

SNOAR NEWS

MARCH
1987

THE LEADER IN SPACEMODELING

\$2.00

HIGH POWER CLUSTER TECHNIQUES!

ADVANCED
ROCKETRY:
Black
Powder
Cluster Tips

FIRST
LOOK:
MRC Model
Rocket Kits

NAR BOARD
MEETING
REPORT
"Don't Mix!"

NORTH
COAST
ROCKETRY
1987
RELEASES



SNOAR NEWS

THE LEADER IN SPACEMODELING
ROCKETRY'S LONGEST PUBLISHING, MOST CONTROVERSIAL NEWSLETTER

VOLUME XIII, NUMBER 2

QUOTABLE

"It's like taking a vow of fidelity with your wife. In the old days, you just promised not to cheat on her. Now, you can see another woman, as long as it's not in the same bed, or at the same time."

Matt Steele, explaining the new NAR "no mixing" high power rule adopted at the Feb. Board Meeting.

COVER STORY:

John Fleischer displays his clustered Sonic Seduction, complete with an XMTR-1. In this issue, we discuss high power clustering techniques that will help get a cluster bird into the air, as well as how you can get an XMTR-1 from Transolve's new distributor, North Coast Rocketry. Photo by Chris Pearson at LDRS-5.

CREDITS:

Editor, Team Owner, and Publisher: Matt Steele, 13011 Branscomb Rd, Huntsville, AL 35863; Team Manager: Robyn Palmer Steele; Starting Pitchers: George Cassaway; Chris "Norton Freak" Pearson; Relief Pitcher: Mr. Maddog (Tony Williams); C: Vince Heugele, 1B: Mary Roberts, 2B: Randy Kelling, SS: Terry (Swanstop) Lee, 3B: Chas "Hot Corner" Russell, LF: (as out in...) Chris Johnston, CF: J. Pat Miller, RF: Jack Kobzeff, DH: Mister Twister, Bleacher Bums: Moose, Andy Robertson, Bob Ferrante, The Beastie Boys, Heidi Smakula, Whoopi Goldberg, Brad Bowers, Randy Redd, Jordan Pavlov, Sammy McNully, The Honorable Wasco Schafter, Robert Anderson, Opus, Berke, Calvin, Hobbes, and the entire 1987 edition of the Cleveland Indians, our pick to win the American League East. Other picks? Kansas City will rebound in the AL West, and the Mets will repeat in the NL East. The Cincinnati Reds will win the West, sweep the Mets, and meet the Indians in the World Series. Gutsy calls, huh?



From Your
Sometimes
Sober Editors

Further High Power Triumphs

Having just returned from the NAR Board of Trustees meeting in Washington, D.C., I am quite pleased to announce that the NAR no longer intends to kick people out of the Association strictly for the act of flying rockets that exceed the model rocket weight and propellant mass limits. (Continued on page 14)

IMPORTANT STUFF

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Publishing Funds: Courtesy North Coast Rocketry
Published By: Graphic Solutions, 555 Sparkman Drive, Suite #1616, Huntsville, AL 35816

1987 Winter Board of Trustees Meeting

by Matt Steele

On the weekend of 13-15 February, ten NAR trustees met at AMA headquarters in Reston, Virginia to discuss important business and policies of the National Association of Rocketry. Present for the meeting were: Pat Miller, Mark Bundick, Vern Estes, Claude Greenlee, Howard Kuhn, Chris Tavares, Ed Muccio, John Worth, Jack Kane and Matt Steele. Highlights of the meeting included:

* Presentation and acceptance of the Barrowman Commission's recommendation that NAR members not be penalized for flying high power rockets. As a result of 9+ hours of discussion, the Board agreed to propose that the Bylaws be changed at NARAM-29 to permit NAR members to fly high power rockets if:

- model rockets and high power rockets are not flown from the same launch site within 48 hours of each other:

OR - if flown on the same day, model rockets and high power rockets are flown on sites at least 3 miles away.

Because of insurance considerations, the NAR could not offer additional support to high power rocketeers.

* Mark Bundick replaced Chas Russell as National Contest Board Chairman. Ed Muccio was named to take over the Section Activities Committee.

* The NAR's budget is relatively healthy, allowing the Board to allocate funds for additional membership services. Projects that were funded included: the "Section Target Mailing Program", where clusters of NAR members are encouraged to form sections; the "Retailer Mailing" where advertisements in Model Retailer will hopefully result in additional magazine exposure and sales; and the infamous "Tupperware Project", where NAR volunteers would travel (with expenses paid) to areas with high concentrations of NAR members in an effort to promote sections and section formation. The Board also allocated an expense fund of \$5,000 for the NAR President. While this may seem to be a bit unusual on the surface, it represents the very real cost of doing NAR business. Additionally, it is a start in the direction of appointing a full time, paid NAR executive director, much like the AMA has. When the NAR membership exceeds 10,000 members, a full time executive director will be a necessity.

* The NAR insurance situation seems to have stabilized, with the AMA going to a self insurance pro-

gram. In fact, if there are no significant claims against the insurance fund (both rockets and airplanes) in the next few years, John Worth seems to think the price of insurance (now \$11.00 per year) will decrease.

* Sales of American Spacemodeling continue to increase, and advertising revenue is up. Both factors should allow the magazine to continue to improve in content and appearance. AmSpam has a new printer that has been doing an outstanding job at less cost- and he's an RC airplane fan to boot! John Pursley, despite being quoted in SNOAR NEWS far too often, was given a pat on the back for a job well done.

* NAR membership is at 4200 and is continuing to rise. Projections make it seem likely the NAR will exceed 5000 by the end of the year, and possibly 5500 by mid 1988, which would be an all time high. Interestingly, the growth is largely the result of an increased number of senior members- a healthy sign, indeed.

* Doris Meyer plans to retire as NAR HQ manager in August 1987. A search committee headed by C.D. Tavares was formed to find a possible successor. Candidates to replace Doris include: Nettie Hunsicker, Connie Pursley, Lisa Stine (Bill Stine's wife), Jenny Pratt, (Doug Pratt's wife) and Ginny Miller (J. Pat's wife). Anyone interested in the job should contact C.D. Tavares.

* The NAR is exploring an arrangement similar to the AMA's where members can get loans, checks and credit cards through a major bank. The possibility of paying one's membership dues via Mastercard or Visa was also discussed.

Overall, the meeting was quite calm, with very little fist pounding, table smashing or threats of physical violence that has been typical of past meetings. The NAR has moved out of the crisis stage of survival, and is now undergoing significant growth. As such, the Board was mostly concerned with administering tasks that will aid and augment this membership growth.

There was one interesting sidelight to the meeting facilities at AMA HQ; they were great! The whole place is filled with model airplanes of all types and sizes. If you're ever in Reston, stop in at AMA HQ. It's a shame that the only significant model rocket was Howard Kuhn's 1972 Internats Javelin. NAR Trustee Ed Muccio is still attempting to put together a display of rockets for the museum. If you have a model that you'd like to display, drop him a line.

BLACK POWDER MOTOR CLUSTER IGNITION TECHNIQUES

BY CHRIS "NORTON FREAK" PEARSON

Overview

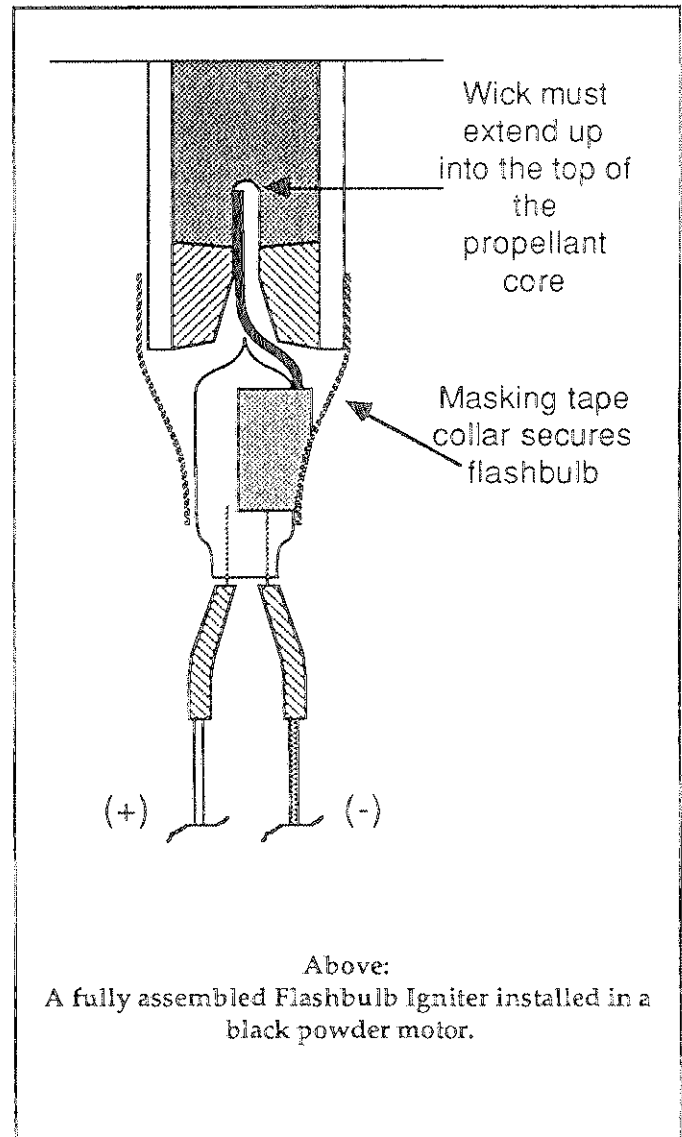
Cluster ignition of black powder motors (i.e. Estes and FSI) have become relatively easy in recent years. With the introduction of the flashbulb ignitor, motor clusters of previously unheard of numbers can now be launched with 100% reliability. This report will document the various ignition techniques used both in the past and present, and the different techniques used for various types of motors.

Ignitor History

Before the Centuri Sure-Shot Ignitor became popular (which was the descendant of the RDC (Rocket Development Corp.) "Ignitrite") the most commonly used ignitor was either with plain 32 gauge nichrome wire or the old Astron Ignitors (still available). Both of these ignitors required 12 volts and at least 1 amp to successfully work. Unfortunately, not too many Estes Electro-Launches could put out that much current, even with Photo Flash cells for one ignitor, let alone a cluster. As a result, clustering was not very popular, even though Estes and Centuri had about 6 cluster kits each in their catalogues. (Estes no longer sells any cluster kits, and Centuri, at the time of their demise, didn't either.)

Centuri introduced the Sure-Shot after acquiring RDC, and this made clustering a bit easier, although the Sure-Shots still needed 12 volts and a fair amount of current to fire.

Early in the 70's, John Langford discovered that a flashbulb could be used to ignite the Jetex wick used in the Sure-Shot and this allowed greater freedom in clustering motors in rockets, as motors no longer needed



to be close together within the rocket airframe to facilitate connection of the micro-clips.

The way a flashbulb ignitor worked was simple. A piece of Jetex wick was placed in the motors nozzle, a flashbulb placed on top of it, and the whole mess attached to the motors case with masking tape. The clips were either attached to the leads of the flashbulb (usually an AG-1 or equivalent) or else a wire could be attached (wire re-wrapped or soldered) to the flashbulb leads. The most common method of obtaining flashbulbs is to break open flashcubes (not Magicubes) and removing them from the plastic mounts.

In the late 70's, the last Jetex plant in England went up in flames and the company went out of business. The wick became unavailable and the price of the Sure-Shot pack went through the roof and became a greatly hoarded item. As we understand it, Sure Shots are no longer available from Estes.

At that time, Thermalite wick was discovered. It is commonly used in the demolition business and usually unavailable to the public. It is available from several rocket companies and comes in three burn rates; pink (slow) burns at 1.125 inches per second (IPS), green (medium) 2.5 IPS, and black (fast) 5.0 IPS. It works as well as the now unavailable Jetex, and has a longer shelf life. The method of motor ignition with Thermalite is the same as with the Jetex.

North Coast Rocketry offers flashbulb ignitors with pre-soldered 12 inch leads (catalogue #FB-1), along with Sure-Shot Replacement Wick (catalogue #RW-2), which are suitable for use in all end burning black powder motors. They also offer 3 foot lengths of fast (5.0 IPS) Thermalite (catalog #RW-3).

After enduring misfires for years, Estes introduced the replacement for the Astron Ignitor, the Solar Ignitor. It requires only 6 volts at much lower current levels to fire, allowing it to be used in single motor rockets with marginal launching systems and could be used in clustering with greater reliability than the old Astron Ignitors or plain nichrome wire. A point of caution, though; Solar Ignitors have a habit of breaking the thin bridgewire inside the pyrotechnic coating on the head of the ignitor. And although they might look OK, they still may not work. A good practice is to continuity check each ignitor in a cluster both before and after installing it in the motor nozzle. Do not tape the ignitor in as they instruct, but tamp a small amount of tissue in the nozzle to hold the ignitor in place. It is generally not recommended to cluster more than four motors in this fashion.

Solar Ignitors can be used successfully in all end-burning Flight System motors, instead of the supplied

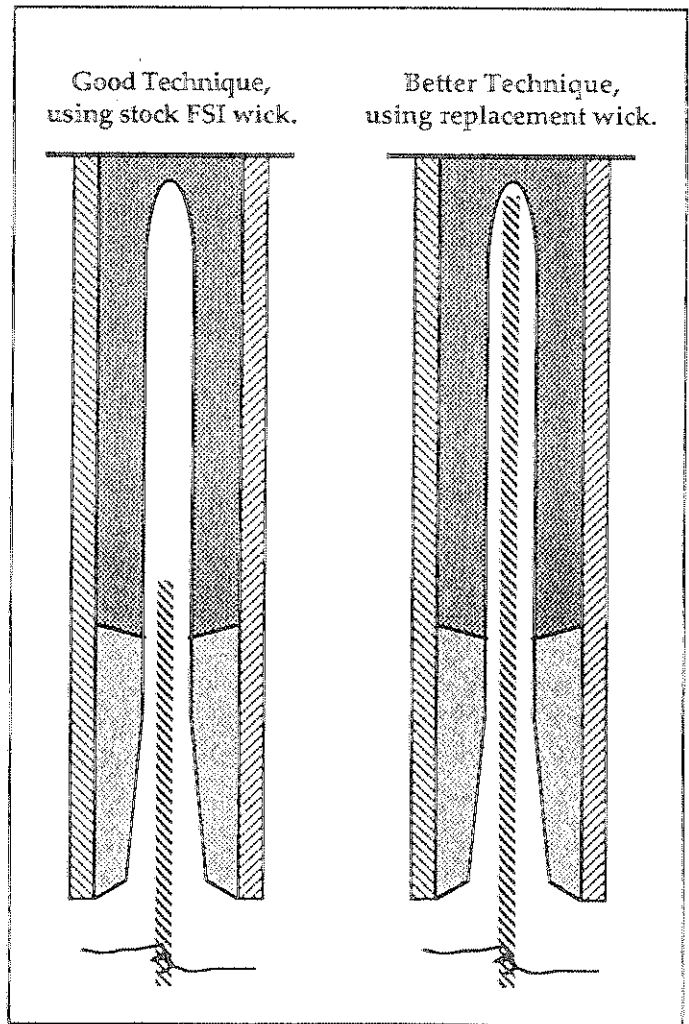
ignitors, with greater reliability.

Clusters of Solar Ignitors seem to work best in D12 motors, probably because of the large exposed propellant grain.

Large Black Powder Cored Motors

Flight Systems makes a series of black powder motors called the "Loadlifters" series, primarily the D20, E60, and F100, which have a long core in the motor. The usual method of ignition will not work, or will at best, misignite the motors.

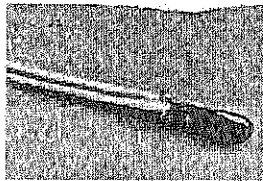
Flight Systems supplies pink Thermalite fuse for ignitors with all of their motors. These ignitors are OK with their endburning motors, but the lengths supplied with the coreburning ones are too short. Use of the wick in the manner shown in their instructions will, in almost all cases cause marginal ignition of the motor. Instead, substitute longer lengths of fast burn Thermalite so that the top of the core can be ignited.



Believe it or not, certain flashbulbs (flashbar types) can fit directly into the cores of F100 motors, and can be used as ignitors. Simply solder longer ignition leads onto the flashbulb leads, insert the flashbulb as far as it will easily go into the F100 core and away you go.

Electric Matches

These are actually called squibs and are used in the demolition and pyrotechnics industry. They make large cored motor ignition extremely reliable and safer. Simply insert one all the way into the core of each motor to be ignited, and tape the leads to the side of the motor case. Wrap the leads together, one for positive and one for negative, and attach it to your ignition system. For most ignition systems, these ignitors are NOT continuity safe, so be careful. A good rule of thumb is that if your continuity system will fire a flashbulb, it is not safe to try it with electric matches. Electric matches will fire with less than 300 milliamps at 1.5 volts. Instantaneous ignition is possible with these ignitors. At LDRS-3, a cluster of 12 F100's were flown successfully using this technique.

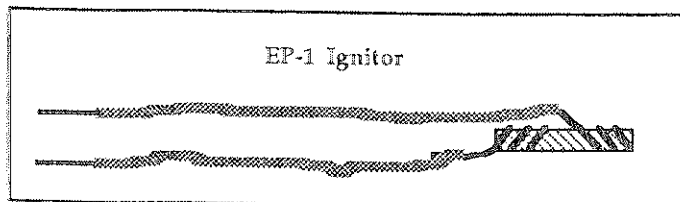


Single electric matches can also be used to ignite Thermalite wick for clusters, upper stage ignition systems, delay systems, or for electronic actuation of ejection charges. North Coast Rocketry sells an Improved Electric Match (catalogue #EM-1), which has a smaller head than the Atlas M100 squib that Flight System sells and also has much longer leads.

Other Types of Ignition

With the advent of current composite motor technology, a new type of ignitor has been developed especially for motors with small nozzles.

This ignitor is a low cost alternative to the electric match and is much more reliable than the fuse ignition. However, this ignitor requires a top-notch ignition system, capable of delivering 12 volts at 2 amps to each



ignitor.

North Coast Rocketry offers these ignitors (catalog #EP-1 for E and F motors, and #EP-2 for G and H motors), for use with all end and core burning black powder motors.

Conclusion

In conclusion, there are a number of techniques that one can use to cluster black powder motors. Without a doubt, the most reliable method is the flashbulb technique, which has been successful igniting over 60 motors in one cluster, from one power supply. There are other techniques that will work as well, depending on the requirements of the particular application.

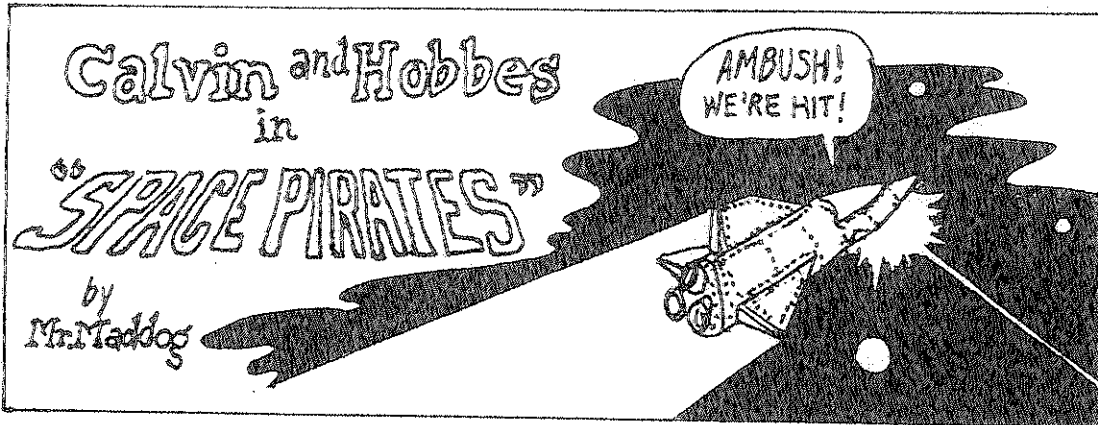
This report is also available as North Coast Rocketry Technical Report #01 (Catalog # TR-01) and is presented here as a service to our readers.

*In the next issue:
Clustering Composite Motors!*

Below:

The author with a seven motor cluster model successfully flown at LDRS-4.

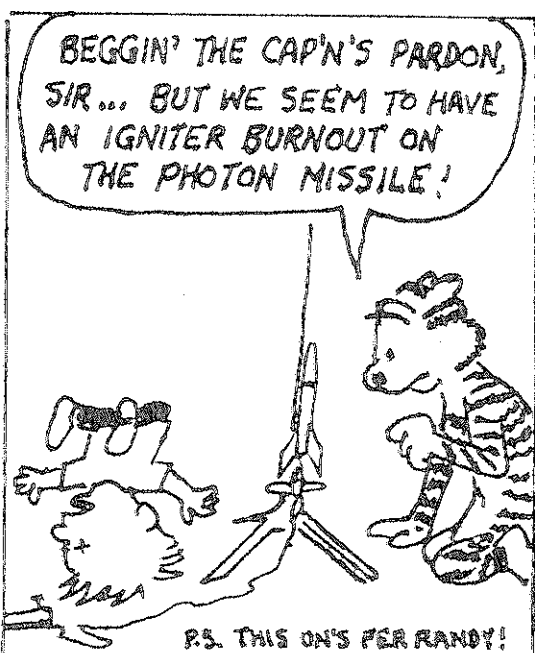
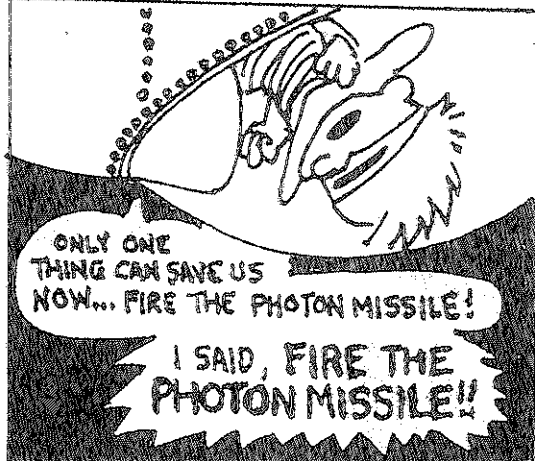


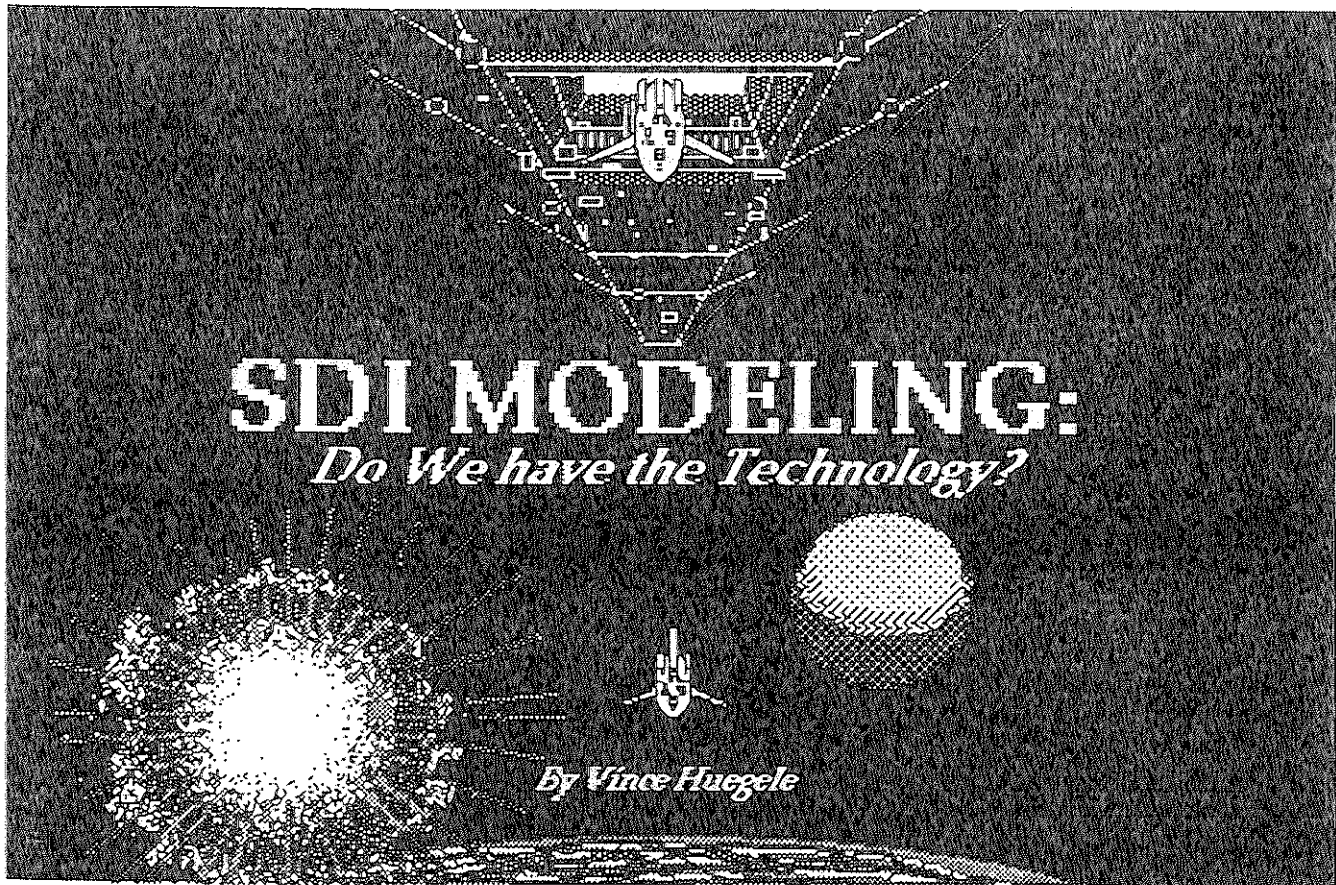


"CAPTAIN NEMITZ STEADIES HIS SPACE CRUISER AS THE VOLGARIAN SPACE PIRATES CLOSE IN FOR YET ANOTHER BLOODTHIRSTY ATTACK...."



"BUT THE SMALL SCOUT SHIP IS NO MATCH FOR THE OVERWHELMING MIGHT OF THE PIRATE PHASER POWER...."





SDI MODELING:

Do We have the Technology?

By Vince Huegele

Spacemodeling is the space program in miniature. The conquests, breakthroughs and advances in space exploration are mirrored in models on a backyard scale. The military and political aspects of rocketry are dutifully portrayed in models of the V-2 to the ALCM. After the war in the Falkland Islands, the first new kit on the market was an Exocet. And although few people have seen a F-19, a Stealth model is available. Our hobby honestly follows the flow of the real world.

To know the future of spacemodeling requires an understanding of the present aerospace climate. Many forecasters would expect to see models of a space station, of new shuttle designs coming over the horizons, but their sights are set far too low. Tomorrow's modeling will unmistakably be patterned after studies in the Strategic Defense Initiative. (This is not to be confused with the STAR WARS models that have already been discontinued.)

The SDI is an extremely complicated and controversial concept; modeling it will be no less easier. Yet the challenge will not be just another flying kit but an entire system. SDI requires recon satellites, directed en-

ergy weapons, lasers, particle beams, and ABM's. Countermeasures and all possible scenarios must be considered. How can all this be done on a small scale?

The only "small" in SDI modeling will be the physical size of the hardware. The system complexity should be preserved for authenticity. To begin, the modeler needs to start an extensive research program. Feasibility studies and paper analyses (like this article) are the way to start. The issues present themselves in the following setting:

A rival rocketeer has several launch sites in your city. Some launchers are standard above the ground units like a tilt-a-pad, but others are in hardened silos or hidden underwater in ponds and ditches. Their greatest threat is a total deployment that would darken the skies with B and C powered rounds. You must develop an effective defense to keep this from ever happening. To simply increase the number of rockets in your fleet, or go to D and E power is not true to SDI form. You need the big plan.

In order to monitor your adversary's activities, proper surveillance is required. Modified Astrocams with video transmitters would be your eyes in the sky. On that fateful day when the other side pushes the but-

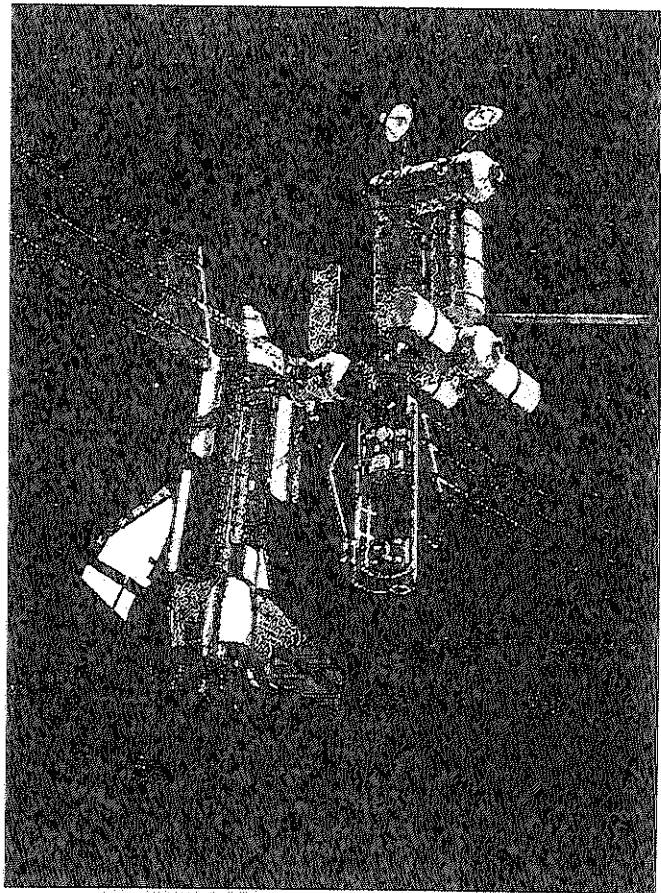
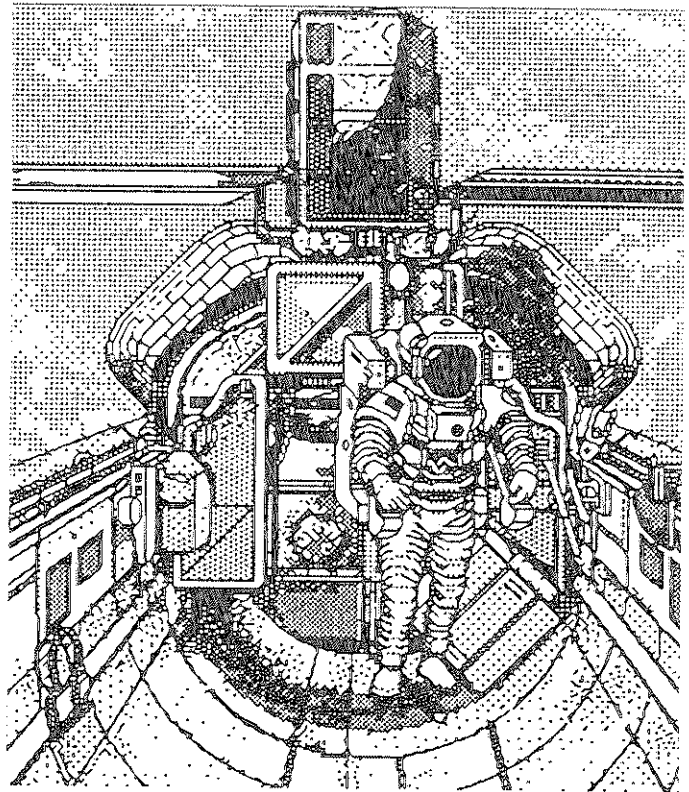
ton, these sensors are the first to know. They alert the ground to launch Phase I. The Phase I vehicles are high altitude mylar boost gliders. Besides being lightweight for extended flight duration, the mylar reflects ground source laser beams to cut down ascending enemy rockets. Next, Phase II activates. Parachute duration models are deployed in the incoming trajectories. These models carry particle beam or kinetic weapons simulated by pellet or BB guns. As the chutes hang in the thermals, they shoot off a few more targets. When in point blank range, the model detonates like an aerial mine. The surviving warheads will encounter Phase III. High speed, port burning motor models will intercept the descending threats. The attacking force will have been defeated by this safety shield and your side wins.

Research on the above scenario can keep you busy enough, just like the SDI contractors are now. Collect your scale data the same way you do for any other scale model and be proud to know you're really breaking new ground on this. Or be creative. All kinds of proposals and concepts are possible. Let your imagination go wild- the sky's the limit. Pretend you're spending government money!

When you've done enough at the drawing board, it's time to start building. Be meticulous in your assemble and remember, reliability is a critical factor. But from here, the hobby may begin to diverge from its prototype source. How much of SDI is presently getting built? And how will its operation be tested? Will it really work? Not just modelers are asking these questions.

Model rocketeers have the opportunity to participate in- even lead, not just follow- our country's technological development. "Models" doesn't always mean replicas of existing prototypes but also *designs for future prototypes!* Engineers and scientists build "models" of everything before they go full scale. The same can apply to SDI. Why not let the American Spacemodeling community contribute? Individuals and clubs could play STAR WARS too, with the nation reaping the benefits of our brainpower resources. SDI demonstrations could be made at NARAM in the space system competition with military brass observing. (Some safety code waivers may be required.)

Is model rocketry an armchair musing with toys or a reflection of our society and technology? No. Well, maybe. The challenges of the future face the model rocketeer and people in the real world as well. Like it or not, SDI is part of that challenge.



First Look: MRC Model Rockets

SNOAR NEWS was the first to tell you about MRC model rockets. Now, in an exclusive feature, *SNOAR NEWS* is the first to build, fly, and review the new MRC model rocket kits!

At first look, the MRC model rocket line reminds one of the old MPC flying model rocket kits. There are a number of striking similarities: attractive packaging, plastic fin units, plastic nose cones, and a big name hobby manufacturer responsible for the whole effort. Hopefully, though, the MRC effort will not suffer the same fate as MPC's. From initial indications, it looks as though MRC will make the grade and become a significant force in the hobby.

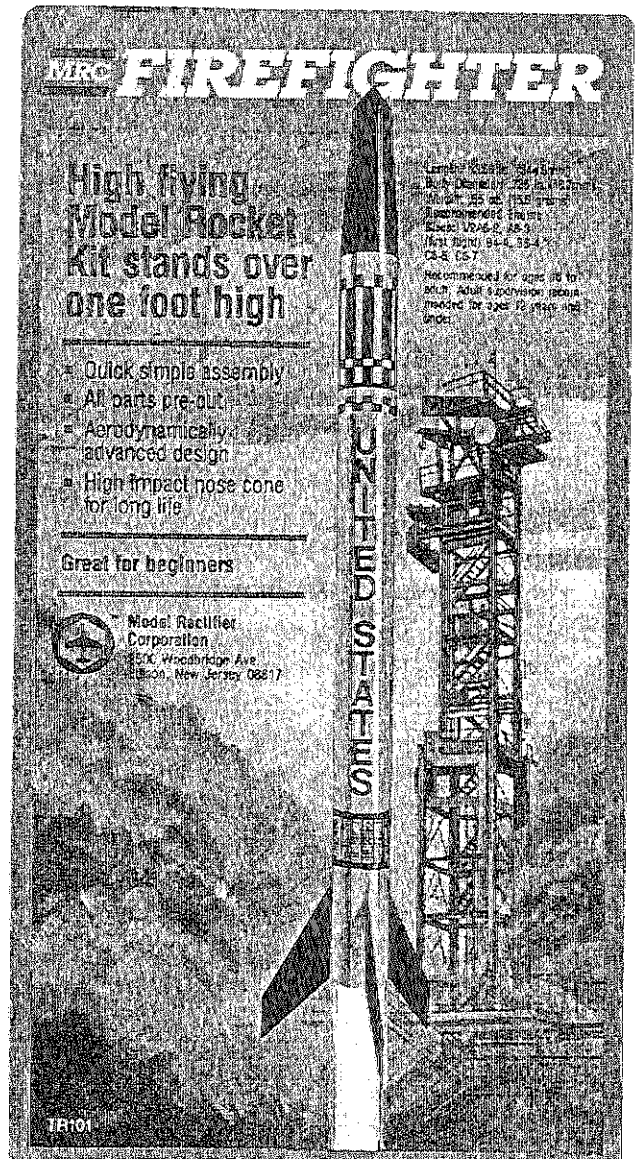
MRC has a solid reputation in the hobby industry as a quality manufacturer. If you wander into a hobby shop and pick up almost any sort of modeling magazine, you are likely to see a full color, full page advertisement for an MRC hobby product. Their line includes radio control cars and planes, as well as plastic models. Their entrance into the model rocket field reflects the same sort of quality seen in their other hobby products.

For this review, *SNOAR NEWS* obtained the following kits: the *Starfire* (\$2.98); the *Firefighter* (\$3.25); the *Hornet* (\$5.98) and the *Wildfire* (\$8.98). MRC must have something for the word "fire" as a kit name, since it shows up in three kit names. The kit prices are reasonable, and in line with Estes's.

Kit Packaging and Documentation

The packaging is similar to Estes kits for the most part, combining colorful artist's renditions of the kits on a facer card in a poly bag. Directions for the kits are average, and are done in the same style as the old MPC kit instructions were. The process flow is good, allowing the modeler to work on items in parallel (i.e., one constructs the parachute while the engine mount joints are drying). I was surprised by the lack of promotion for CA glues in the assembly instructions, since almost everyone has access to them. Also, there is a curious

Below:
The Facer Card for the MRC Firefighter.



quirk in the Hornet's instructions that suggest to mask the nose cone off while painting the body tube. It is much easier to pull it off the tube, and place it in a plastic bag. The directions lack some of the details necessary for the flying the rockets. Considering the target audience, this is a serious oversight. The directions do make it clear that model rockets are not toys, and that the safety code must be followed.

Kit Components

Body Tubes: MRC followed Estes's lead all the way here. There are two basic tubes offered, a BT-20 and a BT-50. The tubes are the standard spiral wound type. However, the tubes that I got had a huge (.125") gap between the seams on the outside. This is much worse than any Estes tube I've seen. One sure wouldn't build a scale model around these tubes, but otherwise they're OK.

Nose Cones: There are three basic types of nose cones offered: a short ogive for the BT-50, a longer type for the BT-50, and a two section conical "contoured" nose for the BT-20 tube. The BT-50 cones are stylish and sleek, but the BT-20 cone is... unusual. All of our samples were cleanly molded from plastic, with out a no-

ticeable flash line. Instead, there is a small mark where the cone separates from a sprue tree. This is better than the Estes plastic cones. The cones consist of two pieces, and the bases fit cleanly into the cones.

Fins: The *Hornet* and the *Wildfire* both use a plastic fin section. Both units look good, fit together well, and are quite strong. The rest of the kits feature balsa fins. All of the balsa looked to be of good quality.

Recovery Systems: The parachutes supplied in the kits are an attractive red, black, and white check pattern. They are also manufactured in Taiwan! I did like the way that the instructions had one tie the parachute to the nose cone without a bulky knot. The shroud lines seem to be inferior in quality to Estes's; they are little more than a thin string, unlike the strong thread that Estes supplies. The shroud lines did come in precut lengths, which is better than the mess that never seem to untangle in the Estes kits.

Standard tape dots are supplied, as well as a rubber strip shock cord. I guess good quality elastic just isn't cost competitive with rubber strip. The shock cord is by far the weak link in the whole system, just like Estes kits. The streamers in the kits were made from florescent orange material like the old Centuri (and now Estes) kits. It's good stuff.

Engine Mount: The MRC engine hook has a front and back, determined by the length of one "tang". Everything looks familiar, with no problems fitting together.

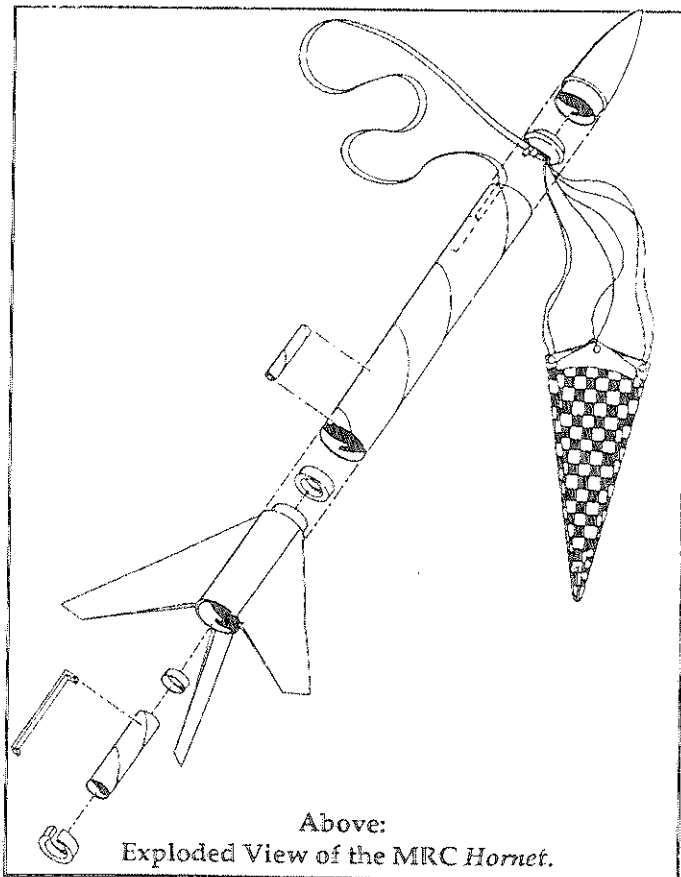
Decals: The decals for the MRC kits are radically different that from any other model rocket. Applying the press-on, multi color decals is a two step process. First, one cuts out the desired decal, and removes the backing sheet. The decal is then positioned in place and smoothed down. Then, a clear top covering is peeled away to leave behind the decal.

The decals look good, but their application takes a bit of practice with the technique to do it right. This is one facet that separates the MRC kits from the Estes kits, but I can't say that I really prefer one method to the other. For high gloss sport, models, the effect is probably better with the MRC decals than the Estes "wet type" decals.

The kit materials are generally similar in quality to Estes's.

Assembly

The models went together well, with no difficulty. In fact, I finished mine in less than 90 minutes, and that included letting two coats of silver paint dry enough to touch!



Above:
Exploded View of the MRC Hornet.

Flight Tests

I got the opportunity to test fly the *Hornet* a few weeks ago when the weather got nice. The motors for the flights (an A8-3 and a C6-5) look identical to Estes motors, except that the nozzles sport that "graphite gray" look that the old Centuri mini motor had. (*The engine specifications are presented at the end of the article.*) MRC has a good sized pack of wadding, and it seems to be a good deal for the price. The wadding is single sheets of a treated paper that has a "waxy" feel, and seemed to work quite well.

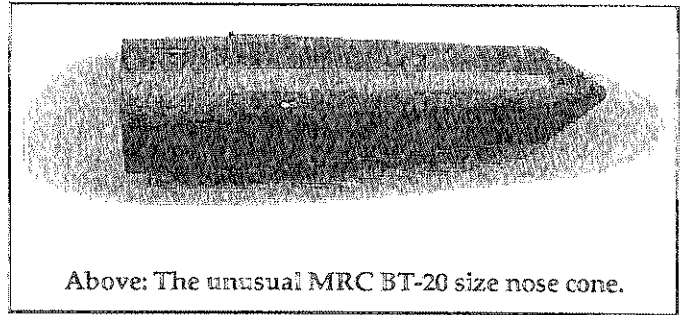
The biggest disappointment with the whole MRC line is their "Power Blast" igniters. The idea looks promising, but it's obvious that the concept needs more development. The igniter consists of a "U" shaped small diameter wire that has a small bit of white pyrogen at the end. Both of the wires are encapsulated in a tiny glass bead to keep the wires from shorting. It looks neat, but I ran into problems in using them. The first one I use was OK, but the second one was twisted above the bead, and would have shorted, had I not untwisted the wires. Then, 5... 4... 3... 2... 1... Misfire! The wire heated and broke just above the bead, nowhere near the pyrogen. Well, it must have been a bad one, right? No, the next igniter looked OK, but it too failed to ignite the motor before burning in half. The overall failure rate I experienced was 60% (3 of 5) on this admittedly small sample. In all the igniters are quite expensive to have such a high failure rate. The igniters need more pyrogen, not unlike the problems Estes encountered with the first Solar Igniters.

All in all, the motors looked good in flight, although there was no discernible difference between the MRC engines and Estes ones. Smoke output though thrust and coast phases seemed comparable, although the MRC engines had noticeably more ejection charge. All in all, it looks like a dead heat,

The *Hornet* flew quite well, pretty much as one would expect. Also, pretty much as one would expect, the rubber shock cord broke on the second flight, allowing the nose cone and parachute to go sailing away. A careful post flight failure analysis concluded that the cord broke because of the strong ejection charge's force pushed the cord to the breaking point. There was no sign of the cord being burned, although the inside of the body tube was quite scorched.

Conclusions

If one was looking for an alternative model rocket company to lead the hobby out of the kiddie corps and into the adult world, MRC ain't it. With their initial offerings, it looks as though MRC has pretty much fol-



Above: The unusual MRC BT-20 size nose cone.

lowed the Estes marketing plan, with few deviations. Their NAR certified engines are slightly more expensive than Estes. It looks as though the "Power Blast" igniters need work, but the wadding and kit decals are suitable reasons to buy from MRC. On this go around, at least, everything else appears to be a dead heat.

To order any of the MRC products, write to: Model Rectifier Corporation, 2500 Woodbridge Avenue, Edison, NJ 08817.

Special thanks to MRC's Kevin Godbee for providing information about MRC's model rocket line, as well as the kits mentioned in the article.

MRC Prices:

(Other than those described above)

Almost Ready To Fly Kits:

Mach V 6.98

Rebel 6.98

Beginner's Kits:

Hot Shot 4.98

Enforcer 6.98

Intermediate Kits:

Wildfire 8.98

Moon Blazer 10.98

Launch Supplies:

Star Launch Pad 6.95

Lunar Launch Pad 11.95

Electro Launch 13.25

Wadding (100 pcs) 1.75

A8-3 3 for: 3.25

B4-4 3 for: 3.25

B6-4 3 for: 3.25

C6-3, C6-5 3 for: 3.60

Power Blast Igniters (6) 2.15

Also due out (but not NAR certified yet):

1/2A6-2 3 for: 3.25

D12-5 3 for: 5.25

MRC Model Rocket Motors

Safety Certified: as of January 1, 1987
Contest Certified: as of April 1, 1987
Motor Propellant Type: Black Powder
Casing Size: 18mm dia X 69 mm (Estes standard)

Motor Type:

A8-3 B4-4 B6-4 C6-3/C6-5

Tested Total Impulse(NSec):

2.30 4.73 3.60 8.25

Burn Time: (Sec):

0.42 0.19 0.81 1.89

Peak Thrust (Newtons):

12.90 10.54 11.13 13.50

Total Mass (Grams):

15.4 18.9 18.1 C6-3: 23.2
C6-5: 23.5

Propellant Mass (Grams):

3.0 6.0 6.0 12.0

Ave Measured Delay (Sec):

2.73 4.52 4.85 C6-3: 2.14
C6-5: 4.00



SISKLE and EBERT on our Cover

"I don't know about you, Roger, but I found this issue of SNOAR News to be innovative, entertaining, informative, and an incredibly ' Good Read!'"

"On the contrary, Gene, I think this particular newsletter is one of the worst of the season. It's trite, derivative, and totally lacking in any redeeming social value!"

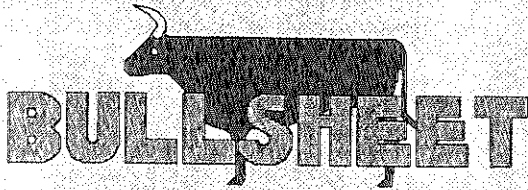


Hello!
I'm Bruce,
the Burrowing Owl,
unofficial mascot
of NARAM-20!

I can't begin to tell you rocketeer chaps how happy I am that my home field has been once again selected as the site for the national meet.

So, I'm dressin' up in my finest, and I'm planning on making this NARAM one contest you'll never forget!

Courtesy of Mr. Maddog of Mile Square.



From Your Sometimes Sober Editors
(Continued from Page 2)

In August, the Board will propose that the NAR By-laws be ammended to remove the "punishment" from the act of flying high power rockets by a NAR member.

Quite frankly, in light of events as recent as five years ago, I find this a remarkable change of approach. It means that the NAR and the "high power flyers" (be they Tripoli or whoever) will no longer be adversaries, but rather partners in advancing safe rocketry as a whole.

The situation represents yet another triumph for those who fly high power rockets. No doubt, many rocketeers will look back on the mid to 1980's as a very dynamic time in the NAR's history. It will remembered as the time when "the NAR grew up". Instead of continuing down a narrow, close minded path, the NAR instead chose to expand its Safety Code, and removed the penalties for flying high power rockets. As a result of these actions, as well as others, the outlook for the NAR is quite positive.

Why has the NAR made these changes? The overall reason is the adult nature and the apparent safety of the high power sport. Despite some acts of poor judgement by a group of California rocketeers, the majority of high power rocketeers are safety concious craftsmen who take a great deal of pride in their "models" (as opposed to "the toys that Estes sells"). Interestingly enough, the same group of California rocketeers who greated the safety concerns are the ones who are attempting to take credit for implimenting new changes. Nothing could be farther from the truth.

While it will still take a considerable amount of time to move these changes through the NAR, the FAA, the DOT, the NFPA, and various state legislative bodies, the changes are being made. Perhaps another "Golden Age" of model rocketry is about to begin!

Matt and Mac SE

Word is out that some new model rocket motors are under development at Vulcan Systems. No specific parameters are available yet, but we understand Vulcan will be expanding their model rocket motor line (E, F, and G) considerably.

Tansolve is now distributing their XMTR-1 through North Coast Rocketry. A directional antenna for the XMTR-1 is also being developed. Also in the works is an altimeter device that should be in the market shortly. An IC pressure sensor will send pulse coded data to a ground frequency counter display. A 50,000 ft altitude is projected to be the maximum that the XMTR-2 can handle, well below most high power rockets' maximum altitude. This should be an interesting device, particularly for G powered models.

On the high power scene, it seems as though High Power Research is struggling to publish even 2 issues a year. We also understand Mark Mayhle and Crown are still doing business. And, we hear Irvine and Company (i.e. U.S. Rockets) still owes a number of people money, but U.S. Rockets is shipping some orders- only 4 months later.

The MIT Competition Handbook is back in print at NAR, thanks to Matt and George, who lent their copies to be reproduced. If you don't have a copy, pick one up. Many of the plans are still very competitive today.

NARAM 30 to be held in the Rocket City? Could be. The Huntsville Area Rocketry Association is getting serious about putting together a bid for the thirtieth anniversary of the NAR Annual Meet. Possible Contest Director: How about Matt "The Man of" Steele?

SNOAR NEWS is produced on an Apple Macintosh SE with an internal 20 Megabyte hard diskand two 800K floppy disk drives, a Laserwriter Plus, and an Abaton 300 FB Scanner. Software used to produce and mail this newsletter include Macwrite, MacPaint, Ready, Set, Go 3.0!, MacDraw, FullPaint, MacDraft, C-Scan FB, Cricket Draw, Mac Lightning Spelling Checker, SuperPaint, FileMaker Plus, and MS Chart.

NEW NORTH COAST ROCKETRY KITS FOR 1987!

North Coast Rocketry begins its fourth year by announcing 14 new kits, new advanced motors, and an expanded line of parts and supplies. With this much variety, there's bound to be one for everyone!

The NCR Viking is one of our new "flagships". A four inch diameter model built for a single G motor, it can also be constructed with motors in the strap-ons (parts supplied!). Introduced at NARAM-28 and LDRS-5, the North Coast Star Spangled G Bird is a 2.6 inch maxi-length kit (almost 7 feet long) that is perfect for demonstrations. Also new this year is the super sized "Redwing ASP", a sport scale model of the famous rocketsonde that stands over seven feet tall! This one will change the very nature of the NAR sport scale event!

NCR has expanded their line of model rockets with such kits as: the Orbit, a BT-18 high performance, high efficiency design; the Long Tall Sally, a record holding F Super Roc; the Corporal C, a sport scale model of one of the Army's first tactical missiles; the Eliminator, a sexy sport design; the Aladdin, a next generation stealth cruise missile design; the Renegade-X, a rugged high flyer; the Saber SR, a long, lean design featuring a trio of strap ons; the Thunder-

bolt, a BT-26 rocket for F motor performance; and, the ASAT-21X, a super detailed BT-39 "Anti Satellite" model that might be confused with the real thing! Another new maxi-kit is the North Coast Orion, which offers optimum performance with Class B motors.

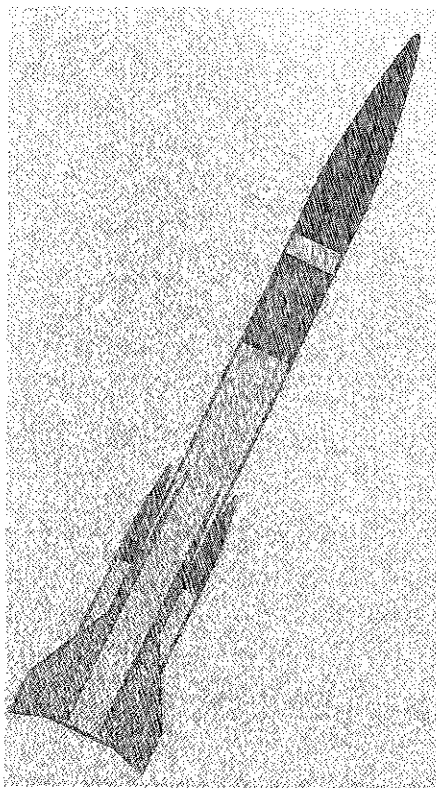
North Coast Rocketry is proud to announce that it is now a distributor for the PIC line of modeling adhesives. This was in response to various requests that we provide a source for our construction supplies. With this, NCR becomes the only high-power rocket manufacturer which offers a complete line of adhesives for the modeling community.

North Coast will also be offering Monokote trim sheets. These sheets, long a Pearson/Steve "secret" to fantastic finishing, make any model look super without the hassles of painting or masking.

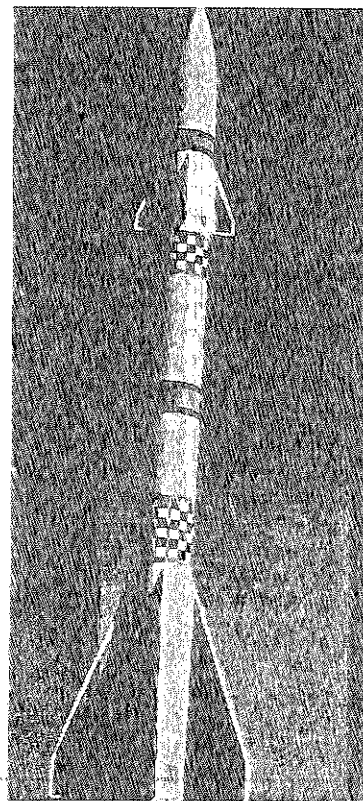
NCR has added a new BT-7 tube with an increased in length to 34 inches. It is twice as thick as the Estes BT-20 at less than one half the cost, which should be perfect for Super Roc competition.

Please note that NCR's address has changed; it is now:

North Coast Rocketry
P.O. Box 240017, Mayfield Heights, OH 44124

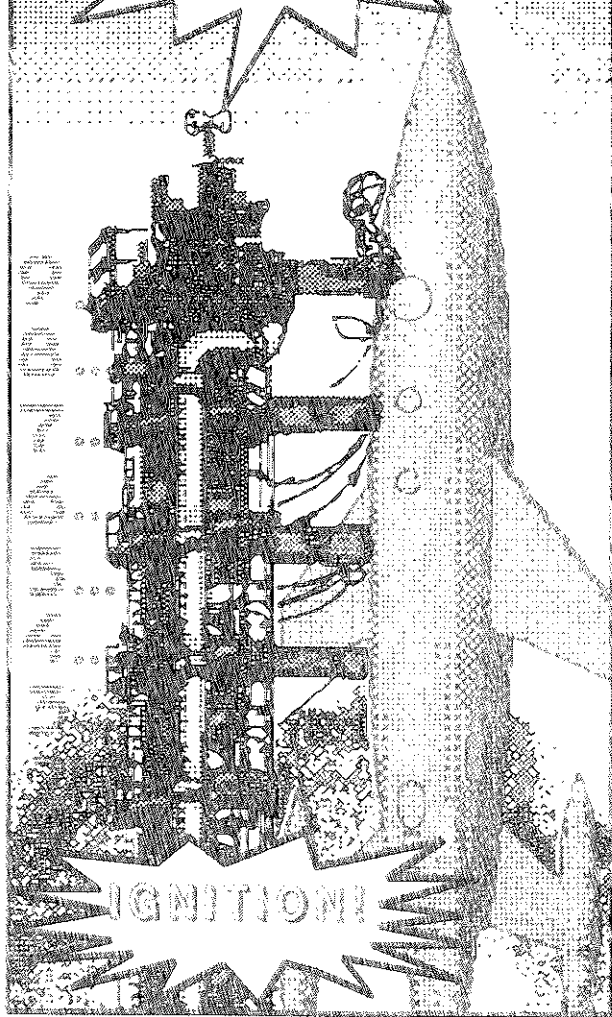


At Left:
NCR Viking, featuring
optional strap-ons.
At Right: The new NCR
Lance Beta,
a tactical missile design
that stands 45" tall and
is 2.6" in diameter.



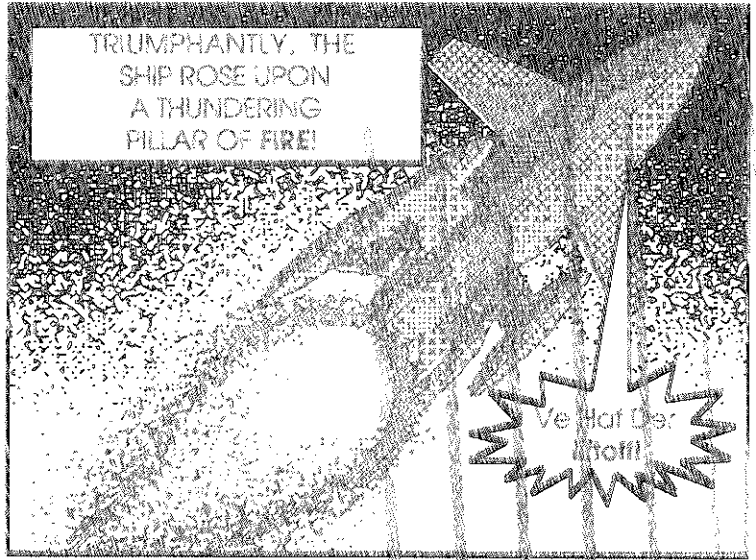
NORTH  COAST
ROCKETRY

WARNING!
The Starship SNOAR lifts
off in 10 seconds!



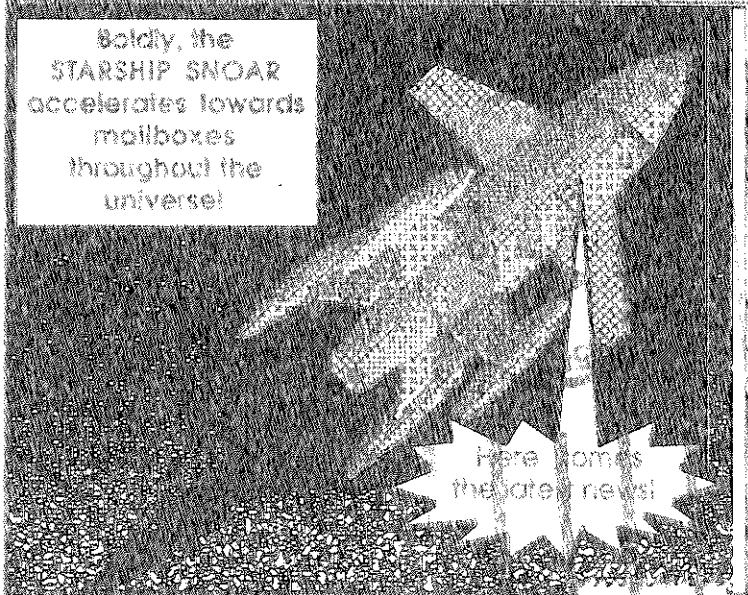
IGNITION!

TRUMPHANTLY, THE
SHIP ROSE UPON
A THUNDERING
PILLAR OF FIRE!



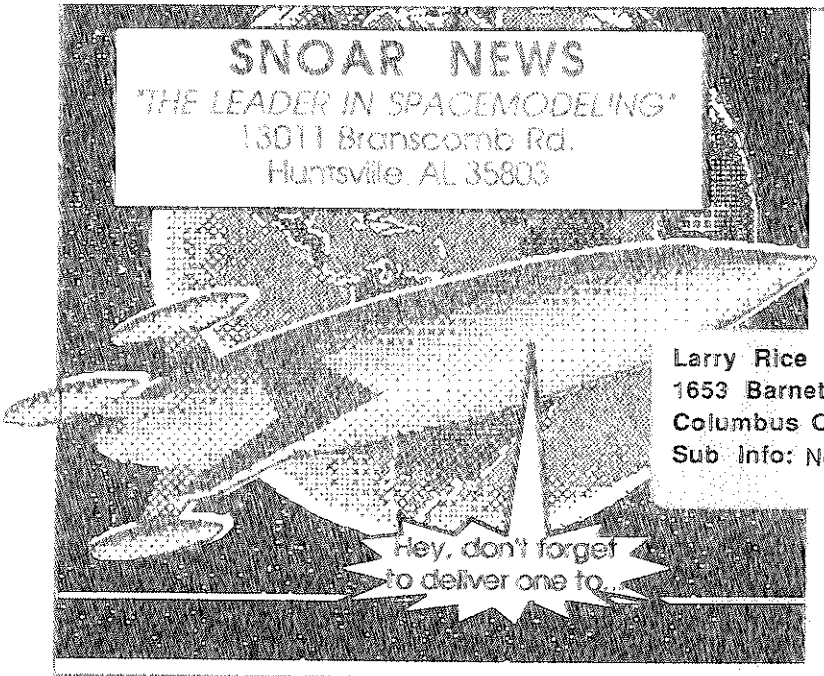
Ye Hat Der
Hoff!

Boldly, the
STARSHIP SNOAR
accelerates towards
mailboxes
throughout the
universe!



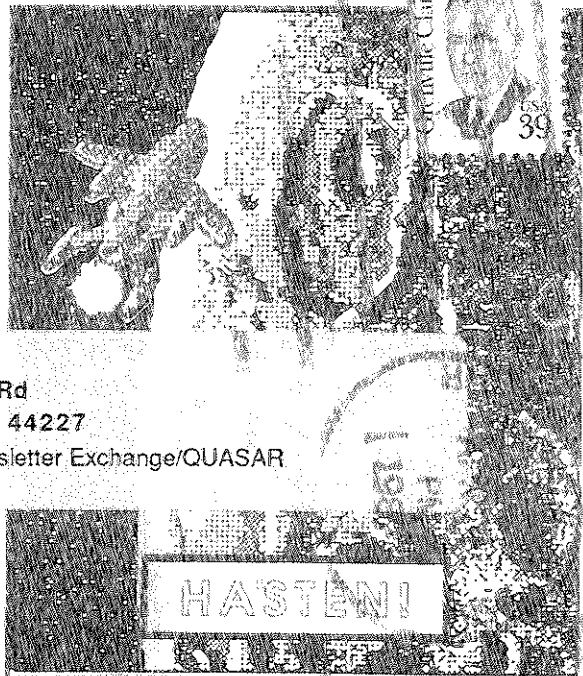
Here comes
the late news!

SNOAR NEWS
"THE LEADER IN SPACEMODELING"
13011 Branscomb Rd.
Huntsville, AL 35803



Hey, don't forget
to deliver one to...

Larry Rice
1653 Barnett Rd
Columbus OH 44227
Sub Info: Newsletter Exchange/QUASAR



HASTEN!