THE TRAILING EDGE

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

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March-April Fools 1997

From the Editors Desk
by Bob Wiersbe

The April launch has been moved from the 20th to the 27th, and will be held at a sod farm in Harvard, IL. **PLEASE CALL THE NIRA HOTLINE FOR LAST MINUTE INFORMATION ABOUT THE APRIL LAUNCH!** The number is (630) 690-6353. The launch will run from 10am to 5pm, so bring out the rockets! This site is perfect for model rockets, but won't support any High Power stuff. Ken Hutchinson sent me these directions:

Use your favorite route to get to US highway 14 and turn west on 14. If you are coming from the western or southern suburbs three good choices would be to go north on I355/IL53 or IL59 or IL47 which intersect with US14 in Palatine, Barrington, and Woodstock respectively. Once you are heading west on 14 you need to go to and through Harvard which is only a few miles south of the Wisconsin border. As you continue on 14 beyond Harvard you will pass the large Motorola factory on your right. Once you pass the factory start looking for Yates Road on your left, it will be at least a mile maybe as much as two or three past the factory. Turn left (west) on Yates and continue to its end, a tee intersection with another road. Turn left (south) on this road follow it around a 90 degree bend to the right and the sod farm will be on the right about a quarter mile past the bend. Bob Kaplow highly recommends you allow some time in your schedule to shop at the Fleet Farm store in Woodstock. It is on the SW corner of 14 and 47. They have a good selection of tools and hardware at pretty good prices.

We still don't have a launch site lined up for the rest of this year. It's not that people haven't been trying to find one, they have, but nothing has opened up yet. We all owe Cheri Chaney a big "Thank You!" for making dozens of phone calls trying to find us a field, and thanks to all of you who have been following up on leads.

What can you do to help? Keep your eyes open for a site! We know that Glen Ellyn, Wheaton, Lisle, Downers Grove, and the Forest Preserve won't let us use their parks, so we need to get creative. The site doesn't have to been in the western suburbs either! Die hard NIRA members will drive almost anywhere for a launch, so even if you think the site might be too far, pass it along to Cheri Chaney at (630) 462-0260.

A committee has been working very hard on a presentation to the powers that be at the DuPage County Forest Preserve to gain access to Green Valley as a permanent home for NIRA launches. There is no guarantee that we will ever be able to use this site, so the search for a new home must go on.

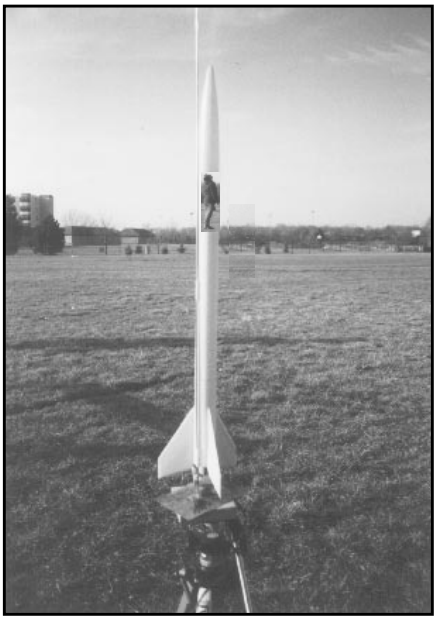
The bright spot in all of this is that we have secured a field for MRFF!! For those of you who are new to the club (and there are many of you!), MRFF stands for the Midwest Regional Fun Fly. It's a two day sport launch that we host over Father's Day weekend in June. People come from all over the Midwest just to launch rockets, swap stories, eat some food, win some prizes, and have fun! Last year over 100 people attended MRFF, and we launched close to 950 rockets.

You won't want to miss this launch! We expect to get a waiver to 5000 feet, vendors will be able to sell on the site (we couldn't do this in the Forest Preserve), and a meeting room is available on site too! There will even be bunk rooms (8 beds per room, and 8 rooms available) and camping on site! The only down side is that we may not be able to fly any High Power rockets due to a residence on the site (this is still being investigated). Hey, we've had MRFF's without HPR before, and had a blast! Don't let that stop you from coming!

This is where I make my monthly plea for newsletter material. SEND ME STUFF! It doesn't have to be on a disk, all I need is to be able to read it. So the next time you build a new kit (hint, hint) take notes about your experience and do a brief write up about it. Going to a launch? Take along a camera and snap some pictures! Then you'll have something to jog your memory to do a Launch Report. Got an idea? Pass it along! My address is on the back page, and email address is on page 2.

Inside this issue: Plans for the IFO!

Hot New Rumors!
Kit Reviews!
Interview with the Nibbler - The Trailing Edge talks with NAR President Mark Bundick
New Evidence from the Jerry Irvine Trial!



Sneak Preview: The Trailing Edge obtained this poster for the new movie "Honey, I shrunk the obnoxious neighbor and stuffed him in the payload of my rocket", starring Dennis Rodman as the neighbor.

T MINUS 1 - NIRA'S CALENDAR OF UPCOMING EVENTS

1997 CLUB LAUNCH DATES

Launches are BYOL (bring your own launcher). The location for our 1997 launches is unknown at this time. If you have questions prior to any launch, call the NIRA hotline at (630) 690-6353 and leave a message, I will call you back.

April 27 - Regular Club launch, Havard, Illinois, 10am-5pm. Please call (630) 690-6353 for a recorded message about the launch (it may be cancelled due to rain/mud).

May 18 - Regular Club Launch, call.

June 14 & 15 - Midwest Regional Fun Fly! More details to come.

July 20, August 17, September 21, October 19, November 16 - Regular Club Launches.

STAFF

Bob Wiersbe - Fooled into Editing this newsletter
Ric Gaff - Just Fooling Around
Frank Zappa - Dancing Fool
The Beatles - Fool on the Hill

CONTRIBUTORS

Mark Bundick, Ric Gaff, Joe Nowak,
Mark Soppet, Tim Van Milligan, Bob Wiersbe,
Gary Larson, Lenny the Wonder Llama

Unclassified Ads

For Sale - Complete line of Enertek rockets and motors. All in original packaging, 2 of each kit. Serious inquiries only. Meet at corner of Roosevelt Road and North Avenue in Glen Ellyn, 9pm. Come alone.

Model of the Month Winners

Well, we finally got some photos! Better late than never!
January - Pierre Miller won in Youth with his Alarm (a Launch Pad kit), and Ric Gaff won in Adult with his scratch built Nike-Hercules (from a Launch Pad plan).
February - Ric Gaff was the winner in Adult with his Nordic Rocketry Warhorse AGM, and Matthew Duckworth won in Youth with his Vaughn Brothers Stretch Blobbo.
Congratulations!

MONTHLY MEETINGS

All meetings start at 7:30 PM, and include refreshments, 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 Bob Wiersbe at (630) 690-5442 if you can help with ideas or can speak yourself.

Currently schedule meeting dates are: February 7, March 7, April 4, May 2, June 6, July ??, August 1, September 5, October 3, November 7, December 5.

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 r.e.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. Thanks to a public outcry and a grant from the Comic Relief Foundation, this section has returned! I also want to thank Mark Bundick and Bob Kaplow for expressing concern when I announced it would be cut from the newsletter. Without support like this I wouldn't be able to continue editing this newsletter.

Other Items of Interest

March 21 - 23 NARCON-97, NAR annual convention at Springer Recreation Center, Champaign, IL. For more information contact Jonathan Sivier at (217) 359-8225.

March 28-30 Danville Dare in Danville, IL

April 19 - High Power rocket launch at Bong Rec. Area, Burlington, Wisconsin. Contact Dave Sutton (414) 886-6017.

April 26 - High power rocket launch at Rantoul Aviation Center, 10 AM. For questions call Greg Smith at (217) 352-9655, or (217) 840-1678 at the launch site on launch days

May 17, 18 - Sport Launch at the AMA National Aeromodeling site in Muncie, Indiana.

May 24 - High power rocket launch at Rantoul Aviation Center, 10 AM. For questions call Greg Smith at (217) 352-9655, or (217) 840-1678 at the launch site on launch days

May 31 - High Power launch at Bong Rec. Area, Burlington, Wisconsin. Contact Dave Sutton (414) 886-6017.

Jun 21-22 - High Power launch at Bong Rec. Area, Burlington, Wisconsin. Contact Dave Sutton (414) 886-6017.

NIRA Quotes of the Month

January: "The fact that these people are welcoming us with open arms is beyond my comprehension" - Pete Olivola, while discussing the Yorkville site for MRFF.]

February: "Is it just me, or are the stories better than the models?" - Ken Hutchinson, during Model of the Month voting.

Kit Review
Boyce Aerospace Hobbies
1/17.5 Mercury Redstone
by Joe Nowak

A rocketry magazine ad for a 4" diameter sport scale Mercury Redstone caught my eye several months ago. It was back in 1973 when I built my first solid propellant rocket, a 1.6" diameter Mercury Redstone Estes kit. I was in high school at the time and my modeling skills were rather primitive especially when it came to working on a skill level 5 kit. The finished rocket was painted with a brush and the escape tower was pretty crooked, but I was happy with it since my main interest was in flying the thing. Although the escape tower lasted only a few flights, the rocket minus escape tower survived numerous flights and thus began the adolescent phase of my interest in model rocketry.

For this reason, it didn't take much to convince myself to drop $100 on the Boyce large scale kit. I sent a check to Boyce Aerospace Hobbies and waited anxiously for my kit to arrive in the mail. After more than two weeks passed, I started to get concerned. Boyce Aerospace Hobbies called shortly thereafter and apologized for the delay in shipment. They were out of 4" body tubes and expected a shipment of tubes to arrive in a few days. A little over a week later, I received another call stating that the 4" body tubes finally arrived and my rocket would be sent in a few days. I was frustrated by the delays, but I appreciated the courtesy Boyce exhibited by calling to inform me of the situation. Note that other purchases made later from Boyce were received promptly.

The completed 1/17.5 sport scale Mercury Redstone kit is 58" tall and weighs 3 lb. 4 oz. minus the motor. The most eye catching part of the rocket is probably the escape tower and Mercury capsule. Rivet and corrugation details appear on the resin cast capsule which is quite heavy (17.1 oz. with the escape tower). This weight should allow for a stable flight. The escape tower is made out of hardwood dowels, resin cast nozzles, plastic disks, a paper tube, and a plastic aerospike. A jig is provided to help construct a "true" escape tower. Half of the 16 page instruction manual is dedicated to the tower. Although it was not extremely difficult to build, it took quite a long time to complete. Dowels had to be individually cut and sanded at various angles to fit properly. Overall, 40% of the total construction time was spent on the escape tower, but the results are well worth it.

Next to the construction of the escape tower, the shaping of the fins took the most time to complete. The 4 fins provided are precut and made of 3 ply white plastic. The middle ply is the thickest and makes up the entire fin blank. The thinner outer plies cover about half of the fin's surface to produce a fin of dual thickness. The fins are shaped to create four flat edges (making two V shaped cross sections per fin at the leading edges). Care was required because the edged surfaces meet at one point on each side of the fin. A slip up produces a nice gouge in the other surface since each edge is on a different plane. The white plastic used here is different than the type of plastic that Aerotech uses for fins on rocket kits like the Mirage and others. The Boyce plastic fin material is a lower density and has working properties similar to oak. I tried using a Dremel tool to shape the fin, but I could not control it enough to produce the two V shaped cross sections with reasonable accuracy. A wood file was used to rough in the edges. This was followed by sanding in the "V" with 100 grit paper using a sanding T. Finishing was accomplished using a fine grit paper and a sanding T.

Two sections of 4" body tubes are provided. A short section is used as a fin canister. Slots had to be cut in this section to accept the fin tabs. Fins were epoxied to the rocket at three points: 1) the outer surface of the body tube and the root edge of the fin's outer plies, 2) the top edge of the fin tab and interior centering ring, and 3) bottom section fin edge to the bottom centering ring. The back edge of the fin tab does not come in contact with the motor tube.

The rocket kit is available with either a single 29 mm or a single 38 mm motor tube. I opted for the 29 mm version to be used with G40-4, G80-7 or H90-M motors. The recovery of the rocket is via two well constructed bright pink 36" parachutes. The Mercury capsule and escape tower use one parachute and the remainder of the rocket uses the other. The capsule connection to the parachute and shock cord is from the outer side of the capsule using a very thin kevlar cord. A small hole is pre-drilled through the capsule to allow passage of the cord were it is epoxied to the inside of the capsule after tying the end of the cord to a wooden dowel. On the finished rocket, the cord is exposed from the hole in the capsule until it enters the body tube. Since the kevlar cord is yellow and the capsule is black, an indelible marker was used to color the cord black so that it cannot readily be seen. My initial concern with this method of connecting the parachute to the capsule being unsightly proved to be unfounded. The instructions advised that the rocket could be flown with the escape tower on or off. I opted to fly it with the escape tower epoxied in place since the tower makes up a large percentage of the rocket's overall height and flying without would be sacrilege. The atypical parachute connection to the capsule means that the escape tower would not be the first thing to hit the ground when landing and the odds of it surviving a landing are greatly improved.

Painting the rocket involved spraying it with a primer, Krylon semi-flat black, red and semi-gloss white. The fin color pattern was painted on and required a laborious masking job to complete. Fortunately, the roll pattern at the top of the rocket body was created by a very large decal. Decals also made up the "UNITED STATES" lettering that appears on the capsule and both sides of the rocket body. Other decals include a black outline of a square box containing the characters "MR 7" which are placed above each fin and a thin black stripe which appears on the middle of the body tube. The decals are made of self-adhesive vinyl. I was concerned with the decal application due to their size and my inexperience with this type of decal.

To attach them, a bottom covering is peeled away to expose an adhesive surface. The decal is then pressed down in place and rubbed onto the rocket. A top film layer covering is then peeled away to complete the application. What remains on the rocket is only the material intended to be seen. For instance, with the lettering, only vinyl material making up each letter is on the rocket. No transparent vinyl material appears between the lettering as would be the case with traditional decals or rub-ons. Overall, I was very pleased with the completed appearance of these decals. However, I would recommend taking time to plan out the application, being especially careful to line up the large decals like the roll pattern and the 20" strips of lettering. The decals can be moved if they are not pressed down too hard but why ask for trouble.

The kit that I received was not perfect - nothing

ever really is. Since I'm not happy unless I get to complain about something, the following imperfections were noted in the kit that I received:

1. The 4" body tube section which makes up the bottom of the rocket containing the fins was several inches too long. This tube had to be cut down to agree with the fin slot cutout plans.

2. The resin cast Mercury capsule had numerous (hundreds?) small dimples on the surface, incomplete or disfigured rivets, flashing in the corrugation valleys, and other small imperfections which are probably a normal result of the molding process used to make the capsule. In a few of the more noticeable areas, plastic filler was used to fill in the dimples and needle files were used to remove some of the excess material in the corrugation valleys but I was not close to correcting all of the little imperfections. After spending an evening of tedious work on the capsule, with the feeling I was getting nowhere, I decided to just paint the thing and get it over with. After completing the paint job with semi-flat black paint, all of the imperfections were hardly noticeable at close range and from more than three feet back, the capsule looked great.

3. Two of the three centering rings (made out of the same white plastic material as the fins) were not cut very accurately. They were noticeably out of round and required some heavy sanding to fit inside the 4" body tube and accept the 29 mm engine tube.

4. The proportions of the characters making up the decal lettering were not always consistent. The "D" in UNITED and the "A" in STATES are noticeably too wide. The proportions of some of the other lettering is off in width as well. Photographs of one of the actual Mercury Redstone rockets show lettering of equal proportions so apparently the decal's inconsistent proportioned lettering has nothing to do with scale reproduction. This criticism may seem picky, but it should be something that is easy to correct by the supplier. A few people have already commented to me about this lettering inconsistency after seeing the rocket.

5. The resin cast escape tower nozzles supplied were made of two pieces glued together. These required quite a bit of sanding to get them looking good. One of the nozzles required plastic filler to get it into the proper shape.

6. The motor bands supplied to add detail to the escape tower motor were precut about three times too wide compared to the drawing in the instruction manual and the photographs of the completed model. No dimensions were defined for the motor bands in any documentation provided so I just cut the bands to appear like in the photograph of the model.

7. On two of the four fins supplied, the outer plies were cut slightly different than the middle ply (or perhaps the middle ply was cut wrong). In any case, these two fins required further doctoring after shaping in the two "V" cross sections.

In spite of what you might think after the list of imperfections, I recommend the kit to anyone interested in big sport-scale model rocketry. The guy who prefers launching big rockets over building them may get frustrated by the amount of time it takes to complete this project. Anyone who has experience building some of the Estes scale kits should have no problem with this one. The imperfections noted were all relatively minor and with a little more "attention to detail" by Boyce Aerospace Hobbies, this kit would be a great one.

For those interested in this kit or any of their other kits should call Boyce Aerospace Hobbies at 619-277-6385

E-mail: a.boyce@ix.netcom.com

Web site:

http://ideations.com/
Boyce_Aerospace_Hobbies

Address:
Boyce Aerospace Hobbies
3430 Old Meadow Road
San Diego, CA 92111

Kit Review - New Estes E2X Rockets
by Mark Soppet

Here are three new E2X rockets by Estes: The Flash, Banshee, and X-Ray. The Flash is a typical E2X rocket with BT-50, 3 fins, a nose cone, and lots of plastic parts. The point where the parachute ejects is halfway up this 21 inch rocket. The large payload section is supposed to flash in the sky.

The Banshee is similar to the Flash, but with a shorter tube and different fins. Just make sure not to run plastic model glue down the engine tube.

The X-Ray is the same length as the original X-Ray, but the tubes sizes are one caliber smaller to make use of some Gnome parts. It would make a great punishment vehicle for insect invaders in your home.

I would recommend these rockets to anyone who wants an easy rocket to build for their first flight.

Rocket Origami
Using Paper in Unusual Ways to Make Unusual Rockets
By Tim Van Milligan

Paper is truly a wonderful building material for model rockets. Did you ever really sit down and think about its characteristics? It is light weight, strong, accepts almost any type of glue, can be easily painted, and is both bio-degradable and recyclable. When used in the construction of a rocket, it is one of the safest materials to use, because if it hits something, it crumples in on itself without shattering. This is the best way to rid the kinetic energy of rocket with the least amount of damage.

The variety of paper types is immense; as defined by its construction and material components. For example, think of all the different types of paper products: tissue paper, wax paper, newsprint, crepe paper, cotton rag paper, bond paper, light cardstock, heavy cardstock, corrugated cardboard, Bristol Board, and molded paper products; to name just a few. And papers comes in even larger assortments of weights, colors, textures, and finish coatings. For component materials, paper can be made from a wide variety of organic materials: wood pulp, cotton fibers, and the latest craze; hemp fibers.

The natural fiber paper products retain many of the wood-like qualities. They can be cut, glued, sanded, painted, and shaped with the same type of wood working tools. Another "wood-like" quality is that most papers have a grain direction. To see this for yourself, take a piece of newspaper and tear it. You'll see that if you tear it one way, you get a fairly straight line, but the other direction, it is very jagged. This makes it stronger in one direction than the other; and you can use this to your advantage. You can also see that the grain direction will make a difference in the sharpness of a fold. If you fold perpendicular to the grain direction, the crease isn't as sharp, and may try to straighten itself out.

And if the natural fiber-based paper products are not enough, there is even synthetic varieties that have other characteristics. Think of Tyvek (a polyester based paper) which doesn't tear at all, spun woven nylon (like a Bounce fabric sheet) which makes a great hinge material because the fibers stay springy, and even Nomex paper that doesn't burn. Paper is also used in combinations with other materials too: I can think of "Foam Core" products which are really strong and can be used to make fins and even glider wings.

But this article is about the wood based products, because they can be more easily used by average modelers. The characteristic that I like about paper is that you can shape it in a variety of ways. The best and most obvious example for rocketry is that it is easily rolled into body tubes. You can also "roll" it to make conical nose cones and transition sections.

There is one type of paper is better suited to rolled cones and transitions. It is called Bristol Board. You can find Bristol Board in varying thicknesses at the better artist supply stores. What makes it unique is that it is made up of two or more layers of paper where the grain of individual layers is placed perpendicular to each other. What this does is to make it strong in nearly all directions, and it doesn't crease as eas-

ily. So for rolled conic sections, like nose cones and transitions, it yields a "better looking" part which is actually stronger for the same weight as other types of papers.

Flat sheets, or panels of paper, can also be used as fins on the rocket. The easiest way to do this is to use thick cardstock. A lot of small rockets (1/4A through B) use paper fins in this manner. A nice feature of paper fins is that they do not chip apart from hard landings. If a paper fin is bent, it can easily be repaired by wicking water-thin CyA glue on the crease to increase its stiffness and strength. But since the grain of paper isn't as strong as the grain of wood for the same weight, for larger rockets, you typically use wood fins.

But to make these wood fins even stronger, you can add a layer of paper to both sides! Tissue paper applied with aircraft dope works well and adds very little weight. And at the same time, it makes the surface smooth and can be used to colorize the rocket. For a stronger fin, I like to use ordinary bond paper applied with wood glue. You need to coat both the wood and the paper with glue to assure that no air bubbles get trapped under the paper; and you need to do both sides at the same time to lessen the warpage of the wood.

But fairly strong paper fins can be made using the built-up method too. This is where two skins of paper are separated by structural spar. This method is particularly useful in making "scale" fins - like on a Nike rocket. The fact that you can get a sharp crease on the high point and both the leading and trailing edges makes it easier to construct than sanding a solid balsa wood fin. And sometimes, you don't even need a structural spar inside the built-up fin to give it strength. I submitted an "all paper" fin model rocket design to many newsletters around the country. You may have seen it and even built one yourself.

Creating a cone or a transition section from paper is pretty easy. The simple equations to begin the construction process are found in either the book "Model Rocket Design and Construction," or "The Handbook of Model Rocketry." Or if you prefer, many of the rocketry software programs now have a feature to generate patterns from dimensions you input. Once the pattern is transferred to Bristol Board, you can begin to cut it out using a hobby knife.

Curling the piece would be the next step in the assembly sequence. You can do it over the edge of a table; although this must be done carefully to get the curl in the correct direction. The method is similar to making curly ribbons for wrapping presents; pull down hard, and fast. The fibers will stretch slightly giving the desired curl.

But I prefer to carefully wrap it around the handle of a hobby knife. It is more forgiving of errors. For tight curls, like on the point of a cone, I use a 1/8 diameter wood dowel as a curling tool.

If you are making a pointy cone, it might be better to make two separate cones, one out of light -weight bond a paper, which is easier to curl, and will yield a sharper point; the second you could construct out of a heavier weight index cardstock. This second cone is glued inside the lightweight cone to give strength to the piece.

Gluing the edges of the cone or shroud together should always be done with wood or white glue. It allows you to reposition the edges to get the correct fit before the glue dries. It is also flexible, and can be curled itself; unlike CyA glue which is brittle. Depending on the type of paper used, I sometimes like to come back and saturate the paper fibers with water-thin CyA glue. This adds incredible strength and seals the fibers so they can be sanded down very smooth. Coated papers, such as those with a glossy finish, don't seal well with CyA, and therefore don't need to be sanded down later. Usually one side is uncoated and has a dull finish; this is the side you'd apply the CyA into to add strength. This dull side should also be oriented to the inside of the piece.

The overlap used to aid gluing, is often an eyesore, particularly on "scale" models. To get rid of the seam, you have two options. First, on large diameter cones, you can press down on the "inside" of the seam with a fingernail. This can stretch the fibers and crease the paper so that the overlap is less pronounced. After the cone is glued to the rocket, you will have to come back with some filler putty and fill any gaps. Sometimes this will deform the part, so that the cross section isn't perfectly round, but has a point - like a teardrop. You may need to reform it before gluing it to any tubes so it is perfectly circular.

On cones 18mm dia and smaller, that method doesn't work well, so you should leave off the extra glue tab when you cut out the pattern. Use a separate piece of paper, and glue it over the joint between the two inside edges being joined. This should leave a very thin join line on the outside of the part which can be filled later with putty. The drawback is that you don't have the ability to reposition the part while the glue dries, so your pattern has to be fairly exact when you cut it out. You can also use this method on large cones too.

Cones or truncated cones made using this method can be purely decorative too. I like to make "simulated" rocket nozzles that add a lot of pizazz to most models.

"Molded paper products" is pretty much the only other way to make complex and compound curves out of paper. You've probably seen molded paper in the form of egg cartons at the supermarket. The are formed by making a thick water slurry of paper fibers and pouring it into a two part mold. The mold halves are brought together under a lot of pressure which squeezes the water out of the fibers. Typically, one side of the mold has a mesh surface which allows the water to escape. This makes one side fairly smooth, and gives the other side a rough texture. The part is then removed from the mold and allowed to dry. Big parts with thin wall thicknesses can be made this way. I've seen very large plant pots made out of this method.

I think we've all made molded paper products as juveniles in the form of spit wads! But for rocketry, molding paper hasn't really caught on due to the intensive set-up required to make molds. A simpler way may be to use a papier-mache set-up. I think a neat use of molded paper would be to make a shroud for a Delta Clipper type model that is a big flying shroud with a rounded nose. It could be made both light and strong with this method.

Flat sheets of paper can be folded into very complex shapes; which is where the title "Rocket Origami" comes from. Cutting, folding, and gluing paper is an art-form that I think can be taught to most modelers. But before this can happen, you have to have a desire or need for the shaped part. So what types of items can be made?

As mentioned before, the obvious ones are tubes, nose cones, transition sections, and simulated nozzles. If you look in some old rocketry catalogs, you can find some others too: cockpits, and simulated jet engine inlet ducts. The variation of designs is only limited by the imagination of the builder.

Making 3-D parts this way using flat sheet stock is called "pattern development." The easiest pattern development to make is the cube. If you unfold a corrugated box, you'll see how this method works.

What makes pattern development challenging and fun is making two different 3-D objects mate to each other. This is where textbooks that teach engineering-type "drafting" come into play. If you are really interested in doing complex rocket origami, the books will show you "step-by-step" how this is done.

For a simple start, I'd suggest designing a paper cockpit. Basically you could start with a cube and see how to mate it to a tube. If you leave one end open, now your cockpit becomes a jet engine intake duct. Then you could start changing the cockpit or intake duct by making one side an angled piece (now the cube becomes a prism). By continuing to stretch the shape of the prism, you could turn the cockpit into a long shroud -- like the conformal tanks on a NASA X-15 rocket plane.

A variation of the conical transition piece would one that transitions from a circular tube to a rectangular or triangular tube. I first used this method on a rotaroc style helicopter; I needed a triangular tube to give me a flat area to mount the hinges for the blades.

You can add even more challenge to the pattern development process by mating two curved pieces together. I'd start by changing the simple right angle nose cone to a "oblique" cone; where the point is not over the center of the cone base, but off to one side. This could give you a nose cone for a Ariane or Proton scale model.

For modeler's who want to go to the extreme, how about trying to mate two tubes together at an odd angle? This could be used to duct the ejection charges of side pod motors into the core tube of a model. You could use the same piece to create another type of simulated jet intake duct, but with a circular opening. I've used this same method to make tube fins that jutted out into the airstream and that looked like thick dowels.

And other combinations are possible too. I've made "cone fins" and transitions that make it possible to mate together a cluster of two tubes down to one single tube. To date, the most complex part I've made is an oblique cone which mates with two tubes; that allows ejection charge gases to vent into the core tube from a pod tube. This is one method that could be used for the NAR 6-C cluster altitude competition model. A copy of that very complex pattern has been printed in many club newsletters.

For modeler's that would like to 'cheat' and see what other finished parts might look like, you can purchase Apogee's "Designer's Resource Pak" which includes all of these different pieces listed above. A nice feature of the parts is that with a photocopy machine, you can change their size so they even can be used on big model rockets!

Finally, you can even make entire rockets out of large shaped shrouds. The classic examples are some of the kits produced by Quest. The "Space Clipper" and their version of the NASP are excellent examples of the types of rockets that we can all create ourselves. The added advantage is that all types of surface decorations (panel lines, heat protection tiles, insignia, etc.) can be printed on the outside of the paper, so that the finished model looks really complex, even though it is simple.

Oh... I just remembered the most important characteristic of paper that makes it a great choice for rocket builders. It is cheap! Most times, it is even FREE! So if you are limited by your rocketry budget, it is the "best" material to use for construction. So get to know it; find out its advantages, its limitations, and ways to shape it. Then you'll develop a great appreciation of its many great qualities.

For further information on Apogee's "Designer's Resource Pak" or any other Apogee products, send $1 for a catalog to:

Tim Van Milligan
Apogee Components
1431 Territory Trail
Colorado Springs, CO 80919-3323

January Building Session Report
by Bob Wiersbe

Ahh, the smell of CA, epoxy, balsa dust, and motor exhaust. Smells like.. a building session at Bob Kaplow's! Sixteen NIRA members ventured out on a cold winters day to Bob's Hobby Shop to either work on something, browse through Bob's collection, or just shoot the breeze.

Tom Pastrick helped Pierre Miller, Ed Thiel and Bill Thiel work on their Flat Cat boost gliders, generating vast quantities of balsa dust. No word whether any of them actually finished it this year. Jonathan Charbonneau was hard at work on his Rocket R&D Iris, cutting fin slots with a Dremel tool, shaping fins, and epoxying parts together.

Bryan Chesi and Rick Kramer were working on Aerotech kits. Bryan put together a Strong Arm and Rick built an Initiator. Those Aerotech kits really go together fast, especially when you use CA! Adam Elliott spent the afternoon working on an Astrocam, the older version where you have to build the camera. I worked on a Custom Serval, opting to build a kit with tube fins rather than mess with cutting and sanding fins. That way I had more time to shoot the breeze :)

Mark Bundick came out to work on a tower launcher, and proved that an NAR President can learn new technology - he brought out his new Adept staging unit. We spent a lot of time fooling with the neat device, learning how it works and running some tests. Neat stuff!

Bob Kaplow and Steve Smith were busy making Firestar igniters, with Bob showing all of us some neat tricks (like how to make twisted wires with an electric screwdriver). We even tested one of the igniters, and it looked like it would ignite any composite motor.

Someone suggested that we go out in Bob's backyard and fly something, so Bob got out his Oberweis Rocket that just happened to have a motor in it. After a traffic jam in the kitchen, we found ourselves in the garage freezing while Bob tried to find his launch rods. After about 5 minutes of looking, Ken Hutchinson decided he'd had enough and dug one out of his trunk. How many of you keep a launch rod in the trunk in winter?

We picked our way through the yellow and brown snow looking for "safe" spots to watch the launch from, and Mark got the honors of the first (and maybe only?) NIRA flight of 1997. He also got to hop through the snow to go recover it from the bush in the neighbors yard.

We talked about the situation with the BATF, and expressed our concerns and ideas to Mark to take to the NAR board meeting. Mike Ugorek showed up late in the afternoon to give us some good news about a possible site for MRFF. If things work out, this may be a really good year for MRFF! The site has a pavilion with picnic tables, no swamps, we can sell stuff, no fee for putting up tents, and a meeting room is available too!

All in all, a very nice afternoon. Next best thing to actually going to a launch!

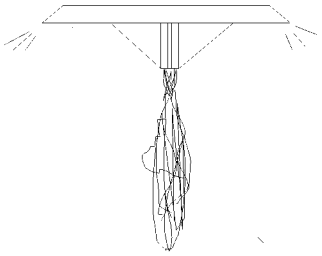
The "gang" in the backyard of Bob's Hobby Shop getting ready for a quick launch. That's Norm "I'm not cold" Heyen in the middle, and Bill "What the @#!! did I just step in?" Thiel at the far right.

The "gang" in the basement of Bill Thiels house, working on new projects and finishing up on leftovers from last month. (photos by Ric Gaff)

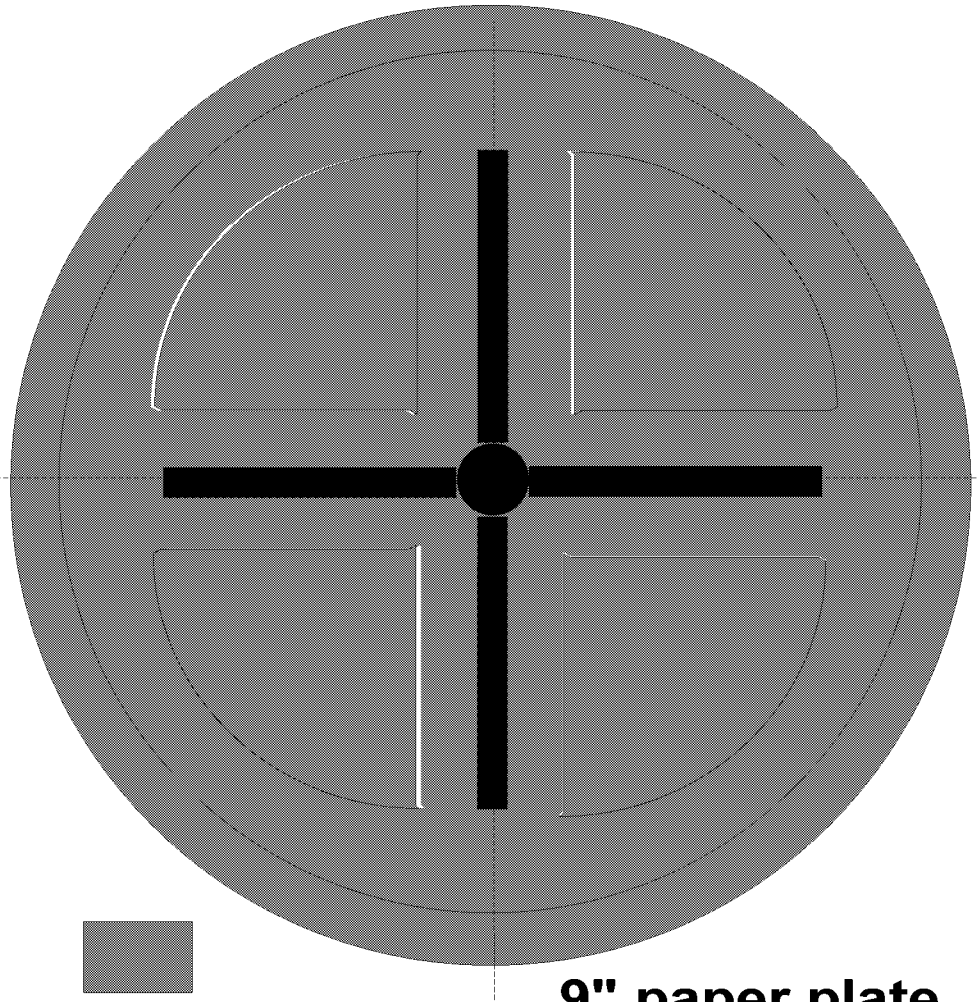
IFO

Identified Flying Object

By Richard Gaff



People look at the model and say, "Hey!, that's a paper plate!" hence the name, "IFO"

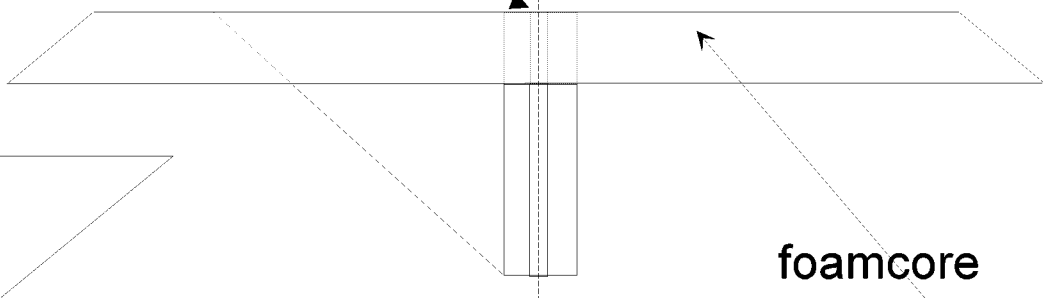


9" paper plate

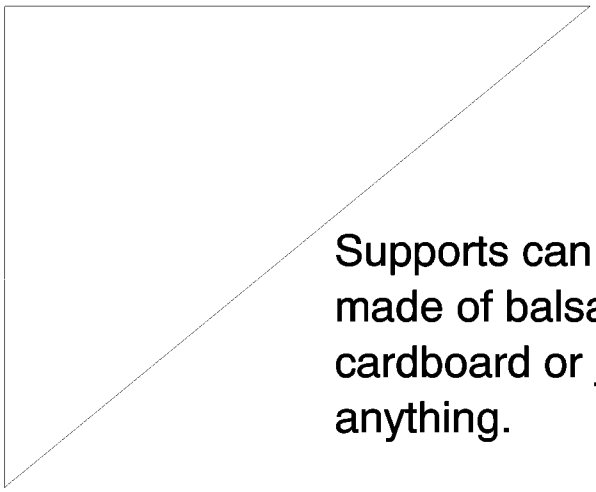
Material to remove

Flys great on C6-0's!

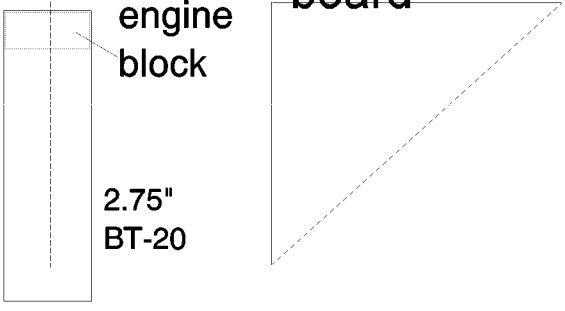
Hole cut in top to vent ejection charge coat wit epoxy.



Full size support pattern (4)



Supports can also be made of balsa, plywood, cardboard or just about anything.



New NIRA Reprint Series Booklets
by Richard Gaff

Seven new booklets have been added to the reprint series this issue bringing the count to 41 available booklets.

11.9) The Lawrence Bercini collection of rocket plans Vol. 9. Thor IRBM, Space Shuttle PMC, Silver Streak and 4 other neat plans

11.10) The Lawrence Bercini collection of rocket plans Vol. 10. Thor-Able, Tube finned rocket, XR-46 and 4 other plans.

11.11) The Lawrence Bercini collection of rocket plans Vol. 11. Hammerhead Rocket, The Frog, Nighthawk and 4 other plans.

14.4) Articles from the Leading Edge. Wind tunnels, Titan museum, R&D reports, Turbulation, and three other articles.

15.3) Ancient Estes plans from the '60s. Vol. 3. Little Beth X-2, Flyin' Stovepipe, Ganymede 274, Space Twins and 6 other great plans.

16.1) Supersonic Rocketry from Sport Rocketry. Break the sound barrier with a model rocket.

19.3) Stability of Hand Launched gliders, articles from Free-Flight Magazine.

Frequently asked questions Mini Reprints

FAQ #5) "Born Again" Rocketeer 6 pages FAQ #6) Model rocket Construction and finishing 8 pages

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

5) Ideas. A collection of 10 articles about... well...IDEAS! Some things you may not have thought of such as launching from under water! or kitbashing. 16 pages

7) Rec.Model.Rockets Glossary of Rocket Terms. What is a "NAR"? or a "worm burner"? What is an "FAR"? or a "Copperhead"? These and many other words, abbreviations and expressions are defined.

8) The NIRA Big Book-o-tips! 22 pages of tips, hints, suggestions and ideas that will help you with everything from building to flying!

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 32 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;

Richard Gaff
3175 Norwood Ct.
Streamwood, IL 60107 (630)
483-2468

Email: rickga@ix.netcom.com
or G12091@email.mot.com

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

1997 Estes Catalog Review
by Rick Gaff

The new Estes catalog for 1997 just dropped into my mailbox so let's see what's new.

There are 7 new E2X models. E2X is the Estes designation for their pre-colored, easy to build models. One of the most interesting to me is the "Star Booster" (18", BT-60, standard), a sci-fi model based on Buzz Aldrin's science fiction story "Encounter with Tiber". The Star Booster has plastic details and with its midpoint mounted wing, looks a bit like Orbital Sciences "Pegasus" satellite lofter. The Star Booster uses rear ejection for recovery, a model after my own heart! The "MK-109 Stingray" (16", BT-?, standard) has the look of a navy ship-to-air missile such as the Tartar. The "Astrosat LSX" (19", BT-55ish, standard) is another futuristic model of a satellite launcher. The nose cone has spiffy molded in canopy and air scoop detail. The model ejects 2 streamer equipped "satellites", shades of "Halley Comet"! (but the kids love it). The "Flash" (28.3", BT-50, standard) has a large pre-wrapped reflective payload section intended to catch plenty of sun, a nice engine elimination vehicle. The "Nike Arrow" (17", BT-20, mini's) one of only 3 new mini-engine models. The "Nike Arrow" is a single stage model with a 2 stage sounding rocket look. This could be a good model for kitbash! The "Banshee" (16.6", BT-?, standard) is a 3fnc engine elimination vehicle, a cute model but not much going for it. The "X-Ray" (14.8", BT-5 & 20, mini's) is the new, smaller, version of the venerable old "X-Ray" kit of years ago. Like its older brother it has a clear plastic payload section (so the bugs have a great view!) but has a flashier (i.e. E2X) color scheme and flies on mini engines. The last new E2X model is the "Mach-12" (21.3", BT-55, standard) a hyperbolically named model with removable fins, on purpose no less! The model is designed to fly with any of 12 different fin configurations (hence the 12 in the name). It will be interesting to see how they keep the fins on.

The Beta series of models has 5 new models. The "Quark" (5.2", BT-5, mini) is the third new mini engine model and is about an inch longer then the "Mosquito" and is basically the same type of model. Perhaps now that Adam has the club record for recovering his mosquito he'll try a "Quark"? The "Fatboy" (12.9", BT-80, standard) is the latest in a long line of short, stocky models. I rather like models like this, they fly real nice, don't get too high and are easy to recover. The "Firebird" (23.9", BT-56, standard) is your basic 4fnc engine elimination vehicle. It appears to a good size for standard size motors but not much else is happening here. The "Venom" (18.5", BT- 50, standard) your basic 4fnc model but with a snake motif and cockpit molded nose cone. The "Sizzler" (27.8", BT-60, standard) uses rear-ejection and needs no recovery wadding. Another model after my heart! The "Astrocam" has apparently been redesigned to be easier to build. No details on what was changed, how much easier could it be to build? All of these rockets use thru the tube fin mounting for strength and easier building. Estes has given the technique the trademarked name "T3."

The Explorer series has 4 new models. The "Silver Comet" (25", BT-80, D12) is a large model with a 1940 sci-fi look. The model has plastic nose and tail cones and is clearly using parts from their old "midi" V-2 kit of years ago. The nose cone has been modified with molded in detail. The "Gemini DC" (21.5, BT-50, standard) is the third new model using rear ejection which clearly demonstrates that this is the Estes year for rear ejection models. The difference between this model and the other two is that the "Gemini DC" has vented side pods that have the chutes while the other two models eject the entire engine mount. Ejecting the engine mount is a much more reliable method then side pods. The "Python" (33.25", BT-1.84 ?, D12) is a large model with an air to air missile motif, should be a great little D12 elimination vehicle. The "Long Shot" (46", BT-56, D12/standard) is a 2 stage model using a D12 in the booster and a standard size in the upper stage. I suspect the name describes the odds of your getting it back.

One new Star Wars model has been added and three more maybe's. The new model is a rocket with a "Death Star" nose cone. The "Death Star" breaks apart at ejection with streamers on the pieces for recovery. Ok, call me crazy! but I want one of these! The three maybe's are the "Millennium Falcon", the "Shuttle Tydirium" and a "Star Destroyer". No prices are listed or availability mentioned, worse, the pictures in the catalog are of the "real" spaceships and not

of models. This implies the models may be almost as close to fantasy as the "real" ones. There are three new starter sets as well, with models of the "Death Star", "Y-wing"'s and "A-wing"'s. Sadly these starter sets appear to be the only way of getting a "Y-wing" or an "A-wing" model, a darn shame!

Then there is a bunch of Cox control line, RC and rubber power planes and West Wings gliders. I have to admit that the West Wings gliders are kind of neat, especially the new Star Wars gliders; "X-Wing Fighter", "Y-Wing Fighter", "A-Wing Fighter" and a "Star Destroyer".

North Coast Rocketry gets a bare mention in the last couple of pages with no mention of availability of kits or motors. Surprise! Surprise!

One last item. Scattered through out the catalog are little "rocket tips". My favorite is on page 4 and I quote; "In most cases, baseball, soccer or football fields are great launch areas!" Well at least they said "In most cases..."

Kit Review - The Launch Pad "Kormoran AS.34"

by Mark "Bunny" Bundick

My MRFF 1996 raffle prize was the Launch Pad "Kormoran AS.34" kit. An air launched anti-ship missile like the Exocet, the prototype contains small rear and large forward finds. While I had some misgivings about that configuration in a model rocket, everyone I talked to about Launch Pad kits had nothing but good things to say about them. So, I cut open the bad and started, with an eye towards trying some new techniques.

The kit contains two sections of 2.6" dia. tube that look to be dead ringers for Estes BT-80. A blow molded plastic nose cone, some sheet and strip balsa, a sheet of cardstock, a couple of centering rings, engine tube and hook, launch lug, shock cord and parachute kit complete the parts. All were of good quality. Eight pages of instructions illustrated with simple, but more than adequate drawings were quickly read over before I began.

The engine mount was first and completely standard Estes. I used yellow carpenter's glue. Launch Pad then tells you to modify the nose cone profile. To do that, you make a sharp cone from paper, reinforce it with white glue, then use CA to attach it to the nose cone. Too much trouble for the overworked NAR president, so I skipped it. According to Ric Gaff, the technique works pretty well.

The lower fins feature a wedge shape. Launch Pad creates that through a balsa framework covered with card stock. The framework was slightly different from what I was used to; the central spar with larger than normal, almost like a fin. I cut out all the balsa parts and CA'ed them together. Launch Pad suggests attaching the cardstock skins with white or yellow glue. To reduce the wrinkling which would result, I instead painted a 50-50 mixture of glue and water onto both the frames and cardstock. After drying, the stock patterns were cut out, and attached using a hot Monokote iron. The heat polymerizes the glue and sticks the parts together quick as a whistle. Launch Pad also thoughtfully provided two extra fin patterns in case you screw some up, which I did.

The forward fins are 3/32" sheet balsa. A strip of 1/16" balsa glued along the root simulates the fin attachment points. I finished the balsa with Elmer's Professional Wood Filler before attaching them. This light brown paste gets thinned with water to a paintable consistency before application. I used only one coat, and got pretty decent coverage. After all, it was only a sport model I was building.

The body tube is a bit unusual; you've got to glue the two tubes together to get a full length. Why the kit is built that way is unclear to me. It might be the cost of a longer length tube, or Launch Pad's desire for a more reasonable bag size. In any case, you'll be stuck filling in the tube joint along with the spiral. I used the Elmer's stuff again, with good results after only one coat.

I then installed the engine mount and shock cord. The engine mount is recessed a couple of inches into the 2.6" dia. tube. While it wasn't hard to do, I wonder how it might affect flight performance. Attend our first 1997 launch and find out! A final tube feature was the use of another centering ring to create a parachute compartment. When glued 4.5" down into the front of the tube, the ring prevents the chute from slipping all the way back to the engine mount without the expense and weight of a full length stuffer tube. I liked this feature and may try it out in other models.

The instructions point out you can cut the heads off straight pins to simulate rivet bands around the tube and along the fin root. I substituted some Sig scale rivets I've had for years and years. To properly space them around the tube, I used my Estes fin marking guide, a welcome addition to any serious rocketeer's workshop. After drilling holes in the tube with a pin vise, I CA'ed the rivets in place. I did have to modify the rivets for the fin roots; they were too long, and so were shortened so they didn't poke all the way thru the fin.

Launch Pad shows how to make some tunnels out of balsa bits, but I substituted some 1/4" dowel, split and sanded to shape.

The parachute is made of an attractive copper colored mylar. Launch Pad uses paper reinforcing rings to attach shroud lines. You put the rings on the mylar, poke a hole thru the center of the ring, and tie on the line. Looks like it'll be plenty strong to me. A snap swivel completes the chute.

The instructions provide for two different paint schemes, a dull gray operational round, and a slightly more colorful test round. No further documentation sources are referenced in the instructions, a mild disappointment to us scale types.

Launch Pad recommends a D12-5 for the first flight, and says an Aerotech E15- 7 can also be used. I'd make sure all my glue joints were double and fins were well filleted before trying that motor. D12's shouldn't put any strain on the bird. Estimating a 3 ounce empty weight, RSIM says you'll get almost 900 feet out of the bird, quite a respectable altitude.

Overall, I'm quite pleased with the Launch Pad kit. Parts, instructions and design were all on a par with kits from much larger companies. Launch Pad now has a distribution arrangement with a hobby distributor, so we may soon see more of this company's product out there on the shelves. In the meantime, excellent mail order service is available directly from Launch Pad owner Chuck Barndt; consult the latest Sport Rocketry magazine for the address.

If you're looking for a good kit value and have a fondness for military missiles, a Launch Pad kit should be your next rocket project target.

Apogee Helicopter Sale

Interested in some serious competition? Then don't miss the "Helicopter Madness Sale." For $14 (plus $3.50 S&H), you get the following:

(1) 10.5mm molded rotaroc hub (completely assembled).

(1) 13mm molded rotaroc hub (completely assembled).

(1) Conversion kit, that includes another 10.5mm hub plus three molded rings to allow you to make a 18mm diameter "Rose-A-Roc" style helicopter. This is the easiest way to make this high-performance style helicopter.

(1) Background information; i.e., care and handling, etc. about the hubs that also includes basic instructions on how to build a rotaroc model (both 10.5mm & 13mm versions).

(1) Simple plans and fin patterns for a 13mm dia. rotaroc rocket.

(1) Simple plans and fin patterns for 10.5mm rotaroc (based on using the Apogee Centrix rocket kit).

Send to:

Tim Van Milligan
Apogee Components, Inc.
1431 Territory Trail
Colorado Springs, CO 80919-3323

Nordic Rocketry Incorporated
By Rick Gaff

One of the most interesting trends of the last few years has been the increase in the number of "cottage industry" Model Rocket companies. These are small, usually 1 or 2 person operations that often bring a breath of fresh air to our Estes dominated hobby. Nordic Rocketry is one of the most recent and made it's debut at MRFF-96. I ordered my first Nordic kit - Warhorse AGM - a few months after MRFF-96. After waiting a month (or more) and receiving nothing, it was looking bad for the new kid on the block! I was on the verge of calling Howard Olsen (the owner of Nordic Rocketry and a friend from NIRA's days of flying WWAR contests in Wisconsin) when he called me! He was very apologetic about the long wait, he was having trouble with a supplier, to help make up for it he was going to send along a free kit! I received both kits less then 2 weeks later.

So what are these models? The Warhorse AGM is a 2.2" dia. four fin 'D/E' powered model with a set of small forward mounted finlets that give the rocket the look of an air to air or air to ground missile. The Delta-X is a 1.6 " dia. four finned model for 18mm motors. The fin planform is unusual in that the fins are mounted as 2 "V's" giving the model an X-form rather then the more common cruciform, pretty neat. Both kits have the highest quality parts I've seen in a long time.

Laser cut plywood fins and centering rings[1], cloth parachutes, thick walled body tubes (similar to what you would expect in a HPR model), balsa nose cone (wrapped separately in bubble wrap to keep it from being dinged up, very nice!) and excellent instructions.

The instructions are well illustrated and written so that a beginner should have little trouble building these models but with enough leeway for an experienced builder to do some things their own way. The Warhorse is the simpler of the two models and went together quite quickly. Oddly enough, no guide for marking the fin locations on the body tube is included, while this was no problem for me it could be for a beginner. The only thing I really did different with these kits was that I used Titebond for construction and longer curing epoxy instead of 5 min epoxy, Bob Kaplow has finally convinced me that 5 min epoxy is crap! For wood and paper models Titebond (in my humble opinion) works fine, is easier to use and is cheap.

The centering ring and nose cones of both models fit their body tubes perfectly, no sanding down or building up was necessary, very nice! The body tubes are thicker walled tubes then we normally expect in model rocket kits and have been cleanly cut to length.

These are durable, easy to build kits of very high quality, I look forward to flying both of these models this summer (somehow MRFF-97 seems an appropriate place) In the mean time write to Nordic Rockets for their catalog. They don't have a lot of kits at this time, but I think we'll be seeing a lot more of these folks. For a catalog write or call;

Nordic Rocketry Inc.
PO Box 1164
Wisconsin Rapids, WI 54495-1164
(715) 424-0240
Catalog: $1.00

Footnotes:

[1] You can tell laser cut parts from die or shear cut by the slightly charred edges of the parts and, if you look closely, by the small pits along the edges. Laser cuts are usually made as a series of rapid pulses rather then a continuous beam and this leaves a trail of small pits or perforations.

NAR Standards & Testing News

The following motors have been certified by NAR Standards & Testing as of November 10, 1996 for general use as model rocket motors. They are certified for contest use effective March 10, 1997. Announcement of certification was delayed at the manufacturers request.

The following are all Aerotech single-use disposable motors.

Aerotech:

29mm x 73mm: F20-4, 7 (64 Newton-seconds total impulse, 30 grams propellant mass)

29mm x 98mm: G35-4, 7 (105 Newton-seconds total impulse, 50 grams propellant mass)

Contest Motor Decertifications

The following motors will lose their certification for NAR contest use effective July 1, 1997 but are certified for use at NARAM 39. They remain certified for general sport flying.

Aerotech:
C6-3, 7 (reload)
C12-2, 5, 7 (reload)
E25-4, 7
E27-3 (reload)
E45-4, 8, 12
F14-4, 6, P
F44-5, 10, 15
G42-4, 8, 12

Apogee:
1/4A3-4T
A3-2T, 6T

MRC:
FX (smoke generator, no thrust)
A8-3
B4-4
B6-4
C6-3, 5

Aerotech-Licensed Manufacturers Certified - Aerotech has announced the licensing of other manufacturers to produce and sell components of their patented "Reloadable Motor System." NAR S&T has agreed to honor the certification of these casings so long as they are built under license from Aerotech and constructed to the same specifications as the original Aerotech components. The first such licensee uses the trade name, "Dr. Rocket."

FSI F100 Now Designated F80 - Flight Systems Inc. has relabeled their F100 model rocket motor as the F80. Under the definitions of a model rocket motor (cf. NFPA 1122), the average thrust must be 80 Newtons or less. Both remain certified for contest use and general use as a model rocket motor.

NAR Member HPR Certification Motors Clarified - NAR members using motors for NAR High Power Rocket certification should use the manufacturer's motor designation of impulse class. Some NAR members questioned what designation to use when the manufacturer designated impulse class differed from tested impulse class for some Tripoli certified motors. It is the decision of the NAR Sport Services Committee, as reviewed by the NAR Board of Trustees, to utilize the manufacturer designation.

Tripoli Hybrid Certifications Recognized - The NAR Board of Trustees has voted to recognize the certification of all hybrid motors certified after testing by the Tripoli Rocket Association for use by qualified NAR members. Prior to this action, NAR S&T examined the test data before honoring the certification. With the retirement of this procedure, NAR members may now use hybrid motors as soon as they are announced as having been certified.

Jim Cook, Secretary for NAR Standards & Testing <JimCook@AOL.COM>

Jack Kane, Chairman

Midwest Region Contests

14AL-97 (One For Al (Neinast))

Wisconsin Organization Of Spacemodeling Hobbyists (WOOSH) is holding a NAR sanctioned Open Meet. The tentative date is May 31st, 1997. To be held at Bong State Rec. Area, Burlington, WI.

Events will be:

1/2A Streamer Duration, C Eggloft Altitude, Random Duration, Open Spot Landing, Sport Scale.

There will also be a fun event - People's choice Classic Kit.

For more information, contact Steven Koszuta at (414) 481-6341 or stevenk@solaria.sol.net.

HUVARS EVENTS:

Michigan Spacemodeling Championships (MSC)

Regional NAR Contest - June 21-22, 1997 Michigan Space Center, Jackson, MI CD: Jim Fackert (Roger Wilfong)

Events:

Sport Scale, 1/2A Helicopter Duration, 1/2A Parachute Duration, A Rocket Glide, C Streamer Duration, Open Spot Landing
Contact: Roger Wilfong aroger@umich.edu

Falling Leaf Finale

Open NAR Contest - October 4-5,1997 Michigan Space Center, Jackson, MI

Events:

1/2A Streamer Duration, 1/2A Rocket Glide, A Parachute Duration, Plastic Model Conversion

Contact: Roger Wilfong aroger@umich.edu

Heard on the Street
with apologies to the Wall Street Journal

Driver! Once Around the Block! - In preparation for the MIR crew rotation in February, space station occupants Korzun, Kaleri and NASA astronaut Jerry Linenger undocked the Soyuz TM-24 ferry from the front docking port, flew it around to the far side of the complex and redocked at the opposite docking port. This opened up the front port for the arrival of the Soyuz TM-25, launched from Kazakhstan on February 10. Linenger may be one of the few folks who've flown a Soyuz without having to bother with its reportedly 7 G ascent profile.

Stating the Obvious - The Japanese Institute of Space and Astronautical Science (ISAS) launched the MUSES B satellite on February 12. The satellite unfurled an 8-meter radiotelescope antenna to make joint observations with ground based radio observatories, simulating a telescope larger than the Earth. This was the first launch of the Japanese ISAS agency's three stage solid fuel M-V (Mu-5) rocket. All four of the stages involved in this launch had never flown before, so this was a crucial test for the ISAS launch vehicle group. MUSES B has been renamed 'Haruka', which means 'far-away' (duh).

Cape Cato - A McDonnell Douglas Delta 7925 was destroyed shortly after launch from Cape Canaveral on January 17. The subject of numerous TV replays, this was the first Delta II rocket to fail to reach orbit, and the first failure to orbit of any Delta since 1986. The Delta carried nine Alliant Techsystems GEM (Graphite Epoxy Motor) strap-on solid motors attached to the first stage. The only previous GEM failure occurred when one failed to separate during the Koreasat 1 launch, but it appears that one of the GEMs may have failed on this latest launch.

Martian Myopia? - Flight engineers working the Mars Surveyor flight activated a heater onboard the spacecraft in order to remove residual moisture in the camera's graphite epoxy structure. If the bakeout had not been performed, the moisture in the camera's tube-like structure would have slowly leaked into space and caused its length to gradually change distorting the camera's focus. Originally scheduled for 60 days, the bakeout was shorted to 14, but then terminated after only six days. In several weeks, the camera will image stars over a one-week period to determine if additional bakeout time is required.

Major Milestone - On February 16, 1961, the first all solid propellant rocket was launched into orbit from Wallops Island, Virginia. Bunny does not remember the launch.

Self Starter - Twenty five year old Pioneer 10, the first spacecraft to leave the solar system and Earth's farthest probe in deep space, successfully executed a targeting maneuver more than 6 billion miles from the Earth. Mission managers had to turn off Pioneer's radio transmitter and let the spacecraft execute the procedure in the blind for 90 minutes. Thermal shock from the power down, power up command could have shattered the tube transmitter. NIRA members will recall that Bunny's current adventures in scale modeling stated with the AC-27 prototype, Pioneer 10's 1972 launch vehicle.

Bopp-ing Along - Comet Hale-Bopp glows in the east-northeast before the first light of dawn for the next week or so. Go out an hour and 40 minutes before sunrise and look well below the star Deneb. The comet should thus be visible even in very mediocre sky conditions. Look for a fuzzy "star" with a short, broad tail. Light pollution in your sky will diminish what you can see of the comet, especially the tail. But binoculars will give a fine view under any conditions. By March 21st the best viewing time will have shifted to evening right at the end of twilight, when the comet will glow in the northwest. That's where it will be when at its best, from late March through mid-April.

Don't Know Much About History? - There is now a comprehensive list of NASA History Series publications on the Web at http://www.hq.nasa.gov/office/pao/History/series95.html. The list indicates whether each book or monograph is in print and if so, where it can be purchased. It also includes links to those works which are on-line. NASA recently reprinted the famous "Stages to Saturn" book about the development of the Saturn V moon-rocket.

Lighting the Wrong Candle - A problem with an oxygen-generating device on the Mir space station set off fire alarms and caused minor damage to some hardware on the station. No injuries to any of the six crewmembers on board were reported. The fire was located in the Kvant 1 module. The fire, which began at 10:35 p.m. Sunday, Moscow time, burned for about 90 seconds. The crew was exposed to heavy smoke for five to seven minutes and donned masks in response. After completing physical exams of everyone on board, U.S. astronaut Jerry Linenger, a physician, reported that all crewmembers are in good health. Lithium perchlorate candles are burned to generate supplemental oxygen when more than three people are on board the space station. The oxygen-generating candles usually burn for five to 20 minutes. Russian officials believe the problem began when a crack in the oxygen generator's shell allowed the contents of the cartridge to leak into the hardware in which it was located. Crewmembers extinguished the fire with foam from three fire extinguishers, each containing two liters of a water-based liquid. Officials are evaluating possible impacts to the mission and its science activities, as technical experts at the Russian Mission Control Center investigate the incident. The burned panel and other materials may be returned to Earth for further analysis.

Travelin' Man - NIRA welcomes Mike Hellmund to the American Midwest! Mike has announced he will be leaving Estes Industries in April, to take a position in marketing with one of Estes' largest international distributors. Location in the vast NIRA-land area is a little unsettled at present, but once moved in, Mike will be looking to join our little band of rocket flyers and find out how things are done in the Midwest. Look for further details on a "welcome wagon" launch after Mike's arrival in late April.

Nostalgic News - The following was found by a NIRA member while rummaging through a trash bin outside of the Estes plant in Colorado. Watch for more information about this in the May/June issue!

Press Release [not to be released until April 1, 1997 - violators subject to prosecution]

Estes Industries, the largest manufacturer of model rockets and motors, is proud to announce their "Blast from the Past Campaign". For a limited time, beginning in May, Estes will be re-releasing some of their classic kits from the 1970's, at 1970's prices! Also, some currently available kits will be priced at the 1970's rate!

Featured on the list are:

Mosquito - $.49
Alpha (balsa fins and nose) - $1.50
Big Bertha - $2.75
Sandhawk - $3.00

Gyroc - $1.25
Aerobee 300 - $2.00
Orbital Transport - $3.75
Mars Lander - $7.75
1/70 Saturn 1B - $10.95

These kits and prices will only be available when mail ordering directly from Estes. Special "Bonus Kits" will be available on orders over $50. For more information, contact Estes Industries at 1-800-FOOLEDU and mention "Blast from the Past".

Guns & Rockets - Two sports with more similarities than either would care to admit are rumored to be joining forces. The NAR and NRA have been holding informal discussions to see if the two organizations can help each other. The main emphasis is on seeking relief from the BATF on HPR issues. "We figure that if we could get an exemption for 50 pounds of black powder for us, we should be able to do the same thing with that AP stuff you guys use," one NRA insider was reported to say. When asked what's in it for the NRA, he replied, "Well, we heard you guys have got some kind of big rabbit."

An inside look at a typical Tripoli Board Meeting.