

DECEMBER 1972

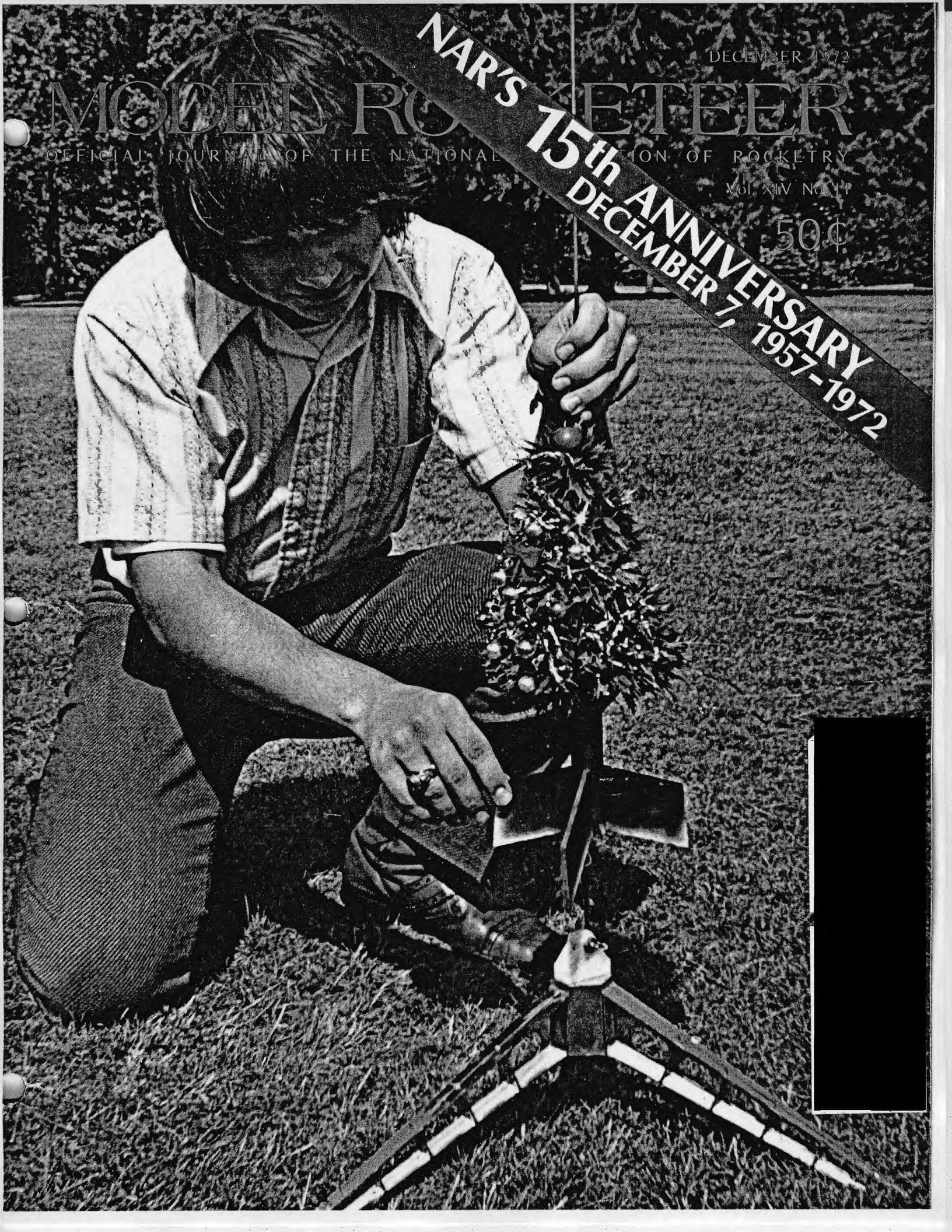
# MODEL ROCKETEER

OFFICIAL JOURNAL OF THE NATIONAL ASSOCIATION OF ROCKETRY

Vol. XIV No. 11

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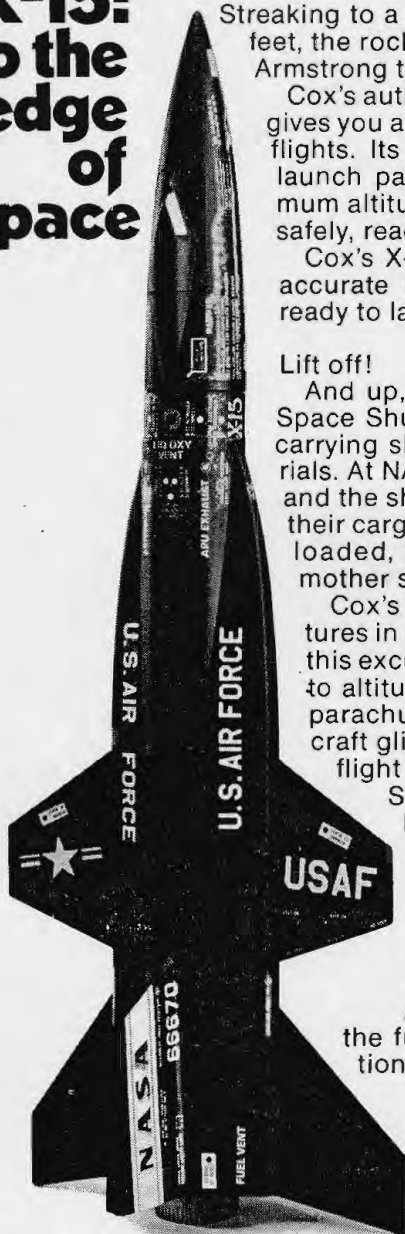
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# MODEL ROCKETEER

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Vol. XIV No. 11

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**COVER PHOTO**

Stuart Zaharek prepares to launch his flying Christmas Tree. The Model Rocketeer staff wishes a happy holiday season to all our readers. (Photo by Bob Mullane)

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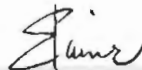
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## EDITOR'S NOOK

The first of our new product evaluations appear on page 7. We hope you find the comments useful, and we'd like to thank Cox for sending the *Model Rocketeer* kits to build and test fly.

We have received some comments on the cover of the August *Rocketeer*. Apparently a picture of something that wasn't strictly a NAR event was objectionable to certain members. We can't see why this should be so. After all, a NAR section was one of the sponsors of the 4H meet, so the NAR was involved. We used the cover (and the story, for that matter) because we think that NAR sections should get involved with the affairs of their communities. Throughout the years, NAR sections have been helping the handicapped, the underprivileged, and community groups. This month we have a report from a section in Missouri (see *Missouri Section Launches Modroc Program at Boys' Town* on page 6) whose members are seeing to it that the kids at Boys Town will be able to enjoy model rocketry as much as they do. What harm can spreading out to the community possibly do? On the contrary, we think it can do a lot of good. First, it makes people aware of model rocketry, and eventually it might bring the NAR some new members. Second, it improves the image of model rocketeers. People who see us as either children playing with toys or mad bombers might not change their opinions after looking at standard press and TV coverage of rocket meets, but seeing rocketeers involved with their communities could show the public that NAR members are mature and responsible. And third, of course, this type of involvement brings enormous satisfaction to those who participate in it.

We're sorry some of you didn't get the point from the photograph and story; we hope this explanation helped.



—Elaine Sadowski

Send questions, ideas and gripes about NAR (don't forget about the "Loudly from a Broken Soapbox" and "If I Wrote the Pink Book" columns!) to:

Robert Mullane  
NAR in Action Editor  
34 Sixth Street  
Harrison, New Jersey 07029

Send technical articles and plans to:

Patrick Stakem  
Technical Editor  
1001 Rockville Pike, Apt. 625  
Rockville, Maryland 20852

Section news goes, of course, to:

Charles M. Gordon  
NAR Section News  
192 Charlotte Drive, Apt. 2  
Laurel, Maryland 20810

Manufacturer releases on new products should be sent to:

Robert Lieber  
Manufacturer News Editor  
6323 Waldron Street  
Pittsburgh, Pennsylvania 15217

Send your rocket plans to:

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Any other articles, photographs, cartoons, ideas, etc. go to:

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*Model Rocketeer* Editor  
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COME VISIT THE **NEW...**

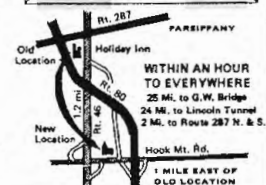
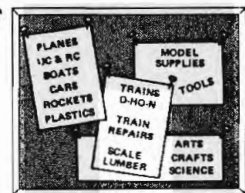
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SEND .25 FOR CATALOG.**



# NAR NEWS

All NAR members in the Rhinelander, Wisconsin area interested in forming a section please write to:

Curtis Squires, Star Route 2, Rhinelander, Wisconsin 54501

### Speak Out!

There is still time to return your NAR Evaluation Questionnaire (see August *Model Rocketeer*) to Wanda Boggs. Completing this questionnaire gives you a chance to speak out on the NAR. If you have a gripe, tell the NAR. You can't expect NAR officials to remedy problems that they don't know about, so send in your questionnaire before December 25.

### Missouri Section Launches Modroc Program at Boys' Town

After a May sixth program at Boys' Town of Missouri, members of the St. Charles Model Rocket Club (S.C.A.R.E.) elected to take on the task of seeing to it that model rocketry would thrive at Boys' Town, even though there are no finances available for such a program at the town. S.C.A.R.E., in cooperation with local hobby shops, staged a series of five demonstration launches to receive merchandise awards from Estes Industries. The last of the launches took place on September 30. S.C.A.R.E., using the merchandise award, will donate a launch system, rocket kits, and engines, along with finishing materials, to Boys' Town.

Major Donald H. Somerville (USAF), Senior Advisor, and members of S.C.A.R.E. are to be congratulated for an excellent showing of concern for the welfare of other, less fortunate, individuals. Other clubs should take notice of this unselfish giving of time, energy, and money, for a very deserving group.

—David B. Flagg

(Other clubs wishing to help with kits, engines, or donations please contact: David Flagg, P.O. Box 864, St. Charles, Mo. 63301.)

### Trustee Election Coming Up

The triennial election for the NAR Board of Trustees will be held at NARAM-15. The following procedures will apply to that election:

1. The NAR By-Laws encourage voting by mail for those voting members (Leaders, Seniors, Honorary, and Manufacturer members) who cannot attend the election meeting at NARAM-15. A ballot will be printed in the July issue of the *Model Rocketeer* (to be mailed by June 15) with 1) the names of those nominated by the NAR Nominating Committee, and 2) the names of those nominated by mail prior to April 15, included. This ballot must be returned before August 1.

2. Any NAR Senior member may be nominated by any voting NAR member (including himself or herself). A letter indicating the consent and home address of the nominee must be attached to all mail nominations.

3. Accompanying the ballot in the July issue will be a brief biographical resume of each nominee indicating his or her experience, qualifications, and any connection with model

rocket manufacturers. These resumes must not be longer than 150 words, and must be in the hands of the NAR Secretary by April 15. Those nominees who fail to submit a resume by April 15 will be listed in the resume section by name, but with the comment "NO RESUME RECEIVED". The city and state of each nominee will be listed after her or his name.

4. Nominations may be made from the floor as provided by the By-Laws at the NARAM-15 election meeting. Any voting member who has not returned a mail ballot may vote at that meeting.

5. The new Board of Trustees will meet at NARAM-15, and will elect officers then.

Nominations and resumes should be sent to:

Jay Apt  
NAR Secretary  
15 Line Street  
Cambridge, Massachusetts 02138

### CANADIAN NEWS NOTES

#### CAR to Go to Cape Kennedy

Hillel Diamond of the Canadian Association of Rocketry has announced that his group in Toronto is planning to go to Cape Kennedy for the last Apollo launch on December 6. Any

interested rocketeers in the Toronto area should contact Mr. Diamond, c/o The Science Shop, 137 Yonge St., Toronto 1, Canada, or call (416) 364-2610.

#### ARRA Forms Scientific Applications Group

Steve Kushneryk of Montreal's Atmospheric Rocket Research Association has, along with other R&D oriented members, formed the Scientific Applications Group. This group is devoted to doing scientific work in rocketry. It is separate from the ARRA and membership is open to anyone in the U.S. or Canada who is interested in flying experiments or aiding in range support. For more information write the Group at P.O. Box 1455, Place Bonaventure, Montreal 114, Quebec, Canada.

### OOPS!

An error has been found in the September issue's *Editor's Nook*. The line reading "a check from *Model Rocketry* was returned . . ." should read "a check was returned from *Model Rocketry* . . ." It was NAR's check.

By the way, please don't send minor corrections to the *Model Rocketeer* office. We know we make mistakes, but we can't print corrections for every one.

# NAR IN ACTION

### A MESSAGE

#### TO THE SOUTHLAND DIVISION FROM THE SOUTHLAND DIVISION MANAGER

I feel that this effort to communicate has been long overdue, so I chose this method to share some needed information with the Southland Division.

There are many channels of communication available in our division to help sections with problems or just to be of service. Unfortunately, very few people know who to contact in their areas should they need assistance or information. Listed below are the State Directors of Section Activities for each area of the Southland Division.

The Virginia, West Virginia, Maryland and Delaware area (Area 1) is headed by Roland Gabeler. Not long ago he lent his time to the NAR's Transpo '72 effort. Roland's address is 5105 W. Franklin, Richmond, Va. 23226. He has recently named two assistants who will be listed later when I receive their addresses and the areas they will serve.

The North/South Carolina area (Area 2) has no State Director of Section Activities as yet. Anyone interested please drop a line to me for information. Sections and NAR members should contact the State Director in the area closest to them or the Regional Manager.

The Florida/Georgia area (Area 3) has Larry Caplinger as its State Director. Larry's address is 2117 Anton Terrace, Hollywood, Florida 33020. Larry is busy setting up communication lines and would like to hear from sections and unaffiliated NAR members in his area. I'm sure this also applies to the other State Directors.

The Kentucky/Tennessee area (Area 4) has William Tippit as the State Director. William can be reached at The Memphis Bank and Trust Building, 4515 Poplar Avenue, Suite 130, Memphis, Tennessee 38117. He has just been appointed, so those of you in his area should contact him so he can get started.

Area 5, Alabama and Mississippi, has few NAR members and no NAR chartered sections and so, at the moment, no State Director of Section Activities. Those of you in that area who might want to start a section or need information from a NAR representative, write to the State Director in the Area closest to you.

In the Louisiana/Arkansas area (Area 6), John R. Huerkamp has recently been appointed State Director for Section Activities. John is waiting for this procrastinating Southland Director to send supplies so he can get started. Those of you in his area can contact him at 5373 Pasteur Boulevard, New Orleans, Louisiana 70122, so that he knows who is active there.

The people listed above and myself, have the job of encouraging existing sections to grow, helping new ones to get started, helping with problems and supplying information and NAR literature where they are requested. We promote the NAR and encourage the use of imagination by everyone to bring about new and exciting ideas to help model rocketry grow. We all want to hear what new ideas and projects you are engaged in. When we can, within each of our means, we try to visit as many sections as possible. We are available to help and to try to let every part of the Southland Division and the rest of the country know what everyone is doing. Start Communicating! Let us hear from you. If we work as a team, the Southland Division will grow by 50 to 100% by NARAM 15. For the Southland and SOUTHPower . . .

Sincerely,

Richard A. Barnard  
Southland Division Manager

**PRODUCT EVALUATION**  
"Upated Saturn 1B" Model Rocket Kit,  
L. M. Cox Co., \$5.00

The L. M. Cox Company is well known for their plastic model airplanes powered by small gasoline engines. A few years ago, Cox entered model rocketry with some pre-assembled plastic model rockets. These rockets sold fairly well, in spite of the fact that "balsa and paper" rocketeers refused to fly them. Now Cox has expanded the line to include plastic model rocket kits. The uprated Saturn 1B is one of the models in this new group of kits.

The Saturn 1B model rocket kit comes in a very large, colorful box and retails for \$5.00. The kit includes plastic rocket components, a pre-assembled parachute, a launch rod, a tube of glue, decals, and instructions. The only additional items that have to be purchased to complete the model are a bottle of black paint and a brush. The assembly instructions are concise and pictorial, but not clear enough. It is difficult to visualize the position and function of all the plastic components, and although the rocket goes together quickly, there is always a little doubt about what the instructions are trying to show.

The engineering of the rocket is excellent. It is sturdy, and well designed. Painting the rocket is a snap, because the rocket has deep corrugations and embossed lines along all of the paint borders. You can almost paint this rocket in the dark and do a good job; the embossed lines help even the clumsiest painter to draw perfect straight lines along the borders of each painted area. Furthermore, most of the rocket is left unpainted since the plastic is the proper shade of white.

The model makes a very nice static show piece, although it is not an exact scale model. Large plastic launch lugs, and the embossed word "Cox" in two locations detract from the overall effect. In addition, the delicate escape launch tower is reinforced by a large chunk of plastic inside of it. Under the circumstances, I think that this trade-off of scale accuracy for structural strength is a legitimate one.

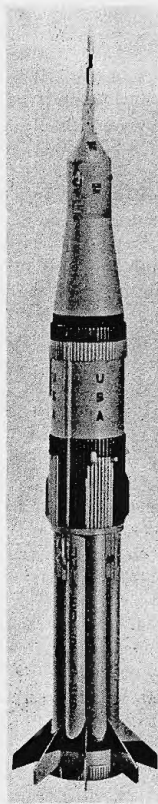
The rocket is equipped to fly with either a single D12 engine or a pair of C or B engines. Engine retainers and a clip whip for Cox igniters are included with the kit. We flew the kit with a pair of Estes C6-3 engines first. The engines ignited simultaneously in a very slight breeze, and the rocket lifted smoothly off the pad, slowly somersaulted across the sky under power, and fell back to the ground before the engine delays had ejected the parachute. The only damage to the rocket was the loosening of some of the glue joints.

For the second flight, we tried a single D12-3, figuring that the small decrease in weight at the rear of the rocket might make it stable. This time the rocket flew straight up to over 200 feet. The ejection charge blew the parachute out at apex, and the chute opened immediately. The glue of the nose cone assembly did not hold, however, so the nose cone separated from the parachute and fell to the ground. An inspection of the rocket after the flight revealed that a number of glue joints had given way or were noticeably weakened. Obviously, the builder should use plenty of glue, especially on the nose cone assembly.

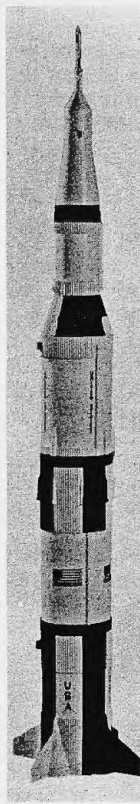
In conclusion, the Cox uprated Saturn 1B might be a good second rocket for a young child who has been using a ready-to-fly Cox model rocket. The instability of the rocket is disconcerting, but not dangerous. A little more nose weight would fix the problem.

# NEW

FROM THE MANUFACTURERS



APOLLO  
SATURN 1B  
KIT  
by COX



APOLLO  
SATURN V  
KIT  
by COX

### Specifications

Length: 22 inches  
Maximum diameter, at base: 4.5 inches  
Weight: approximately 5 ounces  
Suggested engines: (2) B6-2, (2) C6-2,  
(2) D8-3, (1) D12-3  
Recovery: single parachute  
Assembly time: 30 minutes  
Painting time: 1 hour  
Construction material: ABS high temperature plastic

—Richard Fox

Marsha Bishop, NAR 21884, of Honolulu, Hawaii, has told us about a new Revell kit, "V-2, World's First Ballistic Missile". The kit contains a highly detailed V-2, launcher, elevator, transport, and crew, and according to Marsha, is large enough for plastic conversion.

**PRODUCT EVALUATION**  
"Saturn V" Model Rocket Kit,  
L. M. Cox Company, \$8.00

The first thing that I noticed upon receiving the kit was that Cox claims it can be built by someone 12 years old or older. After working with it, I agree, but I think that more experienced modelers will want more of a challenge. There is really nothing difficult in this model, so it is excellent for a beginner who wants an impressive looking model.

Construction is fairly straightforward. Painting should be done before gluing, though. You must provide your own paint and brush; everything else is included. I ran into only one hitch in building the model—the launch escape rocket body was too large to fit into the tower as it should. This required using a tool of some sort to ream out some of the excess plastic. Incidentally, that was the only tool I found it necessary to use. It took me half an hour to build the model and about two hours to paint it, but I'm sure it can be done in much less time if attempted.

There are only a few things wrong with this kit, most of them in the instructions. Several times I saw that something was indicated by parts and pictures, but not mentioned in the instructions. For example, the model has a lug to tie a static line to, a picture on the box indicates the use of a static line on the nose recovery rigging, and the parachute itself is tied to a piece of shroud line suitable for use as a static line, yet nowhere in the instructions is there any mention of a static line. Also, two parts were included that were not mentioned in the instructions. In the end I left them out. The most serious thing wrong with the model is the lack of space to pack the parachutes, even though the body is long. I must give all due credit to Cox, as they did a good job in keeping the weight down.

This model flies with a two-engine cluster, the engines being either C6-2 or 3's and D12-3's. From the information on the box it appears that the model can fly with only one D engine, but this is not so. The engines are retained with the usual Cox plastic engine clip. It seems to work, but installing it may be a problem if you have big fingers or aren't very dexterous. The fairings on which the fins sit have holes into the body at their top instead of coming to a point. At first I wondered about this, but they are very useful for checking shorted microclips (if you don't use the Cox igniters).

In all honesty, I must say that this model flew very well. It was stable and the recovery system was sufficient for the weight. I must recommend that you never use a longer delay than those suggested or you will be digging your model out of the ground.

In conclusion, I can say that this is a good kit for all, though not very challenging.

—Alan Stolzenberg

### ACT To Get Modroc Kits

Major model rocket manufacturers together with other hobby kit manufacturers who are members of the Hobby Industry Association of America have donated 3000 hobby kits to ACT, Action for Children in Trouble. ACT plans to distribute the kits in a pilot program to juvenile delinquents and school drop-outs. The purpose of the program is to offer underprivileged youth a meaningful alternative to anti-social activities.

# BASIC STATISTICS FOR R&D

by Jay Apt

Many R&D projects base their conclusions on quantitative experimental data taken as part of the project. However, few reports show any concern for taking a lot of data at each data point they present, and hence make their conclusions shaky at best. Suppose a project sets out to determine whether black rockets go higher than white rockets of the same design. If the experimenter builds the models, launches each once, and reports that the black rocket was tracked to 330 meters, and the white one to 320 meters, most of us would feel that a conclusion that black models do indeed fly higher would be unjustified. The basis for this intuitive feeling is our experience that engine thrust is not constant from one engine to the next, and that tracking really isn't very precise. We'd have been much more confident of the results if he had launched the model hundreds of times and reported that the difference in the average altitudes was greater than could be accounted for by tracking errors.

This example illustrates two of the many types of uncontrollable external variables whose fluctuations can cause a single piece of data to be far from an average obtained by making a large number of experimental runs. If these fluctuations are as likely to be negative as positive, they are called *random* fluctuations, since they introduce a random error in any single piece of data that cannot be predicted. For example, the variation in engine thrust discussed previously introduces a random error in altitude. Or, if you perform a Gregorek-type strobe B/G glide analysis (*Model Rocketry*, November, 1971), the speed at which you throw the glider can also be considered as fairly random. It should be clear that for this type of fluctuation—where the error from the average is as likely to be positive as negative—that the more data you take, the closer your average value is likely to be to the true result.

If you are to convince anyone that the conclusion you draw from your data is valid, it is very important that you make some estimate of the error due to these random fluctuations. For even if you launch your model in an altitude experiment 20 times, you can't be sure that you have averaged out the engine and tracking fluctuations. What we want to be able to do is report data with an error estimate— $330 \pm 40$  meters for example—which says that we are reasonably confident that the average altitude we would get if we launched the model a hundred thousand times would be somewhere between 290 and 370 meters.

Suppose that the day before we do our experiment, the ghost of Dr. Goddard sneaks out to the launch field and *does* launch our model a hundred thousand times, with closed tracks each flight. If he uses, say, a B engine with a rated total impulse of 5.00 newton-seconds, he may get some engines with very little thrust, and some with as much as 10 or 15 nt-sec, all because the engine-making machines aren't perfect. So he'll have some flights that barely get off the pad, while others will make him swear that our model will win design efficiency at the next contest. A graph of his altitudes would then be like that shown in Figure 1. (This bell-shaped curve is familiar because many types of fluctuations follow the same principle as engine variations: the likelihood of any one piece of data varying from the average a small amount is high, and although it doesn't happen very often, data sometimes varies a large amount from the average.)

When we go out to the field the next day, we can't take nearly as many data points as Dr. Goddard did, so our data might look like that shown in Figure 2. In general, the average of our data won't be the same as his, since we probably haven't averaged out all the fluctuations in engines, tracking, etc. What we must now do is mathematically analyze our data to make an estimate of how far off the true average our average from the 20 flights is; that is, compute probable error limits.

Even though we have taken only a few data points, they should fall on the same shaped curve as Dr. Goddard's, since any collection of data is just a sample of the data that would be recorded if the experiment were repeated forever. So we can use this bell-shaped curve as a model for our data, and use the mathematical analysis of this type of curve that was developed long ago. What we are interested in is the best possible estimate of how far the average of our data is from the average of the data from the experiment repeated forever. In mathematical terms, this best estimate is called the *standard deviation of the mean* ("mean" is just another word for average). This "standard deviation" is a standardized "best estimate" of the difference of our average from the true average. It is standardized in such a way that if you report an altitude of 330 meters with a standard deviation of the mean of  $\pm 40$  meters, you are saying that you are 68% confident that the true average lies within one standard deviation ( $\pm 40$  meters) of 330, and 95% confident that the true average lies somewhere within  $\pm 80$ , or two standard deviations, of 330.

We calculate the average of our data in the normal way, by adding up all the altitudes and

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Jay Apt, a NAR Trustee and founder of the Steel City Section in Pittsburgh, is currently a graduate student in physics at the Massachusetts Institute of Technology. Jay has served both as Chairman and Secretary of the Leader Administrative Council, and he won the National Team Championship Award (with his partner, Dave Bayard) several years ago.



dividing by the number of flights. If N stands for the number of flights, X(1), X(2), X(3), etc. are the altitudes of the flights, and  $\bar{X}$  is the average, the formula is\*:

$$\bar{X} = \frac{1}{N} \sum_{I=1}^N X(I)$$

Having once calculated this average, we can get the standard deviation of the mean from the following formula where  $\sigma_m$  stands for the standard deviation of the mean:

$$\sigma_m = \frac{1}{\sqrt{(N)(N-1)}} \sqrt{\sum_{I=1}^N [X(I) - \bar{X}]^2}$$

This formula tells us to find the difference between each of the data values and their average, then square that difference. We do this for all of our data values, add all the squared results, and take the square root of that sum. We finally divide this result by the square root of N, (the number of data points) times N-1 to get the standard deviation of our mean. The standard deviation of the mean of the 20 data values shown in Figure 2 is worked out in Table 1.

It is this standard deviation of the mean that we should quote as the error attached to our average altitude (here it would be  $329 \pm 4$  meters). And the formula for  $\sigma_m$  tells us several interesting things. First, we see that we can reduce the standard deviation of the mean simply by taking more data, since it will get smaller as N increases. Second, if our data is widely scattered, the quantity  $[X(I) - \bar{X}]$  will be large for most of the data values, so  $\sigma_m$  will also be large. So we know that if most of the altitudes in an altitude experiment, for example, are not about the same, we should not expect their average to give very precise information. For example, it would be wrong to draw any conclusion about whether the black rocket goes higher than the white rocket based on data of  $330 \pm 20$  meters for the black rocket and  $320 \pm 20$  meters for the white rocket, no matter how many flights are included in the data. Analyzing your data in this way in the field isn't very difficult, and can often tell you whether you need to take more data to be able to draw a valid conclusion.

The formulas we have just discussed give an estimate for the uncertainty in your data only for random errors of the type previously illustrated. Keep in mind that things like differences in fin finish, launch lugs, calibration of any measuring apparatus, linearity of data sensors used, and personal errors on the part of the experimenter can put the average of the data taken much farther from the true average than is indicated by these formulas. That's why it's important to fully describe the experimental procedures used in your report.

Finally, note that although we have used an altitude experiment as our example in this article, the same principles of taking a lot of data at each data point and reporting the averaged results with standard deviations of the mean attached apply to all R&D projects where quantitative data is taken.

\*For those unfamiliar with it, the notation

$$\sum_{I=1}^N X(I)$$

is a shorthand that tells us to add  $X(1) + X(2) + X(3) + \dots + X(N)$ .

X(I)	X(I) - $\bar{X}$	$[X(I) - \bar{X}]^2$
305	-24	576
305	-24	576
310	-19	361
315	-14	196
320	-9	81
320	-9	81
320	-9	81
325	-4	16
325	-4	16
325	-4	16
330	1	1
330	1	1
330	1	1
335	6	36
335	6	36
335	6	36
340	11	121
345	16	256
360	31	963
370	41	1681
N=20		$\sum [X(I) - \bar{X}]^2 = 5132$
$\sum_{I=1}^{20} X(I) = 6580$		$\sqrt{5132} = 71.6$
$\bar{X} = 329$		$\sigma_m = 3.7 \approx 4$

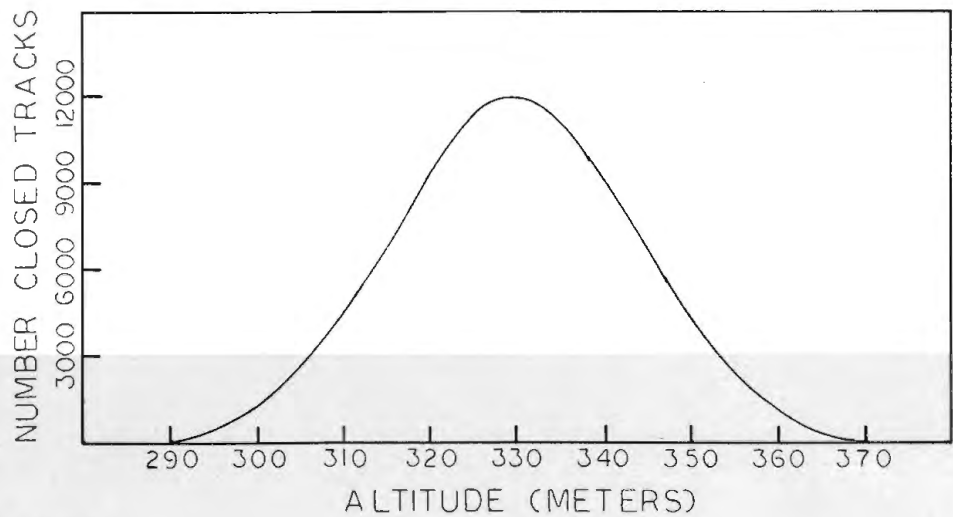


FIGURE 1

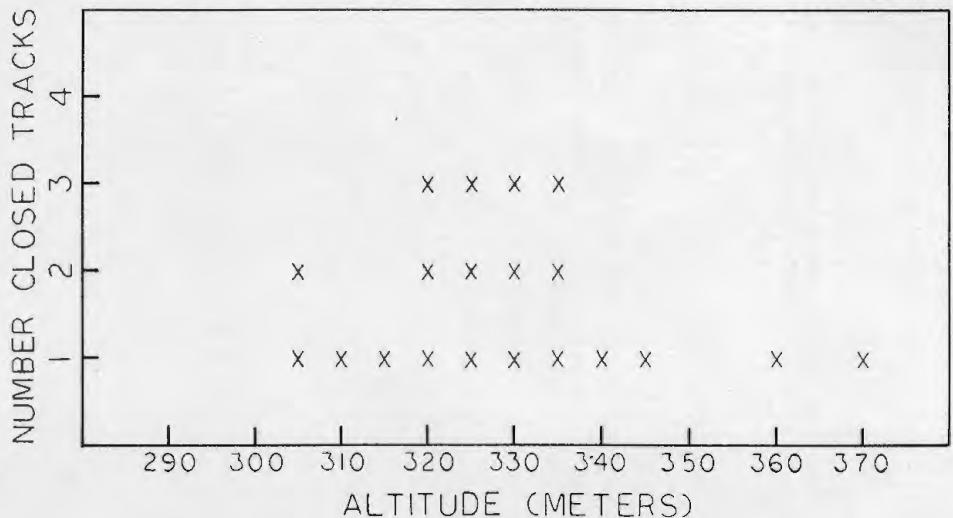
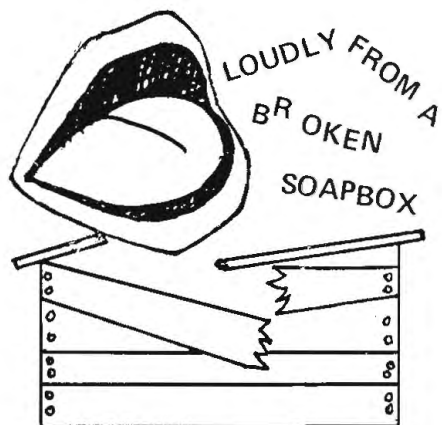


FIGURE 2



The opinions expressed in this column are those of the author alone, and they do not necessarily reflect those of the Model Rocketeer or the NAR.

#### AN APPROACH TO WORLD CHAMPS TEAM SELECTION

By Bernard Biales

The USA Team to the 1974 Space Model World Championship will presumably be chosen based on the 1972-1973 contest year. So, although this is being written a few weeks before the 1972 World Champs, it is not too soon to consider team selection procedures for the 1974 event. This article reviews and criticizes past methods alongside my own views on internats team selection.

At first, teams were chosen by the team captain who consulted with other modelers he considered knowledgeable. This method was used in 1967 and 1970 for international events which were not actually world championships. It has the advantage of being simple and allowing the use of judgement in cases where a quick look at someone's contest record might not tell the whole story. Some drawbacks are that it is rather vague and always open to the accusation of favoritism, even if not conscious or intentional. Although not an integral part of such an approach, it has been suggested that team members were selected on the basis of their suitability as representatives of the US in addition to their competence as modelers. Much as I would dislike having obnoxious personalities on the team (by the way, there are a lot of nice people on this year's team), I strongly object to the idea of the imposition of such psychological, social, or political criteria for team membership. I am not familiar with the exact procedures involved, but an interesting recent example of this approach occurred at the Olympics: In 1968 at Mexico, the American 8 man shell (rowing) was created by the competition. So, for 1972, instead of competing for positions by objective criteria, the final selections were made as a judgement call (I think the coach had the final say). The USA crew this year, which had six men from the coach's school, did quite well. Even so, the coach said he had not yet decided whether this was the best way to do it. The newspaper did not give his reasons. Perhaps he felt that it was unwise to draw too firm conclusions from a single trial or that even if the method did allow a better performance by bringing together athletes who were already a team, it did not really give individuals the fairest chance of getting on the team. One reason that this example does not support the judgement selection as strongly as it might seem is that a crew reaches high performance only after much practice as a unit, whereas space model competition is more of an individual activity.

This year a complex and somewhat more objective selection method was used. This has already been explained in *Model Rocketeer*, and I will review only the basics. Membership on an eligibility list was determined by going through the winners list from NARAM-13 in a specified way. Interestingly, some events from NARAM had higher priority in determining eligibility than one of the events being flown at the World Champs—presumably because they were considered tougher than P/D.

A selection committee was named which included a few of the top people from the eligibility list—to some extent, the committee was in the position of having to worry whether or not to choose itself. The contest record of eligible model rocketeers was examined and a weighted average of their contest records in the relevant events was computed. The committee was supplied with these numbers, plus a statement by the eligible people (along with any information or opinions they might have or receive) and voted, seven votes being required to choose a team member (apparently some measure of final authority was retained by the NAR President). Although I consider this a step in the right direction, it had a number of drawbacks. It was not announced ahead of time, so people who wanted to work toward being on the team did not really know what they had to do to make it. It was very slow and cumbersome in practice, even considering that some unusual problems were encountered. Statistically speaking, getting on the eligibility list was somewhat of a fluky process. If continued, this procedure opens the possibility of building up a good competition record during the year by choosing contests at which winning is easy—a practice which already infiltrates the national championship. Perhaps it is too bad that an objective, balanced, season long selection process is not possible—such a long period of testing would be revealing in the events outside of scale. The approach I propose has less statistical validity than such an ideal, but can be done in a fair manner and should produce a fairly exciting glider event as a side benefit.

Since my own preferences in this area parallel methods used in model aviation, a glance at the way the AMA does it is appropriate. The free flight events—FAI Power, Wakefield Rubber, and A/2 Nordic Glider—are flown off in local qualifying trials, followed by regional eliminations, and culminating in a national level contest. Each of these tests is in itself multi-round. The advantage of this approach is that it is statistically reasonable (though far from perfect) and it is objective, removing the need to choose team members based on personal preference. (It should be noted that the free-flight World Champs is flown multi-round.) Problems are the difficulties in making it to the elims and, with very many good modellers, there is still a good deal of chance in whom among the best will be chosen. Scale, where the need for repetitive flying is less—in fact, you don't want to risk a great model too many times—relies on a single national elimination involving static judging and several flights.

Turning first to my favorite, boost-glider, I doubt if we have the resources to run a three-stage elimination process. Rather, I suggest using the Nationals to run a single, but multi-round, elimination. It could be tacked onto NARAM as an extra day. Alternatively, it could be run one round per day during the week—supplying a variety of weather conditions—or flown from a different part of the field on a

regular contest day; but these would place a greater load on the contest organization. People who, for various reasons, were not competing in the Nats could still try for a place on the team, though I think the personal capabilities as a flier that are needed make it undesirable to permit proxies. An abbreviated indication of the possible modifications to the present rules follows:

- 1) Event run without age divisions;
- 2) Each competitor allowed two complete models;
- 3) Event to be flown in five rounds, the maximum time to be recorded for each round being limited to 180 seconds (a "max");
- 4) If several contestants attain a total of  $5 \times 150 = 750$  seconds (called "maxing out") or other tie for the last or alternate place on the team, extra rounds are flown by the tied contestants with the max increasing 30 seconds each time until the ties are broken;
- 5) Dethermalizers explicitly allowed, but required to have fuse holders and snufflers;
- 6) Return of gliders not required;
- 7) Provision of a launch time window for the competitor so that he can better adjust to the vagaries of the weather (this compensation for the presence of updrafts and downdrafts will not be easy to implement).

The selection event would then not be identical to the event as flown at the World Champs, but it would do a more effective job of getting people who are really good, and it would show USA leadership in bringing the B/G event to maturity—eventually the World Champs could be run this way, like other free flight events.

For Scale, the Scale event at the Nats could be used, though I would prefer that the scores of those trying out for the team be based on the sum of two flights plus static judging. (Again, people not the Nats itself could fly but one might permit proxy flights because flying talents are not as critical in this event.)

I am somewhat hesitant about suggesting having a full scale elimination for the third internats event. While having three events at the World Champs makes for a nicely balanced contest, I think no obvious third event has the stature of Scale and B/G. These latter events alone are distinguished by the high degree of craftsmanship and concentration required, by the richness of opportunity for the display of modeling skill, and by the development of recognizable experts in these areas (Research and Development might be an unfulfilled exception to this. Incidentally, it would be nice to use the World Champs as an international technical forum in addition to a sporting meet.). (These comments do *not* say that other events are uninteresting or that the efforts of any team members should be taken lightly.)

Under the present team selection system there is some sense in not including the under fifteen A and B age division modelers. But the competition for the FAI Team should be open to the best interested fliers, regardless of age. By following the eliminations plan outlined above, it would be quite simple to include sharp young model rocketeers.

I have experienced personally two sides of the subjective selection systems. In 1967 I was an unknown modeler and was not, to my knowledge, considered for the internats team—which doesn't imply that I should have been chosen: I was quite inexperienced. On the other hand, maybe I could have beaten somebody on

the team and I would have appreciated a clear cut chance to prove that. This year, the outcome was reversed and my long term B/G activity apparently compensated, in the eyes of the selection committee, for a rather modest contest record. I happen to think that this was not a bad choice, but in a head to head multi-round confrontation, I might have been knocked off by somebody like John Drake, who is not the B/G performance fanatic I am, but has produced some very reliable performances. That is what I want to find out, win or lose.

I wish to thank the many people who have talked over these problems with me.

#### OPEN UP THE NAR

By Steve M. Lawson, NAR 21925

After reading the article in the July "Loudly from a Broken Soapbox", I decided to write on behalf of the members of the Lawton-Fort Sill Model Rocket Association in Oklahoma. We are now in the process of trying to meet the requirements for a NAR section charter.

I very strongly agree with the author, Charlie Zettek, that no contest can be truly called a championship unless anyone who is interested, whether he be a NAR member or not, is allowed to enter. I feel that the NAR is surely open-minded enough to see the point of this whole discussion.

I had never heard of the NAR as an organization for any interested modelers until I joined our club here in Lawton. I'm sure that I am not the only one who had a hard time finding out. I feel that one way to publicize the NAR would be to ask all major model rocket manufacturers to urge membership in the NAR by stamping slogans, etc. on any packages or letters which are sent to their customers.

I believe that since such a small proportion of the nation's modelers are NAR members, most contests should be open to anyone who cares enough to enter. Until the percentage of NAR members starts to rise, I believe that the NAR should find some way of making itself known to all modelers.

#### SOME GRIPES ABOUT S & T

By Steven Karnowski, NAR 21954

I am speaking out against two actions taken by the Standards and Testing committee recently. Gripe number one is the way they handled the case of the Estes D engines. They decertified their D-13 engines as of January 1, 1972. That meant that the D13 engines could not be used in contests after that date. But the Estes D12 engines could not be used for contest purposes until February 1, 1972. This meant that for a period of one month none of the Estes D engines could be used in any contests. If a person had an adapter to use one of the other brands of engines then they probably wouldn't have had much of a problem, but many people probably don't. Although I wasn't affected, some people probably were. If something like this happens again I might be affected.

Gripe number two is the case of the FSI D18 engines. These are actually D5 engines. I don't think that an engine should even be safety certified unless the label is accurate. I also consider this mislabeling deceptive advertising that shouldn't be allowed. This mislabeling caused some problems at NARAM-13, where many rockets fell out of the sky in the scale event.

I hope that NAR or FSI will do something to correct the D18 problem, and I hope that NAR also takes steps to insure that something like the Estes D engine case doesn't happen again.

#### HELP THE INDEPENDENT!

By Mark B. Bundick NAR #19250

The *Editor's Nook* in the August issue intrigued me. I realize that our organization may have problems, and that certain persons may blame NAR officials for them. But why squabble about some newsletter comment or satire? Why not spend the time in trying to solve the problem? And why do the officials search the newsletters looking for these comments? Solve the problem instead!

For those of you who can't find a problem (or if someone else has already stopped writing satire to work on one) here's a dilly. Help me, the non-section member. All of us don't belong to sections with those newsletters, you know. We sit out in the "sticks" praying for some contact, even if it means a 4, 5, or 6 hour drive. How about it, section presidents and newsletter editors? How about it Regional Managers? Let us know about your section meets and demonstrations. We're out here, waiting and ready.

#### A BETTER WAY TO CHOOSE THE NAR CHAMPIONSHIP SECTION

By Ronald Mitnick, NAR 15293

It is my opinion that the present system of choosing NAR Championship Section is unfair to many NAR sections. As it is now, this choice is made entirely on the number of contest points earned in the contest year. Contests are, of course, an important part of NAR section activities, but I feel that more must be considered in choosing the Champ Section. Other areas, such as regular meetings and attendance, extra meetings and attendance, newsletters and other publications, extra activities, such as campouts and community service projects, must also be considered in this choice.

I would like to propose a system for choosing the Championship Section. Every month, a form would be sent from each NAR section. This form would be signed by the club's Senior Advisor. On this form, a complete, but brief, summary of all the past month's events would be listed. At NAR Headquarters, points would be awarded in certain categories. For example, a regular business meeting would get 10 points and every percentage point above 75% attendance would get 1 point. Any extra meeting would get 5 points each. A regular publication of a newsletter would get 5 points, and extra publication would receive 2 points. A regular monthly launch would get 10 points, as would a contest launch, but with the contest launch extra points would be awarded for the total number of points earned divided by the number of contestants. Other categories would be covered as well. (Actual point values would be decided by the NAR "brass"). Then, come NARAM, the totals would be added up and the section with the most points would be awarded the Section Championship. For those who still concentrate on competition, there could also be an award for most contest points per year, this being the same as the present Championship Section.

It is about time the NAR reconsiders what an NAR section should do in a total sense, rather than choosing the best section by numbers only.

# MODEL ROCKET TIPS

The Model Rocketeer is beginning a new column this month. Send any tips on modeling, construction, launching, etc. that you would like to share with other model rocketeers to:

#### MODEL ROCKET TIPS

David Newill  
313 Mitchell Blvd.  
Lubbock, Texas 79416

Too many beginners find that the igniter just won't work—too many experts have the same problem! Since I began to use the method described below for installing igniters I've had no failures (in over 150 launches). This method uses Estes-type igniters and will not work for F engines.

1. Tear off a small piece of masking tape about one inch in length.



2. Roll this into a sharp pointed cone sticky side out.



3. Bend the igniter over the cone tip.



4. Push the cone into the nozzle of the engine.



5. Separate the wires and mash the rest of the cone against the end of the engine.



This is a fast and reliable way to install Estes-type igniters, and it prevents shorting.

—David Newill NAR 6139





by  
Charles Gordon

## SOUTH OZONE PARK ASSOCIATION OF ROCKETRY Photos & Story by Fred Kushner

In March of 1972, Mr. Isaac Johnson Jr. and his lovely wife Rose decided to help the youngsters of the South Ozone Park section of Jamaica, New York. Through their efforts, the South Ozone Park Association of Rocketry (SOPAR) came into existence.

Unlike any other section that I know of, SOPAR members do not go out on their own to purchase rockets, engines, or any other materials associated with the hobby of model rocketry. The section's dues break down as follows: Junior members, 50¢ per meeting; Leader members, \$1.00 per meeting; and Seniors, \$1.50 per meeting. The section also holds special events, such as cake sales, barbecues, etc. to raise money. It is with these funds that Mr. Johnson buys the equipment for the section. Because of this, no member of the section need worry about having enough money to purchase supplies to enable him to fly in a meet.

On September 10, 1972, SOPAR held its first Section meet. As is the situation with most sections in the New York City area, flying space is the most difficult component of a meet to obtain. They had originally decided to hold their meet at a public park, but when the section arrived they found the park occupied by a local baseball team. But did they give up? Never. They went to a local school yard. Luck was with them, and the place was empty. The start of meet was only postponed a half hour because of the change in site.

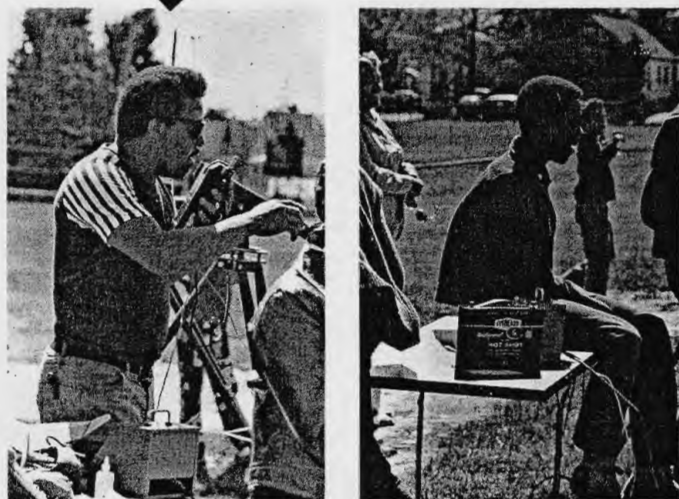
Even though SOPAR is a young section, they have equipment that some older sections have yet to acquire. The launch racks were set up in record time, and the flight area roped off to avoid any possibility of an accident. The recovery crew was readied, the launcher loaded, and the rockets launched. The meet was under way.

All members of this section live on the same block, and they have the full consent of their parents to continue with their rocketry. As a matter of fact, many of the parents feel that this is a good hobby for the youngsters as it keeps them occupied, and lets them relate what they have learned in school to something practical.

At the present time the section has twenty members. The officers are as follows: President and Senior Advisor, Mr. Isaac Johnson, Jr.; Vice President, Mr. Martin Harley; Secretary, Mrs. Rose Johnson; Treasurer, Miss Robin Storey.

As New York City Coordinator, I wish this section much luck. Given the chance, they may soon be among the top sections in the NAR.

*John Scales makes an announcement at the first SOPAR section meet.*



*Marvin Berry and Robin Storey (the section's treasurer) watch the meet from the launch table. A proud relative looks on in the background.*



*SOPAR members (from left to right) Oscar Campbell, Terry Davis, Salvatore Moscatello, Isaac Johnson (President) and Kelly McKnight load their boostgliders.*



*Rose Johnson, the section's secretary, checks on Diane Hunter and the data reduction crew.*

## MODEL OF THE MONTH CONTESTS

by Joe Cimmino

One of the continuing problems for any NAR section is the solicitation of new members. Once new members join, there is the problem of upgrading workmanship to achieve stable, well-finished models that the owners can be proud of. Noticing that many members brought new models to regular monthly meetings, the Wheaton Rocket Association began to experiment with a Model of the Month Contest in 1971. Following a trial period, the regulations were formalized, and the contest was made a regular part of the club's meetings.

A permanent display board with a plywood base was constructed, using gold and silver Embossograph board to facilitate visibility. Suspended on peg-board, above and behind the model rocket counter at Wheaton Placa Hobbies and Arts, the display board has an angled face for easy viewing of the title and club insignia. A wooden shelf has several 1/2 inch holes to allow positioning of the models according to size. Half inch dowels forced into expended engine casings provide the mountings for the models and are easily removed. Various lengths of dowel are stored inside the base of the display to accommodate mini-models, boost/gliders, etc.

The Model of the Month Contest display has not only attracted new members to the club, but also new interest in model rocketry. One school teacher, seeing the display, is bringing four new members to the section, as well as his interested wife. Jerry Trager, owner of Hobbies and Arts and the original sponsor of the Wheaton section, reports that the display models often influence purchases at the model rocket counter.

A copy of the section's regular monthly post card, which notifies all members of meeting and launch dates, is posted on the model rocket counter at Hobbies and Arts. Prospective members are encouraged by the store's employees to attend a meeting or to call the president for information. Jerry and his personnel encourage section membership and stress the benefits to be derived from club activities.

For the benefit of all NAR sections, a copy of the Model of the Month Contest Regulations is printed below, and details of the display board are visible in the photograph. Any section desiring additional details may secure them from Joe Cimmino, 4018 Ferrara Drive, Wheaton, Maryland 20906.

# HISTORY OF THE MIT MODEL ROCKET SOCIETY

Compiled by Trip Barber

The MIT Model Rocketry Society (section #134) was founded in November, 1965, by a group of 18 undergraduate model rocket enthusiasts, including Gordon Mandell, George Flynn, Dick Fox, and Bernard Biales. It was recognized as an official MIT activity on 15 November, and was granted funds by the Undergraduate Association to construct the heavy-duty launch system which it still uses. The early Society meetings were held in a public room in the MIT Student Center, and the group's small amount of equipment was stored in such random places as dorm janitors' closets. The first launch was held in the Spring of 1966 in a two-kilometer-square cranberry bog in Saugus, Mass., ever since known as, among other things, "the Saugus swamps". Subsequent club activity centered around finding a less moist site, a search which ended in November, 1966, with the securing of permission to use the enormous farm grounds around the state prison at Bridgewater, the site still used for all society launches.

By March, 1967, enough members had been persuaded to join the NAR for the Society to apply for and receive a section charter. The club's activity in these early years emphasized the acquisition of basic range support equipment, and the popularization within the Institute of the scientific nature of model rocketry. This last was particularly benefited by the publication of members' R&D reports (done mostly for lab course credit) and a report on the Society itself in Tech Engineering News. Research was the major interest of the members at this time, with Gordon Mandell working on dynamic stability, Dick Fox on transmitters, George Caporaso on altitude prediction, and nearly everyone else on some project.

This R&D emphasis led George Caporaso to organize the first MIT Technical Convention in March, 1968, as an effort to co-ordinate model rocket R&D on a national level and bring together the hobby's technical leaders for a weekend of communication. It attracted 50 people and 4 R&D reports the first year, expanding to 140 people and 15 reports by 1971. In another effort to improve technical communication, a group of 4 Society members (Flynn, Mandell, Caporaso, and Tom Milkie) founded *Model*

*Rocketry* magazine in October 1968. While the two organizations were separate, MRM drew most of its staff from the membership of the Society.

The main activity of the 1968-69 school year was the organization of a lobbying program in the Massachusetts Legislature to have model rocketry made legal in the state, an effort which led to the passage of the present law by the summer of 1969. The other big event of the year was the granting to the Society by MIT of a permanent room for meetings, storage, and construction in the Walker Memorial Building. The first meeting there was in December, 1968.

With the graduation of many of the founding members in June 1969, Society activity reached a low point, then picked up again in the spring with a rise in interest in competition. The Society's first contest, an area meet, was held in May, 1970, and since that time MITMRS members have flown in MARS, ECRM, PVARM, MART, and NARAM, and in the numerous area and section meets which it has sponsored for rocketeers in the Boston area. R&D, however, remains an important activity of the current members of the MIT Model Rocket Research Society.

## Regulations For Model of the Month Contest

1. The Model of the Month Contest will be held at each club monthly meeting. The purpose of the contest is to foster and encourage careful workmanship in the construction of model rockets.

2. There will be three categories in this particular contest depending on the age of the builder: *Junior* (under 13), *Leader* (between 13 and 21), and *Senior* (over 21).

3. A contestant may enter as many models as he wishes.

4. If a particular model once wins in the contest, it becomes ineligible to compete in subsequent contests.

5. Models entered in the contest should conform to the NAR Model Rocket Safety Code and be ready for flight, except for the addition of an engine and wadding.

6. Particular attention will be given by judges to such details as precision in joining together portions of the model, appropriate or attractive finish, application of decals and overall careful workmanship.

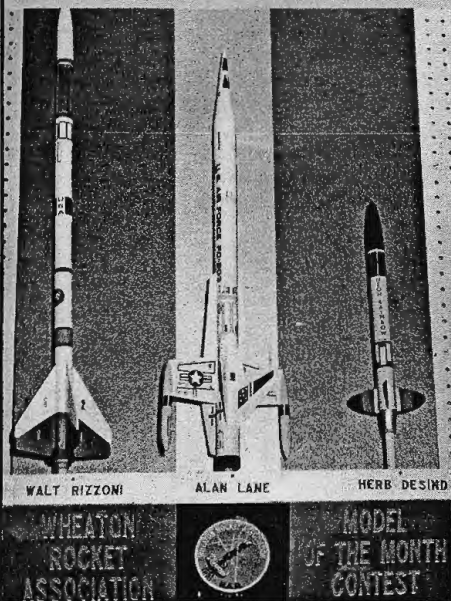
7. Models winning in the contest will be displayed at Wheaton Plaza Hobbies and Arts, Wheaton, Maryland, until the next contest and then such models will be available to be returned to the builder at the next club meeting.

8. Judges will be selected by the Contest Chairman and will serve for three consecutive contests. If a substitution is made necessary by the nonattendance of a judge, the Contest Chairman or the Club President shall select a substitute judge.

9. By entering a model in the contest, a contestant thereby waives all claims for any damage to such model. All models will be given reasonable care and treated gently.

10. The decision, concerning the winners, of a majority of the three judges involves the application of individual value judgements and is final and conclusive.

*Joe Cimmino entered model rocketry several years ago with his son, Joey. He has served as NAR TRANSP0 Chairman and President of the Wheaton Rocket Society. Employed by the Department of Defense, Joe is also an active officer in the 113th Tactical Fighter Wing of the DC Air National Guard. He has been active in many civic and youth organizations and holds the Silver Beaver Award of the Boy Scouts of America.*



*The Wheaton Rocket Association of Wheaton, Maryland, has found the Model of the Month Contest to be a great help in getting new members for the section and in raising the club's general level of workmanship.*



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Mark Pemberton's "Ogre" lifts off. This monster weighs only one pound, and was flown at the Midwest Rocket Research Association's MRR-3. (Photo by Bill Kenny)

## CONTEST calendar

### SEND EARLY FOR CALENDAR!

Please submit all items for the *Model Rocketeer* "Contest Calendar" at least two months in advance! Contest Calendar items should be typed and sent directly to Elaine Sadowski, Editor, *Model Rocketeer* at 1824 Wharton Street, Pittsburgh, Pa. 15203.

The following are contests that have been *sponsored* by the National Association of Rocketry. Points earned at these contests are credited toward national standings.

November 19, 1972—Location pending. Name: ENERCHIPTION. Host: ABM Section 108. Events: Hornet Boost/Glide, Swift Boost/Glide, Hawk Boost/Glide, Pee Wee Payload, Class 0 Parachute Duration, Robin Eggloft. Contact: Richard LaBarre, 1720 Illingsworth Avenue, Allentown, Pennsylvania 18103, 797-2363.

November 25, 1972—Meadow, Massachusetts. Name: Cold Balls 691. Host: The New England Rocketry Federation, Section 236. Events: Scale, Super Scale, Hawk Rocket Glider, Sparrow Boost/Glide, Hawk Boost/Glide. Contact: Patrick M. Griffith, Legion Street, Milford, Massachusetts 01757, 473-7654.

December 29-31, 1972—Phillipsburg, New Jersey. Name: Tannenbaum-2. Events: Official: Condor Boost/Glide and Rocket Glider, Class I Parachute Duration and Streamer Duration, Hornet Boost/Glide and Rocket Glider, Sparrow Boost/Glide and Rocket Glider, Class III Parachute and Streamer Duration, and Open Spot Landing. Unofficial: Scale Christmas Tree, Ornamental Ping Pong Spot Landing, Class II Garland Duration, Dragon Boost/Glide, Class VI Parachute Duration and Streamer Duration, and "C" Engine Feather Boost/Glide. For more information contact: David Klouser, 383 Warren St., Stewartville, N.J. 08886.

December 9-10, 1972—Bossier City, Louisiana. Name: LARK-1 (Louisiana Area Rocket Contest). Host: Ark-La-Tex 284. Events: Pee Wee Payload, Class II Streamer Duration, Predicted Altitude, Class 0 Drag Efficiency, Class 0 Parachute Duration, Sparrow Boost-Glide, Swift Rocket-Glide, Scale. Contact: Tom Sullivan, Jr., 1905 Christine Ave., Bossier City, Louisiana 71010; Phone (318) 746-9461.

April 13, 14, 15, 1973—Camp A.P. Hill, Virginia. Name: East Coast Regional Meet VII (ECRM-VII). Host: NARHAMS 139. Events: Scale, Ostrich Egg Loft, Hawk Boost/Glide, Hawk Rocket Glider, Class 0 Parachute Duration, Class 0 Streamer Duration. Contact: Judith A. Barrowman, 6809 97th Place, Seabrook, Maryland 20801. Phone (301) 459-5261.

Date To Be Announced—Highland Park, Illinois. Name: ERT2, Evanston Tiroso Regional. Events: Hornet Boost/Glide, Condor Boost/Glide, Eagle Rocket Glider, Design Efficiency, Class II Streamer Duration, Class 0 Parachute Duration, Pee Wee Payload, Robin Eggloft, Research and Development. Contact: Bob Finch, 415 Lambert Tree, Highland Park, Illinois. Phone (312) 432-8986.

## CONVENTIONS, SYMPOSIUMS, ETC.

Washington's Birthday Weekend 1973—New York, N.Y. New York Star Trek Convention, Commodore Hotel. Contact: Mr. Al Schuster, Box 95, Old Chelsea Station, New York, N.Y.

March 16-17-18, 1973. Pittsburgh, Pennsylvania. 8th Pittsburgh Spring Model Rocketry Convention. Discussion groups on clubs, competition, electronics, tracking and many other topics. Movies, lectures, banquet, and a special seminar for teachers. Contact: Elaine Sadowski, 1824 Wharton Street, Pittsburgh, Pennsylvania 15203. Telephone: (412) 431-5139.

June 29, 30, July 1—Montreal, Canada. Name: 1973 CANADIAN MODEL ROCKET CONFERENCE. The conference is tentatively planned to be held at McGill University, with a banquet at the downtown Holiday Inn. Contact: Peter Sauer, ARRA, P.O. Box 1455, Place Bonaventure, Montreal 114, Quebec, Canada.



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