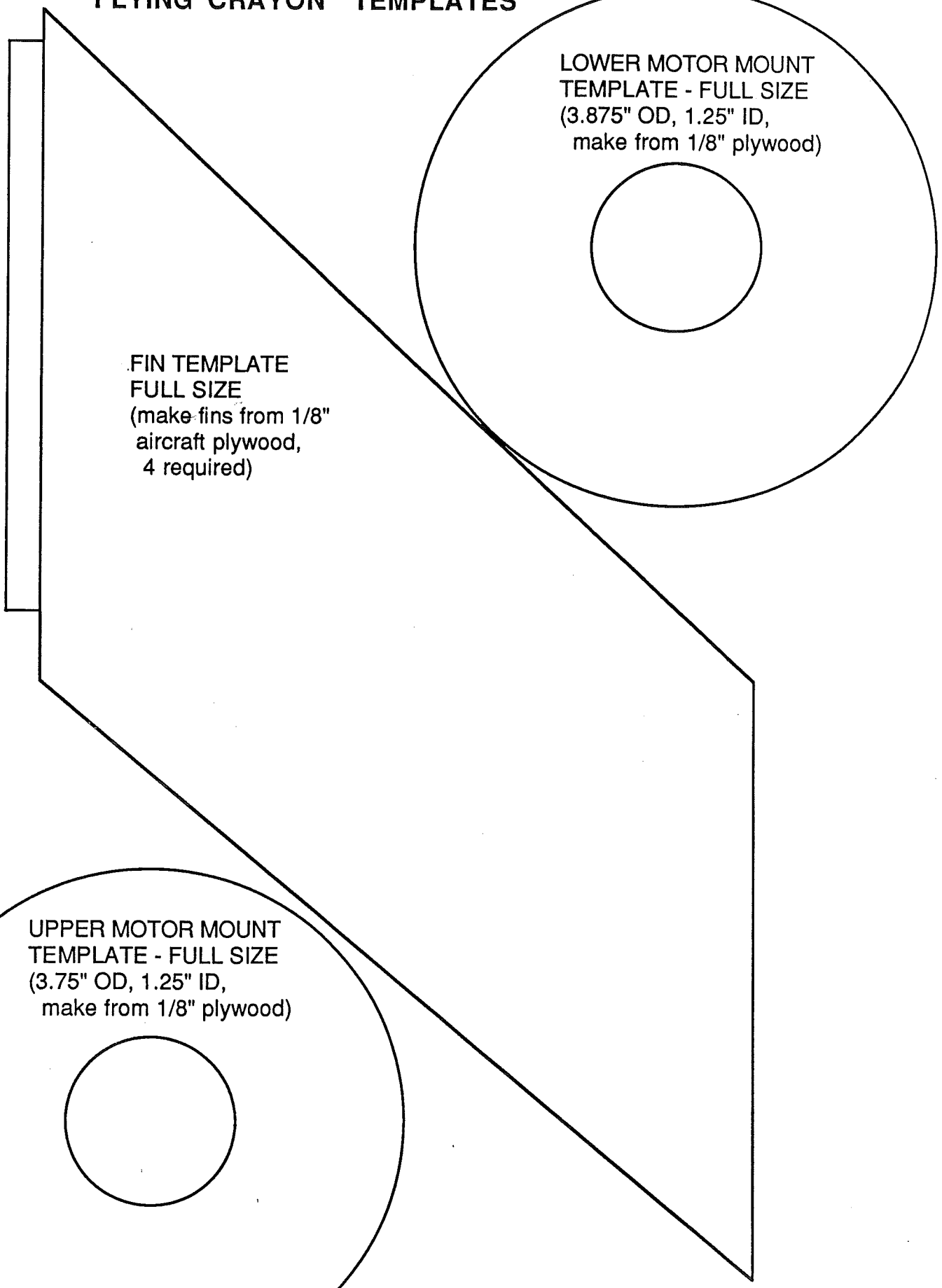
THE "FLYING CRAYON"



PARTS LIST

1. Cardboard Crayon Bank (from TOYS 'R US)
2. Motor Mount Tube, 12" piece (LOC #MMT-1.14)
3. Launch Lugs, 2 1/4" lugs, 1/2" long (LOC #LL-25)
4. Shock Cord Mount (LOC #SCM-2, 2 required)
5. Shock Cord (8' of 3/8" sewing elastic)
6. Parachute (32" - 40" chute, LOC LHPC-35 or equivalent)
7. 1/8" Aircraft Plywood (12x24 sheet)

"FLYING CRAYON" TEMPLATES



NAR TRUSTEES DEFINE NAR'S ROLE IN HIGH POWER ROCKETRY

(Editor's note: Following is a letter from Pat Miller stating the outcome of the NAR Trustees meeting in St. Louis in October of 1990. More details about the outcome of the meeting are scheduled to appear in an upcoming issue of American Spacemodeling.)

The Board of Trustees of the National Association of Rocketry completed a special session in St. Louis this weekend where it carefully studied the NAR's role in non-professional consumer rocketry including, of course, advanced high power rocketry (AHPR). The Board has been studying this and related issues since August 1989. At that time NAR members at the NARAM-31 Association Meeting asked the Board to re-examine and assess the NAR's role in AHPR. Many members were interested in being able to fly high power rockets within the scope of the NAR. In response the Board formed the AHPR Commission (Jim Barrowman, Chairman) to analyze service programs which the NAR might offer. The Commission wrestled with this task from October 1989 through September 1990. Its final report was presented to the Board late last month.

After reviewing the report and meeting for the weekend in the St. Louis the following resolution was adopted:

"The Board of Trustees affirms that the Association was founded as, and is, an educational not-for-profit organization servicing all forms of non-professional consumer rocket activities."

In support of this resolution the Board took specific actions in the following areas:

1) A "tiger" team of experts is to be appointed to establish an NAR science education program utilizing non-professional consumer rocketry. A proposal will be in Board's hands by 02/91 at the earliest and 08/91 at the latest.

2) The NAR will assume a proactive role in the writing of AHPR codes and regulations. A second "tiger" team will be established. It will have a proposed new safety code in the Board's hands by 02/91. Additional codes and regulations including the possible incorporation of the reloadable motor technology will be presented to the Board by 08/91.

3) The NAR will expand its motor certification program to include high power motors. The expansion is to be completed by 08/91.

4) The NAR will permit all types of non-professional consumer rocketry to take place on a single range provided the applicable safety codes are followed.

Let me comment briefly on #4. Essentially this means no more 3/48 Rule. NAR members wanting to fly model rockets at an AHPR event may now do so. Once a safety code is established AHPR flights will be permitted at an NAR event (e.g. sanctioned contest). The Board does want to remind everyone that the NAR does not presently offer insurance for AHPR activities. Also, there are local, state, and federal regulations which must be followed prior to the purchase and use of AHPR products. It will take some time for the "tiger" teams to do their jobs and for a new NAR safety code to be established. The Board asks that you please be patient just awhile longer. The NAR volunteers are peddling just as fast as they can!

J. Patrick Miller, President
National Association of Rocketry

Events Calendar

Model Rocketry related events in the Upstate New York or of interest to rocketeers of this area are listed below. If you have an upcoming model rocket event planned, send info to the editor.

January 18, 7:30 PM. Monthly MARS Meeting.
This months agenda: Contest planning for 1991, Sport launch schedule, insurance discussion,
Contact: Dan Wolf, 458-3848.

February 15, 7:30 PM. Monthly MARS Meeting.
Contact: Dan Wolf, 458-3848.

March 8-10 MASCON 1991, Michigan Space Center. Mid-America Spacemodeling Convention.
Contact: Mascon '91 c/o HUVARS, 2742 Beacon Hill, Ann Arbor, MI 48104.

March 15-17 NARCON '91, Huntsville, AL.
National Association of Rocketry National Convention.
Contact: Matt Steele, 13011 Branscomb Road, Huntsville, AL 35803

August 5-9 NARAM 33, Chicago, IL.
National Association of Rocketry Annual Meet.
Events: 1/2 A Parachute Duration, A Streamer Duration, A Rocket Glider, C Helicopter Duration, A Payload, B Eggloft Altitude, B Boost Glider, 2 Minute RC Rocket Glider, 120 Second Precision Duration, Open Spot Landing, Research and Development, Peanut Scale.

UPSTATE ROCKETEER
c/o Dan Wolf
235 Kislingbury St.
Rochester, NY 14613