



Newsletter of the Northern Illinois Rocketry Association,
NAR Section #117, Proud Winner of the 1996 and 1997 Rockwell Newsletter Trophy!

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Club News

Welcome to 1998! NIRA had a very good 1997, let's hope that this year is even better! If you missed the January meeting, here's a quick run down on what happened.

Elections - The most important thing we do at the January meeting is elect the officers for the new year. The officers for 1998 are:

President - Ric Gaff
Vice President - Steve Smith
Secretary/Treasurer - Ken Hutchinson
RSO - Bob Kaplow

We want to thank Cheri Chaney for all her hard work this year as President and her help with other club related projects. Thanks also to Mike Ugorek for his stint as Vice President, and for running MRFF last year. We can't forget the ongoing efforts of Ken Hutchinson as Treasurer (even though he needs to deposit some checks), and Bob Kaplow for his job of club RSO. Things would not get done at all if these people didn't do their jobs.

Major Mistakes - I really goofed in the last issue, and failed to recognize the efforts of Mike Jungclas for his work with the RCHTA show and launch. Mike has been doing this job for many years now and has it down to a science. Thanks for all of your work, Mike!!

Mike has mentioned that he'd like to take a break from running the show this year, and quite honestly, he deserves one. So, we're looking for someone to organize the show! No experience required, all you need is to be willing to help and can use a telephone (that leaves me out). If you're interested in helping the club out with this important event, give Ric Gaff a call! He can be reached at night at (630) 483-2468. The show this year will be on October 31 and November 1.

New Business - We voted to buy the club a digital camera to use at meetings for the Model of the Month photos, at building sessions, launches, and other events. This will help us get

the photos into the newsletter faster, and save Ric some money (he does all the MOM photos out of his own pocket). Rumor has it that Ric has already found one and purchased it.

There will be 1998 flyers available at the February meeting for you to hand out to local hobby shops. Tom Pastrick is having about 1200 copies made, and needs help distributing these to hobby shops all around the Chicago area. We do generate a lot of interest with these flyers, and it is important that we get them out as soon as possible. Please plan to come to the next meeting and take a stack!

Upcoming Events - The February building session will be held at Pete Olivola's house in Oak Park. There's a map on Page 11 and the address is 803 S. Elmwood. Bring your latest project to work on, or just come for the company!

In March we've scheduled a launch, but given the nature of nature around here we won't know what the weather will be like until the last minute. So, call the info line before heading for the field! We may change the plans at the last minute and this will be the only way you'll know.

We still haven't selected a site for the Midwest Regional Fun Fly in June, but we do have the Hoover Recreation Area in Yorkville reserved. All NIRA members will receive a registration form in the mail with all of the details, after we know what they are. Mike Ugorek and Steve Smith have volunteered to organize MRFF this year, thanks guys!!

The WHOOSH club in Wisconsin is working out the date for Eat Cheese or Fly in August, and we'll be coordinating the event with them again this year. Let's hope the weather is better than it was last year. You need to have your LEUP in order to fly HPR rockets at Bong, and Al's Hobby is planning to be there with motors. You won't be able to purchase and use these motors if you don't have an LEUP.

We are considering holding a launch at the sod farm in Harvard some time this year so that we

can launch the rockets we can't fly at Greene Valley. If we do, we'll try to get Al's Hobby to come out so that we can fly HPR without worrying about the LEUP.

Have a good year, and fly safe!



Engineers take a last look at the Athena-2 launch vehicle January 5 as it sits ready to launch the Lunar Prospector spacecraft to the moon from pad 46 at Cape Canaveral, Florida. Lift off took place on January 6 at 9:28pm, and the Lunar Prospector is scheduled to enter orbit around the moon on Sunday January 11. It is expected to spend a year in orbit mapping the surface and prospecting for minerals.

T MINUS 1 - NIRA'S CALENDAR OF UPCOMING EVENTS

1998 CLUB LAUNCH DATES

Launches are BYOL (bring your own launcher). The location for our 1998 launches is the Greene Valley Forest Preserve. If you have questions prior to any launch, call the NIRA Infoline at (630) 690-6353 and leave a message, I will call you back.

January 18 - Building session at Bob Kaplow's. See map on Page 11 for directions.

February 15 - Building session at Peter Olivola's. See map on Page 11 for directions.

March 15 - 1st launch of 1998! If the weather is bad we'll hit some local hobby shops and get something to eat. Call the Infoline to find out!

April 19 - Regular club launch.

May 24 - Regular club launch (1 week later than normal due to National Sport Launch on the 15-17).

June 20-21 - Midwest Regional Fun Fly.

July 19 - Regular club launch.

August 16 - Regular club launch.

September 20 - Regular club launch.

October 18 - Regular club launch.

October 31 - Nov 1 - RCHTA Show, Rosemont Expo Center

November 8 - RCHTA Launch.

November 15 - Regular club launch

December 13 - Holiday Party at Bundick's

MONTHLY MEETINGS

All meetings start at 7:30 PM, and include entertainment and a brief business meeting. Don't forget a model for "Model of the Month" voting. We need volunteer speakers to entertain the troops after the business meeting, so call Ric Gaff at (630) 483-2468 if you can help with ideas or can speak yourself. The location is the Glen Ellyn Civic Center, 535 Duane Street (usually on the 3rd floor, but check the board in the lobby).

Currently scheduled meeting dates are: December 5, January 2, February 6, March 6, April 3, May 1, and June 5, **July 10** (Note! This is not the first Friday of July!), August 7, September 4, October 2, November 6, December 4.

THE LEADING EDGE, published bimonthly by and for members of the Northern Illinois Rocketry Association, NIRA, NAR Section #117, is dedicated to the idea that Sport Rocketry is FUN! Articles, plans, photos, other newsletters, and news items of interest should be sent to Bob Wiersbe, 1835 Shetland Drive, Wheaton, IL 60187 (or electronically via Internet to wiersbe@lucent.com). Photos will be returned, other material returned if requested. Send membership applications (dues: \$3/year, including a six issue subscription to the Leading Edge) and nonmember subscriptions (\$5 per six issues) to Ken Hutchinson, 84 Jefferson Lane, Cary, IL 60013. Any item appearing in the Leading Edge may be reprinted by Sport Rocketry with proper credit given; all other uses require written permission of the Northern Illinois Rocketry Association. "Model Rocketry is proof positive the you are never too old to have a fun childhood." - Mike Ugorek.

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Model of the Month Winners! (from left to right, all photos by Ric Gaff)

June - Kimber Guzik won in Adult with her Dragonfly that she lost at MRFF, Mark Soppet won in Youth with his Nova Payloader.

July - John Guzik won in Adult with his Stovi, and the ever Politically Correct Mark Soppet won in Youth with his Patriotic Alpha.

September - Ric Gaff won in Adult with his scratch built Aerobee-Hi, and Bryan Chesi won in Youth with his Strong Arm.

November - Steve Smith won in Adult with his beautiful Mercury Redstone, and Matthew Duckworth took Youth with his outstanding Equinox.

Building and Finishing Techniques for the Estes - Gemini DC by Steve Smith

After spending over 3 months of on and off building of my Boyce Aerospace 4" Mercury-Redstone, I was looking, and in the mood for a rocket that was a little less time consuming to build. I went to Walt's Hobbies (located on Plainfield Road in Joliet) to buy some slow cure epoxy, to replace my supply that I exhausted building my Redstone. Not only does Walt's carry a wide range of RC planes, RC cars, plastic models and trains, they also carry ROCKETS. After looking over the selection very carefully (important decisions take time you know... my wife Kimberly is such a trooper as she was with me at the time), the Estes Gemini-DC caught my eye. The thing that I liked most about the kit was the fact that the parachutes were housed in the two side pods of the rocket, more one this later. Needless to say I left not only with the epoxy, but with the rocket as well.

One of the first things I always do when I get a new rocket is carefully cut open the bag and give the contents a quick look over. This rocket includes 1 - BT-50 (24mm) body tube pre-cut to accept the fins, 2 - BT-20 (18mm) body tubes, 1 - BT-50 two-piece plastic nose cone, 2 - BT-20 plastic nose cones, pre-cut fin stock, a standard BT-20 to BT-50 Estes motor mount assembly, two parachute assemblies, a standard 1" long by 1/8" wide launch lug as well as a 1" long by launch lug, a decal sheet and a set of instructions. Given the wide variety of parts, I think this rocket would lend itself very well to a kitbash competition.

I usually skip building the motor mount until later on, so the first thing I did was glue the 2 piece BT-50 nose cone together with plastic cement. Once that dried, I glued all 3 nose cones to the ends of the body tubes, again using plastic cement. Care must be taken when assembling the two BT-20 side pods, there is a vent hole in the side of each one. Glue the BT-20 nose cone to the end which is closest to the vent hole, this is the FRONT of the pod. The side pod vent holes correspond to identical vent holes on the BT-50 main body tube. The side pods will be attached to the main body tube later. After I glued the nose cones in place, I noticed they didn't fit the body tubes that well, there were gaps and overlaps on all three. Since I was planning on filling the spirals anyway, I figured I would take care of the misaligned nose cones as well as an extra vent hole that Estes provided, free of charge, in one of the BT-20 side pods.

I use Elmer's Professional Wood Filler watered down to a brushable consistency to fill the spirals on all of my rockets. It took two coats of this, sanding in between the coats using 320 grit sandpaper to fill the spirals and 4 coats to fill the gaps in between the body tubes and the nose cones. Don't worry if, when you're sanding the body tubes, some of the paper becomes fuzzy, subsequent sanding will take care of this. After I was satisfied that most of the spirals and gaps had been filled, I sanded all 3 body tubes and nose cones with 600 grit, 2400 grit, 3200 grit, 6000 grit, 8000 grit and finally 12000 grit sand-

ing pads to achieve a mirror like finish and remove any paper fuzz and small scratches that remained. I then drew a line with a pencil down the side of each side pod centering the line in the middle of the vent hole and well as down both side of the main body tube again centered in the middle of the each vent hole. I took care to mark the end of each tube where the line ran off the end to help align the side pods when it came time to attach them to the main body tube.

After the side pods and main body tubes were finished and marked I cut the 1" long by each side pod so that half (1/4") was inside the side pod and the remaining half was sticking out the side of the pod. I put these aside to dry.

The old Estes motor mount came next. This is the typical motor mount found in all Estes kit. However, instead of supplying me with 2 centering ring, Estes shipped me 2 thrust rings. Never fear, I had 2 BT-20 to BT-50 centering rings in my range box that I had bought from the NIRA range store. I did use one of the thrust rings in addition to the forward hook inherent on all Estes motor clips to prevent any motor from finding its way up and into the main body tube.

While waiting for the motor mount to dry, I turned my attention to the fins, these were standard Estes fare. This was the first time I had built an Estes rocket using their through-the-wall fin attachment. I sanded an appropriate air foil into all 4 fins and began my finishing technique for balsa. I applied a coat of Pactra Balsa Filler and let the fins dry overnight. The next night, I sanded the fins, using 600 grit sandpaper, and applied a coat of Pactra Sanding Sealer to them. After the sealer had dried, I again sanded them using 600 grit sandpaper. I repeated the process of applying Balsa Filler followed by Sanding Sealer one more time, sanding in between each coat. One thing I DO NOT DO is wipe off any sanding dust until after I have sanded the fins for the last time. The reason for this is, I have found that the dust helps to fill the grain of the wood as well as any small scratches that might be present. Though you can still see some of the grain, this technique is good enough for a sport flyer like the Gemini-DC.

I glued the motor mount tube in place and attached the fins to the main body tube using Sig-bond yellow glue. I must admit, the TTW fin slots sure takes all of the guess work out of aligning the fins properly. After the motor mount was glued in place and the fins were attached I set the model aside to dry overnight. The following night I attached the launch lug and put epoxy fillets on all of the fins, smoothing the fillets with my finger, dipped in alcohol, for a nice clean finish. For the fillets, I used 30 minute Z-poxy. After all of the epoxy fillets had set, I attached the side pods. I ran a bead of epoxy down length of the each side pod over the line that I drew earlier. Once I had the epoxy in place, I inserted the other half of the vent tube into the corresponding vent hole in the main body tube and lined up each side pod with the marks I made on the end of each tube.

I let 2 nights pass, before I painted the rocket. This is the minimum time I let pass before I decide to paint a rocket, it gives the glue and epoxy

plenty of time to dry. I start my painting process by wiping the entire model with a tack cloth to remove any dust that might be on it. I then applied a coat of Krylon Sandable White Primer. After this had dried, I sanded the entire rocket with 600 grit sand paper, and again wiped it down using my tack cloth. I applied the first of two coats of Krylon True Blue and let the rocket dry overnight. You might have trouble getting the paint in between the side pods and the fins. It's a pretty tight space that is hard to get paint from a spray can into. For this problem, I used my airbrush loaded with Testors Ford & GM Blue Acrylic Enamel to accomplish the task. If you don't have an airbrush, DO NOT glue the side pods to the main body tube as noted in the previous step. Instead, paint each tube separately, putting a strip of tape approximately 3/16" wide down the side of each pod, centered over the vent hole, and the same length of tape down each side of the main body tube. By doing this, once the paint has dried, you can remove the tape and still have a good place for the epoxy to bond to. If you don't mask off the tubes, you will be gluing two painted parts together which results in a weaker bond. Knowing that I was going to put another coat of blue on, I sanded the rocket one final time, again using 600 grit sandpaper, wiped it down with my tack cloth, and applied my final coat of paint.

Next came the decals. I let my models dry for 3 days before I apply the decals. I thought the decals were water transfer (which I prefer) since the decal medium was so thin, but to my dismay, they were adhesive backed. The four decals you apply to the fins are straight cuts easily achieved using a metal ruler to guide your knife. The striping I knew was going to give me problems. For this rocket you need to butt four separate decals together down the length of the rocket while maintaining a straight line, not an easy task. What I did was cut the decals out of the decal sheet and instead of removing the entire decal off of its backing, I only remove half of the backing. This gives you a chance to align the decal without the whole decal wanting to "grab" the model. After I positioned the decal properly I then folded the decal back on itself and removed the remaining half of decal backing and applied the rest of the decal. One way to alleviate this problem is to spray the area you want to apply the decal to with Windex. This removes the static charge between the rocket and the decal, in essence giving you a water transfer decal thus buying you a little time to get the decal into the proper position. After all of the striping was applied, I cut out the Gemini-DC logo. A hint on this one, cut the Gemini-DC out without trying to get fancy and cutting the clear decal material out from inside the letter "D" and in the loop in the letter "C". I botched mine by trying to get fancy, make as many straight cuts as you can, your decal will look a lot better. After I cut the Gemini-DC out, I measured it against the striping already on the rocket. I decided to remove the striping instead of applying the Gemini-DC over it. I carefully cut the striping out and applied the Gemini-DC using the same technique as above, only removing half of the backing, applying the decal, folding the decal back on itself

and finally applying the other half of the decal to the rocket. Though you can see a couple of seams between the decals, a little yellow paint rubbed into the seams helped alleviate most of the problem.

The last step involves construction of the shock cord mounts. These are the typical 3-fold pieces of paper that I ALWAYS replace with card stock using contact cement instead of white glue or yellow glue. Once you have constructed the mounts, you glue them to the inside, aft-end, of each side pod. Actually, this is the only place you can mount them to, since all three tubes have their nose cones permanently attached and the aft-end of the main body tube contains the motor mount. The principle of the recovery system is this. Once the ejection charge goes off, it pressurizes the main tube, since the BT-50 nose cone is attached the charge then tries to pressurize the side pods. Like the main body tube, the side pods' nose cones are also attached so the only place for the gas pressure to go is out the aft-end of each side pod, thus deploying two 12" parachutes, one contained in each side pod.

This was a fun rocket to build. Besides the extra vent hole in one of the side pods and the thrust rings in place of centering rings, I was very pleased with the kit. The TTW fin attachment seemed to really stiffen up the fins. Though not perfect, I hope you can use some of the building and finishing tips that I listed above in some of your future projects. If you have any questions regarding the building and finishing tips discussed, please stop me at any meeting or launch or feel free to call me at home to ask.

So you think you are ready for High Power? Part 1

by Norm Heyen

Hopefully, this is the first of a series about getting started in high power rocketry (HPR). I started about three years ago and still remember the first impressions and some of the frustrations I encountered. I'll try to guide you towards the level 1 certification flight from picking out a kit, some construction techniques, motor selection and what to expect with your first flight.

First, pick out a kit. Only you can decide just what will be the 'perfect' rocket for you. You have to weigh a few variables. Like where am I going to fly it, how often, what is my budget, can I transport and store it. First thing is the where can I fly it, and is this going to be the start of many HPR flights, or a once in a while affair. If you plan on small field flying, you'll look at rockets that an 'H' class motor is the biggest it can safely handle. That way, you can use the rocket often, flying G's or even F's most of the time and only the occasional H. There aren't many places near Chicago-land that will accommodate H flights. But, if you fly at a larger field, or just want a 'big' rocket, then pick something that an H motor is near the bottom of the acceptable engines. Just remember that an H motor in a smaller rocket will put it way up there, not exactly what you really want for a certification flight.

In general, the smaller rockets will use 29mm hardware and the larger ones will use 38mm. (As a practical matter, you will need to purchase, or borrow, a reloadable motor set (RMS), there just aren't any easily available H single use motors out there. There are advantages, and disadvantages, for either size. The 29mm reloads and hardware are generally less expensive, but top out at a bottom H. The 38mm starts at the bottom of the H range and goes as big as a baby J, suitable for level 2 flights. Expect to pay about \$50 for a 29/240 reload motor and about \$80 for a 38/240 motor. The reload kit (fuel) is about \$13 for a 29mm H238 and \$13 for a 38mm H123. (Note - There has been some debate if the H128 is really an H, some tests indicate that it is really a big G. My advice is to play it safe and use something no one will argue about.) All the hardware is basically the same, just scaled to different sizes. A motor consists of a forward closure that holds the delay element, a casing to house the fuel and an aft closure for the nozzle. You can start with a single motor set, then buy additional casings for the bigger, or smaller, impulse motors as your goals (I hesitate to say 'needs') change. The reload kit will have a couple fuel 'slugs', a delay element, a nozzle, a few o-rings and some spacers, liners and washers. I won't cover the assembly of a motor here. Find someone at the launch site to watch over your shoulder during assembly. It really isn't very hard, just follow the instructions exactly. Everything should fit into place, nothing left over or difficult to assemble.

Rocket choice is again a function of many things. You don't want to have to deal with the witnesses not being able to see the entire flight, so a minimum diameter rocket flying to 3000' probably isn't the way to go around here. Something that is either draggy or heavy is a much better choice. Ideally, keep the apogee to around a 1000' or so. Even I can see most rockets at that distance. It will cut down on wind drift, making recovery easier. Avoid short stubby rockets, they aren't nearly as stable as you would like. Think about where you have to store it between launches and during construction. And how can you get it to the field? If you live in a small apartment with a couple of active kids, leaving it in a corner of the living room isn't the best idea. Trying to transport a 12' tall rocket in a Geo Metro isn't exactly the easiest either. And of course, how much can you afford to spend?

So what rocket do you recommend, you ask innocently. The answer is simple; it depends. Browse through the catalogs, check the hobby shops, browse some web sites, talk to other fliers. My recommendation is to get something that is at least 3" in diameter, about 60" tall and weighs around 3 pounds without motor. Get a copy of WinRASP and test a few to get an idea of the performance to expect with some simulated flights. Keep the apogee to around a 1000'. You want to be high enough to allow for a little breathing room, but not so high that it is difficult to track and recover. Some kit choices are the LOC 'EZI-65', the Binder Designs 'Excel Plus', the PML 'Tethys', Magnum's TCB in a Flash 'Wasp II' and the Rocket R&D 'Brutus'. There are others, but I've built, or helped build these.

Check around for the best prices, but expect to pay between \$60 and \$80 (or more if you want...) for the kit. Any of these kits will give you the experience in building and flying bigger rockets and still be able to fly on a full G through a mid-I without trouble. Granted, you aren't going to get a lot of altitude with a G104 in any of these, but they will handle I211's without any problem. (Hey, I'm assuming you've been bit by the AP bug and want to fly big rockets.)

OK, so what's the bill so far? Figure that you'll need a 38mm motor for \$80 (consider the 38mm set, about \$135) and about \$75 for the kit. Maybe a bit less. Get an additional (third) centering ring to fit the kit. See if you need a 54-to-38mm motor adapter, both should set you back about \$8. And if you like baffles instead of wadding, get a coupler and two bulkhead plates. Add about \$20 for supplies, like epoxy, paint, sandpaper, etc. You will need to use 30 or 120 minute epoxy for construction. Mix up any of the 5 minute stuff you have, let sit overnight in a Dixie cup and throw it out. It is simply not suitable for anything, especially high power rockets. Makes the \$15 for the reload seem cheap, doesn't it. But, if all goes well, you can plan on a couple of dozen flights before you do enough stupid things to have to retire your learning vehicle. After all, this is what it really is. You crashed, or lost, your first couple of Estes kits too, didn't you?

If I haven't scared you off by now, there is one other minor detail. The current interpretation of the laws indicate that anyone using a motor that contains more than 62.5 grams of AP (currently, this means anything bigger than a G80) in an assembled motor will need to have a 'Low Explosives User's Permit' issued by the Federal Bureau of Alcohol, Tobacco and Firearms, the



Okay, so you're not quite ready for that PML Triton on a K motor. But, you have to start somewhere! Visit Al's Hobbies in Elmhurst and ask to see the stuff in the basement.

BATF. The permit is not difficult to obtain under certain conditions. If you can make arrangements with someone that has a permit and storage, get a signed statement from them and state that you will not be storing motors. That will allow apartment and condo dwellers to fly H and bigger motors. But you need to check with your local districts to see what they will allow. I doubt that a storage permit would be issued to someone living in downtown Chicago. Sorry, just the way it is right now. For a storage permit, you will need to either have someplace other than your house or attached garage to house a magazine. Although you can request a waiver on the attached garage part, I've heard it isn't much of a problem, so don't let that stand in your way. The magazine you need is considered a Type 4 indoor magazine and will be limited to storing a maximum of 50 pounds of AP. Unless local ordinances restrict you to less than that. The good news is that the table of distances doesn't apply, so no need to move your buildings or buy a bigger lot. This is more than I'm going to cover in this article, but might make for an interesting article. (I'd be happy to collaborate with someone on an article about obtaining one. Hint, hint...)

And of course, HPR is a social event. If for no other reason than you can't just step out into the back yard, set up the Porta-Pad and fly. The FAA requires notification if the rocket weighs more than 500 grams and needs a waiver if more than 1500 grams. And a decent pad and controller is going to set you back more than \$100 as well. The costs of the ground support equipment and the hassles of getting the needed approvals cry out for a club activity. You are always welcome to feel a part of the club by helping set up or take down the range. It isn't much work when several pitch in, and it is a great way to have a chance to talk to others and pick their brains for tips and insight.

Next time, first impressions of the kit and some pointers for construction.

Where can I get this stuff?

Locally: Al's Hobby Shop
121-23 Addison Ave.
Elmhurst, IL
(630) 832-4908

Al's is one of the best (if not the best) hobby shops in the Chicago area that carries all types of rockets and motors. They stock LOC-Precision, PML, Vaughn Brothers, Rocket R&D, Estes, Quest, Custom, Aerotech, North Coast, Binder Designs, Rocketman, Robby's Rockets, Dr. Rocket, and Top Flight Recovery, just to name a few. They have Aerotech motors in stock, single use and reloads. And they have hybrids too! They stock components, body tubes (LOC, PML, etc), nose cones, couplers, centering rings, shock cord, etc.

Al's offers a 20% discount for cash, 15% for credit (orange tagged items). Show them your NIRA membership card for a 20% discount on white tagged items. Most of the rockets and reloads are in the basement, so you need to ask someone to take you down there to browse. Drop by some time for a visit, but take cash when you do! You'll probably find something

you like or need.

Mail Order: Magnum, Inc

P.O. Box 124
Mechanicsburg, OH 43044
(513) 834-3306

Magnum is one of the best mail order businesses around. They stock just about everything you can imagine for rockets, from kits to motors to components. If you are on the Net, check out Magnum's home page at:

<http://www.magnumrockets.com/>

The Kits



The LOC-Precision Hi-Tech H45. This is a good kit for F/G/H motors and small fields.
Specs: Length 49.75", Diameter 2.63",
Weight 20oz., 38mm motor mount.
Motors: F50-6, G40-7, G80-7, H45-10.



The Binder Designs Excel and Excel Plus. These kits are available with 38mm or 54mm motor mounts, 4" in diameter, and can be flown on F-I motors.

The Hardware



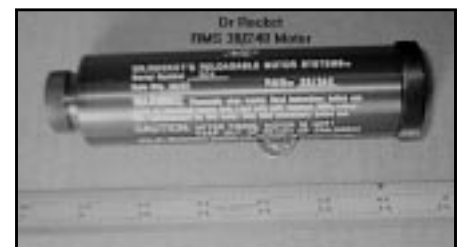
Aerotech 29/180-240 Reloadable Motors



The LOC-Precision EZI-65.
Specs: Length 56.5", Diameter 4.0",
Weight 35oz., 54mm Motor Mount.
Motors: G125-5, I65-7, J100-10



The PML Tethys.
Specs: Length 52.7", Diameter 4.0",
Weight 54.3oz., Motor Mount 54mm.
Motors: H123-7, H65-7, I161-8, I220-11



Dr. Rocket 38/240 Reloadable Motor



Dr. Rocket 54/852 Reloadable Motor

Review - North Coast Rocketry F-62 "Dark Star" Composite Motors by Rick Kramer

A new high performance composite model rocket motor is now on the shelves of your favorite hobby shop. The new F-62-4 and F-62-6 motors were announced at the 1996 RCHTA show and were eagerly awaited until this fall when they appeared on dealers shelves. These motors are 29mm X 90mm and have a thrust ring molded into the back end so you don't have to wrap them with tape. You do need a sharp knife though, to cut open the vent tabs on the flexible end cap prior to launching. North Coast has named their new propellant "Dark Star." Other manufacturers have copyrights on names like "Black Jack" and "Smokey Sam." North Coast probably felt they needed a trendy name to compete. But the idea is the same, the motor leaves a dense black smoke trail as the propellant burns, changing to white smoke as the delay charge burns.



An F62-4 in one of Rick Kramer's rocket at the Harvard launch site. (photo by Ric Gaff)

Looking at the thrust curves printed on the back of the package, these motors develop a whopping eighteen pounds of thrust almost instantaneously after ignition and average fourteen pounds of thrust over the 1.2 second burn time. Maximum liftoff weight is listed as 3.3 pounds which is the maximum weight allowed by FAR Part 101 for model rockets. An added bonus is that North Coast has also developed an ignitor that actually works and packages one "Lazerfire" ignitor with each motor. The ignitors are also sold in packages of six. As of this writing, I have not tried to install a "Lazerfire" ignitor in any other manufacturer's motors. However, as far as I am concerned the "Copperhead is dead."

I purchased several of the F-62-four second delay motors to fly in my heavier LOC-4 and Ultimate Loop models. At the October and November club launches I flew a total of five F-62-4 motors in three of my heaviest models all weighing 2 to 2 1/2 pounds. Before the release of the North Coast motors, I would not even think about flying these with anything less than

an Aerotech G-80. The North Coast F-62 motors launched them all without any problems whatsoever. I am looking forward to flying these large models again with F-62 motors at Greene Valley, our new permanent launch site this flying season.

North Coast Rocketry is also planning to release a "Dark Star" G-70 composite motor in the near future. Unfortunately, the performance numbers for the G-70 motors which are also printed on the back of the F-62 package, show an overall gain of only two pounds of thrust for the G-70 over the F-62 and a few tenths of a second longer burn time and no increase in the maximum lift weight. What this means to me is that the F-62 is the most powerful F class motor on the market, it can lift more weight than most G motors and gives the most bang for the buck. For such a minimal gain the G-70 should not be priced too much higher than the F-62 which is around \$12.99 retail. We will have to wait and see. Hopefully, we will get to test fly these some time during 1998.

THE ONE-PAGE SCALE MODELER: 1/22 SCALE WAC CORPORAL/ TINY TIM BOOSTER by Kevin Wickart

DESIGNER'S NOTES: The WAC Corporal was America's first sounding rocket. Production scale kits notwithstanding, no flights were made without the Tiny Tim booster. The original base color for the WAC was yellow; later rounds were given a base color of white (probably flat).

WAC CORPORAL: The WAC is a pretty conventional assembly. The raceway lines up with one fin, with its rear tip 35mm from the rear of the body. Before painting, check out the Flight Option below. Give the WAC a base color (yellow or white). Paint the nose, rear 44mm of body, and fin under the raceway black. Paint the other two fins silver. Cut stripes shown from black decal material and apply per the drawing.

TINY TIM BOOSTER: Mark the tube for three fins. Cut four 3mm by 44mm strips of peel-and-stick paper to serve as booster fin strap-ons. Apply ONLY the aftmost strip at this point, as it is the only one which goes under the engine hook. Attach the engine hook between fin lines so that the motor will protrude 1/4", and glue the hook in place (except for the lower 1/2"). Wrap the other three strips around the body as shown. **ALIGN ALL WRAP SEAMS WITH ONE OF THE FIN GUIDE LINES.** Cut one 2mm by 133mm strip of peel-and-stick paper and wrap it around the forward end of the booster tube. Attach the fins and paint the entire booster black.

INTERSTAGE: Here's the tricky bit. Wrap enough 1/2" wide masking tape around one end

of the 6mm tube to achieve a snug fit in one of the sections of casing, and glue in place. Form the shroud, coat the inside with thin CA, and paint the outside black. Slide the shroud down the 6mm tube and glue against the casing piece. Drill three 1/16" holes into the shroud/casing assembly, evenly spaced, which go 2mm into the casing. These holes are to anchor the interstage strut dowels. Paint the 6mm tube flat white to reduce visibility. Glue one end of each dowel piece into one of the holes, making sure it is parallel to the tube. Wrap the other end of the 6mm tube with 1/2" wide masking tape to achieve a snug fit in the other casing piece (see the Flight Option below). Drill three holes as before in the other casing piece. Slide the casing in place, seating the dowels in the holes, and glue in place. **CHECK DOWEL ALIGNMENT BEFORE THE GLUE SETS!** Paint the dowels black. Glue the interstage into the booster as shown, making sure the dowels are aligned with the fins. Unless you are using the Flight Option (below) glue the WAC onto the interstage with its fins aligned with those of the booster.

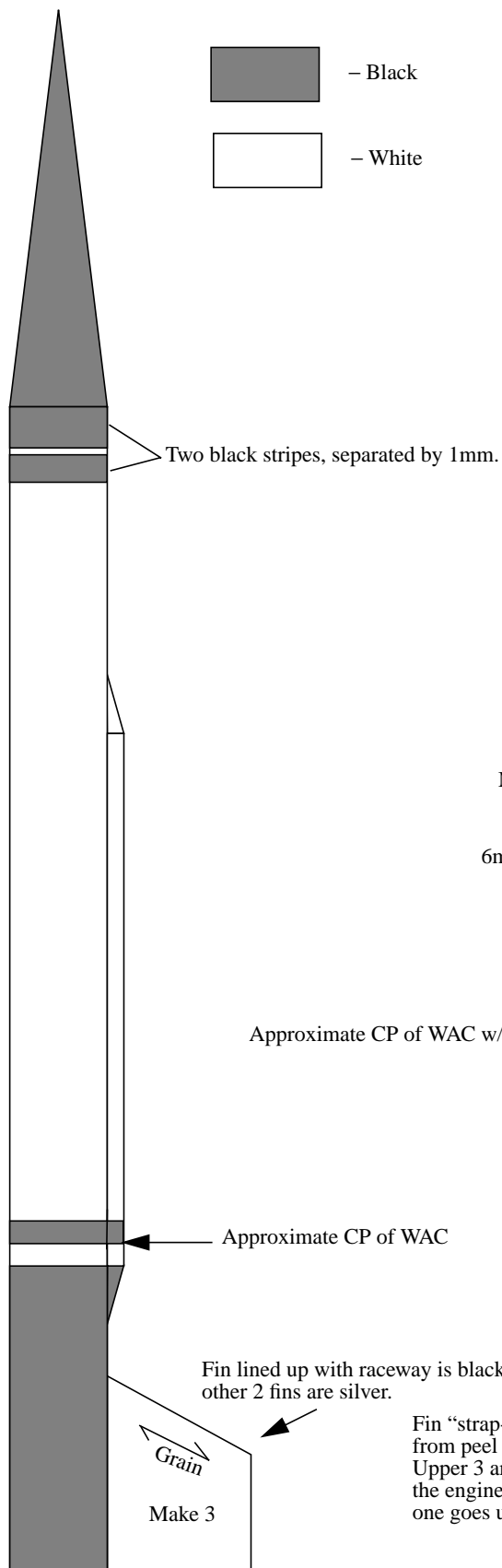
FLIGHT OPTION: Use an entire spent 13mm motor casing in place of the second casing piece. When building the WAC, mount an engine hook flush with the end of the body tube. This way, you can fly the WAC without the booster. Just don't do it in front of Peter Alway.

FLYING: With the model prepped for flight, it must balance forward of the top of the interstage shroud; add nose weight if needed. Fly on any medium-delay 13mm motor. If you are flying the WAC without the booster, I recommend long-delay 1/2A motors only. My BT-20 sized WAC hits over 160 meters on an A motor, so this BT-5 model will likely go out of sight on anything over a 1/2A.



One Page Scale Modeler: WAC Corporal/Tiny Tim Booster @ 1/22 Scale

By Kevin Wickart



Parts List

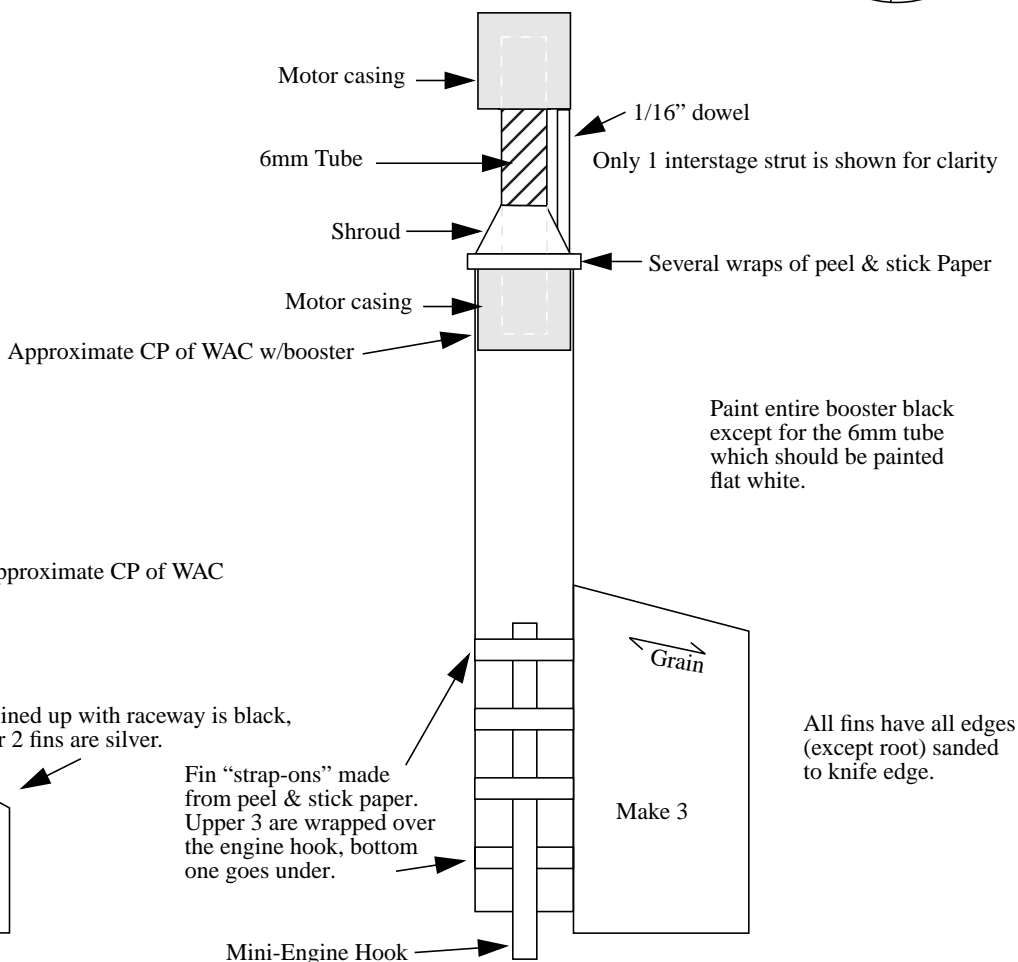
WAC

BNC-5 Nose Cone (as shown, or use stock BT-5 size cone)
 BT-5, 167mm long
 Raceway: 93mm of 3/16" dowel long sanded to half-round, ends tapered as shown
 Streamer or parachute and shock cord
 1/32 balsa fin stock
 Launch lug

Tiny Tim

BT-5, 87mm long
 6mm diameter tube, 42mm long
 Two 1/2" lengths of spent 13mm casing
 Three 23mm lengths of 1/16" dowel
 Bond paper for booster shroud
 Peel & Stick paper
 Engine hook for 13mm motor

Shroud Pattern
 $R1=5.89\text{mm}$
 $R2=13.44\text{mm}$
 $\theta=183.48^\circ$



The Midwest Regional Championships

by Kevin Wickart, with Dan Wolf

Rocketeers from three states convened in Wisconsin on October 11th and 12th to herald the return of the Midwest Regional Championships (MWRC). Sponsor section WOOSH hosted 15 competitors in five official events and one fun event. The breakdown of competitors allowed for divisions A, C and Team to be scored separately (there were no B divisioners attending).

Three of the events--Open Spot Landing, C Helicopter Duration, and B Eggloft Duration--could be flown either day. A Cluster Altitude was flown Saturday afternoon, followed by Sport Scale judging. Sport Scale flights were scheduled for Sunday. Sport launching was allowed both days, and most of the attendees (and their families) took advantage of this.

THE SITE: The venue for the MWRC was the Bong State Recreational Area in southeastern Wisconsin (near Burlington). this is also the site of the annual Eat Cheese Or Fly festivities. The area was idea for the purpose, right on the park's main access road, with adequate parking adjacent to the site. The field was a section of "Wisconsin's largest managed prairie," which meant a vast expanse of knee- to shoulder-high native flora. The prevailing wind gave us a downrange distance of a mile or more. There was certainly plenty of "elbow room," with only the height of the plants to make recovery difficult. Wetlands adjacent to the rangehead and a small pond across the road posed no serious problems over the weekend.

The rangehead was simple but eminently functional: a six-pad arc with one 1/4" rod and one 3/16" rod. RSO Fran Miller kept things rolling in style, with plenty of help from Chris Lyle at the check-in table. There was never any crowding or waiting for a pad.

The weather both days was cool, warming up in the afternoon and with a 100% chance of mosquitoes in the early evening. Winds were light to moderate on Saturday, but the Sunday forecast called for rain (which never materialized) and increasing winds (which did).

THE ATTENDEES: WOOSH members and their families accounted for the majority of those attending: Dan Wolf and family, Mark Smeiska, Kurt Schachner, Steve Koszuta, Dave Lyle and family, Mike VandeBunt, Alan Rognlie, and Dave Miller (in his first-ever competition!) NIRA's Kevin Wickart and family drove up from central Illinois. Fellow NIRA members Ric Gaff and Pierre Miller came in from the Chicago area for Saturday, but returned to the City of the Big Shoulders to help shoulder the duties at the Midwest Hobby Show launch on Sunday. The long-haul award winners were a quartet of Launch Crue members--Krista Brown, Lila Schmaker, Chad Ring and David Woebkenberg--who had arrived from as far

away as Evansville, Indiana.

Launch Crue provided both teams for the meet. Team Demolition was comprised of David Woebkenberg and his son Ryan (in absentia). Chad and Krista formed the 2 Launch Crue team.

Division A honors were fought for by Mary Wolf, Aaron Lyle, and Pierre Miller.

OPEN SPOT LANDING: Pick a spot on the ground. Mark it with a stake. Try to drop an object as close to the stake as you can. Simple? Maybe. Now try it with a model rocket. Not so easy, is it? That's Open Spot Landing. Playing horseshoes with rocketry, is what it is, and becoming proficient at it is next to impossible. It's the ultimate show-off event.

It is a testament to the skill of the competitors that out of thirteen flights only one landed beyond the 50-meter limit.

Some of the suspense of the event was lost when, as one of the first OSL flights, Mark Smeiska landed his model just over 4 meters from the target. This feat would remain unbeaten for the weekend.

The two competing A Divisioners made impressive flights, with Aaron Lyle's 7.65 meter drop edging out Mary Wolf at 10.61 meters.

In Division C Steve Koszuta gave Mark a run for the ribbon with a distance of 6.35 meters, and Lila Schmaker joined them in the infield at 10.08 meters. The rest of the flights were over 22 meters, with Al Rognlie clinching 4th place over Mike VandeBunt by less than .67 meters.

The 2 Launch Crue team managed a 15.01 meter distance to win handily over Team Demolition's 28.16 meters.

B EGGLOFT DURATION: For many rocketeers the mention of this, the lowest-power event of egglofting, conjures the image of more shell fragments than an entire season of "M*A*S*H." The MWRC competitors laid this to rest by making a total of 22 flights, with no eggs broken by anything other than recovery system failures. In several of these cases the eggs were still intact after landing on one of the many patches of soft, mossy ground.

Several competitors opted for qualification flights using the Estes Omloid kit, proving the model capable of safely lofting an egg on a B6-2 motor (your actual mileage may vary). The more competitive used "Two-Minute Egg" models, topped by either the traditional plastic Easter egg or by an Apogee egg capsule.

In Division A, Mary Wolf's 8-second Omloid flight was the winner after Pierre Miller suffered two parachute deployment failures with his slim scratchbuilt egglofter.

Division C polarized into competitive vs. qualifying times. The only serious problems



Steve Koszuta prepares his 4th Place B Eggloft model. (photo by R. Gaff)

occurred to Mark Smeiska, whose Two-Minute Egg failed to deploy on two flights. Al Rognlie's Omloid turned in an 8-second flight, and Kurt Schachner's Apogee-capsule-topped Estes Goblin came in at 11 seconds. Kevin Wickart flew a Two-Minute Egg with a 48" mylar parachute, but the canopy failed to open fully on both flights, and the best he could manage was 14 seconds. Steve Koszuta bounced back from a no-deployment DQ to turn in a 26-second flight for 4th place. Veteran high-power rocketeer Dave Miller made his first-ever qualified competition flight of 24 seconds, then bettered it by five seconds to earn a 3rd place ribbon. Dan Wolf took the lead at 38 seconds with his Two-Minute Egg on a 28" chute. Lila Schmaker's 17-second qualifier didn't even come close. But late on Sunday Lila made a second flight which caught a small thermal, staying up for 41 seconds and first place. Dan could have made a second flight, but the rigors of the day sapped his will and any desire to prep a larger parachute.

2 Launch Crue Team bucked a safety DQ and turned in a 29 second flight, with Team Demolition qualifying (and taking second place) with 12 seconds.

C HELICOPTER DURATION: This event began to look more like a sport launch, with 13 of the 22 flights being made with Estes Skywinders.

It was no real surprise, then, that the two-flight totals in Division A were a mere one second apart. Aaron Lyle managed a 21 and 17 pair to edge out Mary Wolf's 18 and 19, 38 seconds to 37.

Division C was fraught with problems. Dave Miller's Rotaroc failed to deploy and streamlined in--twice--and Dave opted for the better part of valor. Lila Schmaker's intended qualifier, a contest-converted Estes Turbo Copter vanished into the sky and was never seen again.



Dave Miller readies one of his ill-fated C Helicopter flights. (photo by R. Gaff)

Her second flight, a Rotaroc, streamlined into the marsh. Dave Lyle, Mark Smeiska, Al Rognlie and Mike VandeBunt flew Skywinder pairs to take 3rd through 6th places with totals between 33 and 40 seconds. Kevin Wickart's single Rotaroc flight of 54 seconds held first place into Sunday. Dan Wolf flew a 36-second Rotaroc flight and recovered it, then put up a Rose-A-Roc which turned in a 61-second duration to put him in first place by 43 seconds before it drifted into the distance. Kevin declined a second flight, preferring to keep his Rotaroc where he could find it.

Team division was decided by a combination of luck and skill. After a sport flight of their HD model drifted 100 meters downrange, 2 Launch Crue expressed some reservations about launching it on a C motor. They decided to go ahead, and with all eyes on the model it drifted out of sight long before it touched ground. Official time: 149 seconds. But with no return and no backup model, it looked as if 2 Launch Crue would have to settle for flight points only. That evening Chad and Krista located what must have been the only remaining Skywinder kit in southern Wisconsin, and built it overnight. They flew it on Sunday for a 13-second returned flight to post an event total of 162 seconds. That same day David Woebkenberg earned a 98 second time with Team Demolition's HD model, which also drifted into oblivion. Resigned to "No Return," Dave trudged into the field to help Chad look for a lost rocket. Miraculously, Chad stumbled across Dave's 'copter, and Team Demolition had their qualified flight.

A CLUSTER ALTITUDE: Due to the inherent difficulty with tracking, altitude events are always dicey--and Cluster Altitude doubly so. It is a tribute to the trackers, Dan Wolf and David Woebkenberg, that the track was lost on only one of the 17 flights. Additionally, only one track failed to close, and that was only by 1/10 of a percent. Dave and Dan are clearly two of

the very best.

Nearly all of the models were of two configurations: (1) a 2-by-2 cluster of BT-5 tubes in a BT-55, and (2) a center core tube with three external motor pods.

Most of the competitors opted for early ejection by using the shorter-delay (but more reliable) A3-4T motors. Computer projections, courtesy of CD Dan Wolf, placed expected altitudes at around 300 meters for an optimum model. The short delays put most of the flights well below this mark, but the results were impressive nonetheless.

Mary Wolf took top honors in Division A with a clean 161 meter flight using a 2 x 2 cluster. Pierre Miller's four-tube parallel cluster would have beaten it with an incredible 237 meters, but for an ejected motor casing.

Spit motors were the bane of C Divisioners, most of whom opted for the more competitive core-and-pod design. The exceptions were Al Rognlie and Dan Wolf. Al took 5th place with a 137 meter flight. Steve Koszuta topped out at 158 meters, and Lila Schmaker hit 178 meters. Dan Wolf added to the string of roughly 20-meter increments with a single 192 meter flight. Dave Lyle was the big winner with an impressive 255 meters. Mark Smeiska, Kurt Schachner, and Mike VandeBunt all suffered ejected motors which caused recovery system failures. Mark's and Kurt's models were ruined; Mike never found his. The most spectacular DQ of the weekend belonged to Kevin Wickart, whose A2-7 micro-motor core with three A3-4T pods was considered a strong contender. He achieved simultaneous ignition on all motors, but apparently the stress of simultaneous ejection on the pods was too much for the model and it came apart in the air. All of the pieces of "The Amazing Destructo-Roc" were recovered, revealing 3 spit motors. Apparently Dan and Dave were tracking the same piece, because the track closed at 118 meters.

2 Launch Crue's model carried two motors aft and two near the nose. They performed a minor miracle by achieving simultaneous ignition on all four. Their model streaked to an incredible 345 meters to not only win the event but also to set the official record for A Cluster Altitude. Team Demolition's 2 x 2 model turned in a respectable 183 meters.

SPORT SCALE: There were no A Division entries in this event, leaving 8 Division C entries and two Team entries covering nine prototypes. Judges Al Rognlie and Pierre Miller toiled into the early evening on Saturday to complete the static judging. Due to inability to return on Sunday, and to a forecast of windy conditions, several modelers were allowed to make their flights on Saturday.

Static scores were very close, with the top five places separated by only 50 points. Clearly, the

flights would decide the event.

Mark Smeiska's nicely-crafted 1/100 Little Joe II made a good, straight flight to qualify at 8th place (but this would change).

Mike VandeBunt modeled a full-scale Winkler HW-1 (as seen in Peter Alway's "Retro Rockets"). Due to the lack of space for a recovery system above the motor, Mike devised a system whereby the ejection charge would blow the forward plug off the motor tube with enough force to pull the recovery system out of one of the "legs." Unfortunately, the model looped under boost and headed for the prairie grass. Ejection occurred just above ground, but the parachute was not fully pulled out--possibly due to interference from the foliage. The entry was not damaged, but was disqualified.

Dave Lyle's nicely-finished Super Loki Dart kit made a flawless flight to end up in 6th place.

Steve Koszuta's entry was an impressive 1/100 Saturn V/Skylab conversion which he had premiered at the Midwest Regional Fun Fly in 1996. In fifth place after static, Steve launched it on a composite E30 motor. The boost was good, but the delay ran way long and the ejection charge did not fire until about a foot off the ground--too late. Steve says the damage can be repaired, but the model was DQ'd for unsafe recovery. Dave Lyle and Mark Smeiska moved up to 5th and 6th places, respectively.

Dan Wolf's 1/45 Centuri Little Joe II and Lila Schmaker's Brazilian Sonda 2 with immaculate markings were all of 5 points apart at 3rd and 4th places. While the Little Joe II flew well on a D12-3, the Sonda made an arrow-straight flight to move Lila up to 3rd place.

Kurt Schachner modeled a finely-detailed Gemini-Titan, featuring computer-printed capsule and shroud detail, crisp paint lines and well-made clear fins. His successful cluster flight clinched 2nd place.

Kevin Wickart's meter-tall 1/8 Astrobee 500 held the top spot with a hand-turned nose and paper-clad basswood fins. Because of its mass and three-stage gap staging, the decision to fly it on the windy Sunday was difficult to make. Flown on a D12-0/B6-0/A8-5 combination, it staged flawlessly but weathercocked quite a bit. The second stage had to be recovered (by the modeler) from thirty feet up a nearby aspen tree. Despite some slight tree-generated damage, the Astrobee clinched first place.

Team Demolition entered a D-Region Tomahawk, which screamed to high altitude in a beautiful flight. But it was unable to scream past 2 Launch Crue's Russian M100-B, which also made a great flight. In spite of a broken nose probe from a rough landing, the Crue held on to first place.

THE APRES-LAUNCH: With the wind growing ever stronger, the range was picked up and

the rocketeers headed to Shoney's in Kenosha. While the rest of us crunched appetizers and buffet offerings, Dan Wolf crunched numbers to provide the official results.

Dan eventually got to finish dinner, after which he announced the standings. Ribbons were awarded and dinner checks were paid, but not before a birthday tribute was paid to Fran Miller by the Shoney's staff. Then everyone headed homeward to contemplate the weekend's triumphs and tribulations. And to start on rockets for the NEXT competition.

Confused Stages, Stage 5 by Jonathan Charbonneau

In this stage of my series, I'm going to describe the three types of active electronic devices that are used in free flight sport rockets. These devices are the mercury switch, the timer, and the altimeter. They are called active electronic devices because they control critical flight functions of the rocket. A failure in one of these devices can easily be as bad or worse than a cat. An electronic device that is just along for the ride, e.g. a system of LED's, is a passive electronic device.

The first of the active electronic devices is the mercury switch. Bob Wiersbe used one in his Nike Apache. The device is designed to sense the negative g force that occur just after burnout of the booster and ignite the 2nd stage engine at that time. How it works: During the booster burn, the rocket is undergoing positive g's. The pellet of mercury inside the glass envelope of the switch sits on the bottom, leaving the switch open. When the booster burns out, the g force on the rocket becomes negative by more than one g, but the g force on the pellet of mercury goes only one g in the negative direction, since air drag acts only on the rocket and the mercury pellet is inside the rocket but not secured to the bottom of its enclosure. Result; rocket decelerates faster than the mercury pellet, so mercury pellet moves forward under its own inertia (Newton's 1st law) and touches the 2 wires on the top and closes the circuit, allowing current to flow through the 2nd stage igniter, which in turn ignites the 2nd stage engine.

The mercury switch is a simple device. Anyone who is familiar with the launch control circuit can build his own mercury switch airstarter. It is beyond the scope of this article to give detailed info on how to build this device. Bob Wiersbe, Kevin McKiou, and I, myself can help you if you're interested in building one. The drawback of the mercury switch is the fact that it is dependent on the rocket having enough drag to trip it. At MRFF-93, I flew a Nike-Aerobee Hi on a D12-3, D12- 7 combo with a mercury switch. It turned out the D12-3 wasn't strong enough to trip it at burnout, so the Aerobee Hi fired horizontally and crashed.



The second device is the timer. This device is designed to sense the rocket's first motion and send out a current to an igniter or ejection charge after counting down a set number of seconds from first motion. This device can be used to airstart a second stage after counting down the burnout of the booster or it can be used to deploy the recovery device after counting down the time from lift off to apogee. Advantage of timer: In staging, you can have the timer ignite the second stage exactly when you want it to. You can even take into account the time lapse between 2nd stage ignition and the moment it actually starts thrusting, thereby reducing the period of non thrust between booster burnout and upper stage ignition. When used for recovery system deployment, you can get a delay that's not available for the engine chosen, e.g. 2 sec. with a G80 or 5 sec. with a G12. Drawbacks are the delay must be set before flight and prepping is more complicated.

The last device is the altimeter. The altimeter is designed to take air pressure readings at regular intervals and compares each one with the previous one to determine when apogee has been reached. When it has determined that apogee has been reached, (which is when it takes an air pressure reading that's not lower than the previous one) it sends a current to an ejection charge to deploy the recovery system. Some altimeters have a second output for deployment of the main parachute at a lower altitude (250' to 500') after deploying a drogue at apogee. With an altimeter, you never have to worry about having the right delay, since the altimeter will do that for you. However, the altimeter cannot be used to airstart any engines. For that, one of the other two devices is needed.

Summary: Mercury switches can be used for staging if the booster is draggy enough. Timers can be used for staging or for recovery system deployment. However, for recovery system deployment, an altimeter is the device of choice.

Superman's words of the wise.

- 1) Carefully read all instructions and become familiar with them before installing or operating any active electronic device.
- 2) Know the capabilities and limitations of the device.
- 3) Seek help from somebody with experience if you have questions or in doubt.
- 4) Always follow the NAR rocketry safety code.

Small Parts Inc. Catalog #18 by Rick Gaff

Ooooh tools! Gadgets! Gizmos! Thingamabobs and wizmos! I'm always on the look out for non rocket companies that can be a new source for useful tools and interesting parts for our hobby. The most recent such "discovery" is a company in Florida called 'Small Parts Inc', what an appropriate name for a company we might be interested in!

Someone had posted a message on RMR¹ concerning this company so I had to check it out. I have not had time to fully check out their web site but requesting a free catalog was real easy, so I did. The catalog arrived less than a week later and was not disappointing, the 400 page catalog is chock full of ... well, neat stuff!

Tubing, rods, sheets, balls is a wide variety of sizes and materials - stainless steel, brass, copper, teflon, delrin to name just a few. Stainless steel cable of the type often used for high power rockets from .024" to 1/4" diameter. An 1/8" stainless steel rod 36" long is \$2.94, not to bad a price for a launch rod that is almost corrosion free (unfortunately while they have diameters up to 1" the longest length is 36").

How about some Titanium? Rounds, squares, sheets and a variety of nuts, screws and washers. Tools, containers, gears, pulleys, etc. there is all kinds of stuff packed into this catalog and while it is primarily geared towards machine shop / model shop / mechanical work, this is still a worth while company to check out. You just never know when some tool or small part you didn't know existed may come in handy.

The catalog price of **Free** is just right and available from

Small Parts Inc.
13980 N.W. 58th Ct
P.O. Box 4650
Miami Lakes, FL 33014-0650
Email: smlparts@smallparts.com

or their Web site at www.smallparts.com

¹Internet newsgroup Rec. Models. Rockets

Heard on the Street (with apologies to the Wall Street Journal)

What's In a Name - Jeff Pleimling found some more organizations "stealing" our club's initials on the Web:

National Import Racing Association

National Intercollegiate Rodeo Association (NIRA) Ozark Region

NIRA AUTOMOTIVE AB

Welcome to the Club! - Jeff Bezaire, Ken DiGiulio, Mike Hellmund, Kathy Jarman, Mark Kotlick, Mark Kotolski, and John Mindelli have joined NIRA in recent months. Welcome!

Electronically Connected? - Send an email message to Bob Wiersbe (wiersbe@lucent.com) to be added to the NIRA member email list. Also, check out these web sites:

NIRA Home Page - http://ourworld.com-puserve.com/homepages/Mark_Bundick/

NAR Home Page - <http://www.nar.org/>

Rocketry OnLine, the ultimate rocketry related web site - <http://www.rocketryonline.com>

New NIRA Reprint Series Booklets by Richard Gaff

Six new booklets have been added to the reprint series this issue bringing the count to 47 available booklets.

Available after the November NIRA meeting:

Thiokol Rocket Basics. File downloaded from the Thiokol Corp. web site present a brief history of rockets and a long description of how a rocket functions. 27 pages

Ancient Rocket plans of Estes Industries from the 60's, 70's & 80's Vol. 4. Orbital Transport Laboratory, 2 versions of the lookdown Astrocam, Gigantiroc 2-A and the Saturnian.

Technical articles from Sport Rocketry, Vol.2 Dynamic Stability, Wind effects on MR flight, 3

articles on delayed staging, and 6 other technical articles.

Available after the December NIRA meeting:

Ancient Rocket plans of Estes Industries from the 60's, 70's & 80's Vol. 5. Tartar, Argus II, Nimbus, Newfoundland Space Tanker, Harpoon, The Lizard B/G.

Phantoms of space - The Secret Dead Russian Cosmonauts by James Oberg. A long article from the internet about the myth of secret dead cosmonauts written by one of the foremost authorities on the Soviet space program.

Frequently asked questions Mini Reprints:

FAQ #6) Model rocket Construction and finishing

FAQ mini reprints are excerpted from the internet newsgroup Rec.Models.Rockets:

NIRA's Scale Data reprint service:

Scale data published in Model Rocketry Magazine and Sport Rocketry magazine is now available from the NIRA reprint service. Data for over 30 rockets is available including the incredible Beach-Gassaway Little Joe II data. Just ask for a scale data reprint request form.

The Reprint editor recommends:

2) Science Fiction Rocket Plans from Sport Rocketry. Artoo-Detoo, X-Wing Fighter, mini Mars Lander and four other plans with a futuristic flavor.

16) Technical articles from American Space-modeling et. al. Vol.1 Articles about design efficiency, elliptical fins, boat-tailing, CP

calculations and 7 others. Most of these articles are concerned with building more efficient rockets.

18) High Power Rocketry - An Introduction. Nine articles from Sport Rocketry on High Power Rocketry. Includes plan for HPR model

The reprint series is an effort to get interesting useful information out of the collections of "old timers" and into the hands of people who don't have access to the original material.

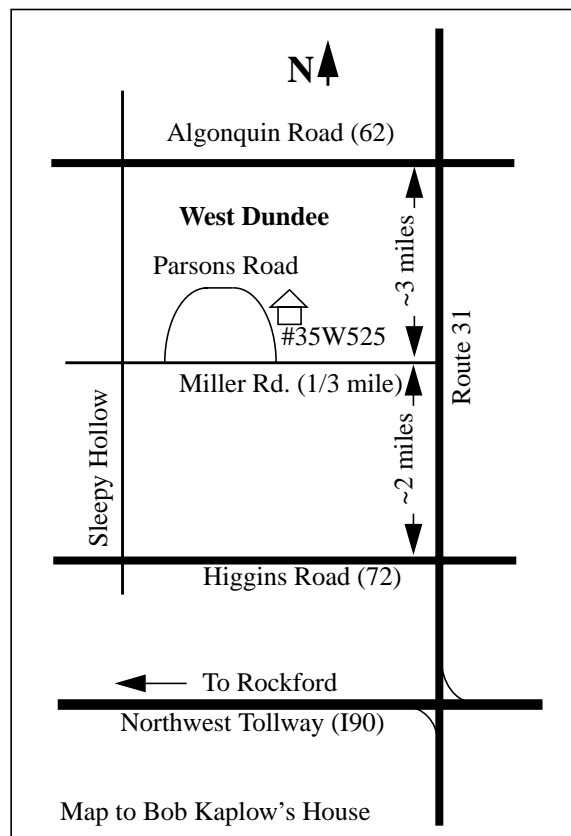
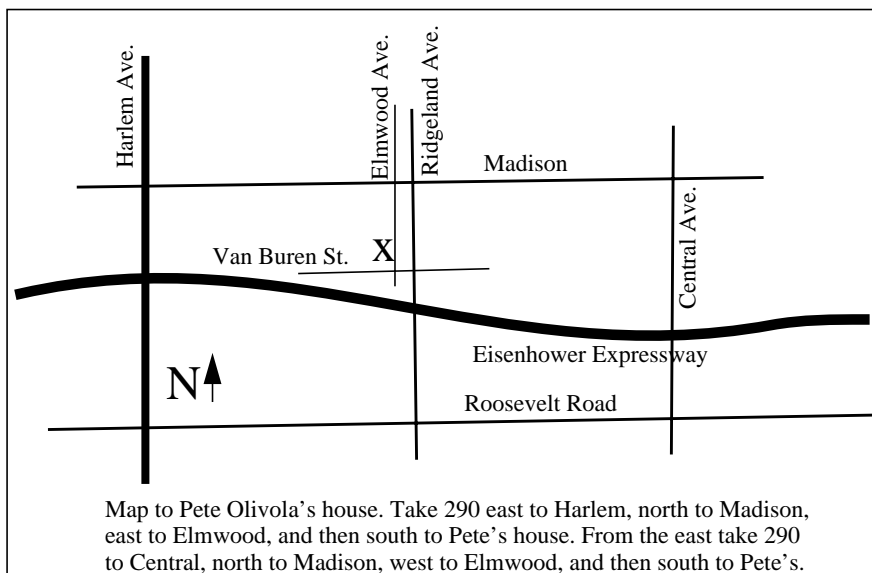
Sources for the reprint series include back issues of Model Rocketeer, American Sportmodeling, Sport Rocketry, Model Rocketry Mag. main stream magazines, rocket manufacturers and the Internet's Usenet rocket group Rec.Models.Rockets (R.M.R) just to name a few.

Reprint booklets are FREE to members at club functions. If you want them by mail simply send 52 cents in stamps or cash for EACH booklet you order. Or a large 9x12 self addressed stamped envelope (the SASE can be used for several at once, be sure to include the proper postage) to;

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A complete up to date list is also available in person, by mail or email.





Troublemakers on the Titanic