MODEL ROCKETRY

47755
OCTOBER 1971
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THE JOURNAL OF MINIATURE ASTRONAUTICS

Mini-Payloader
For MPC Minijet B's

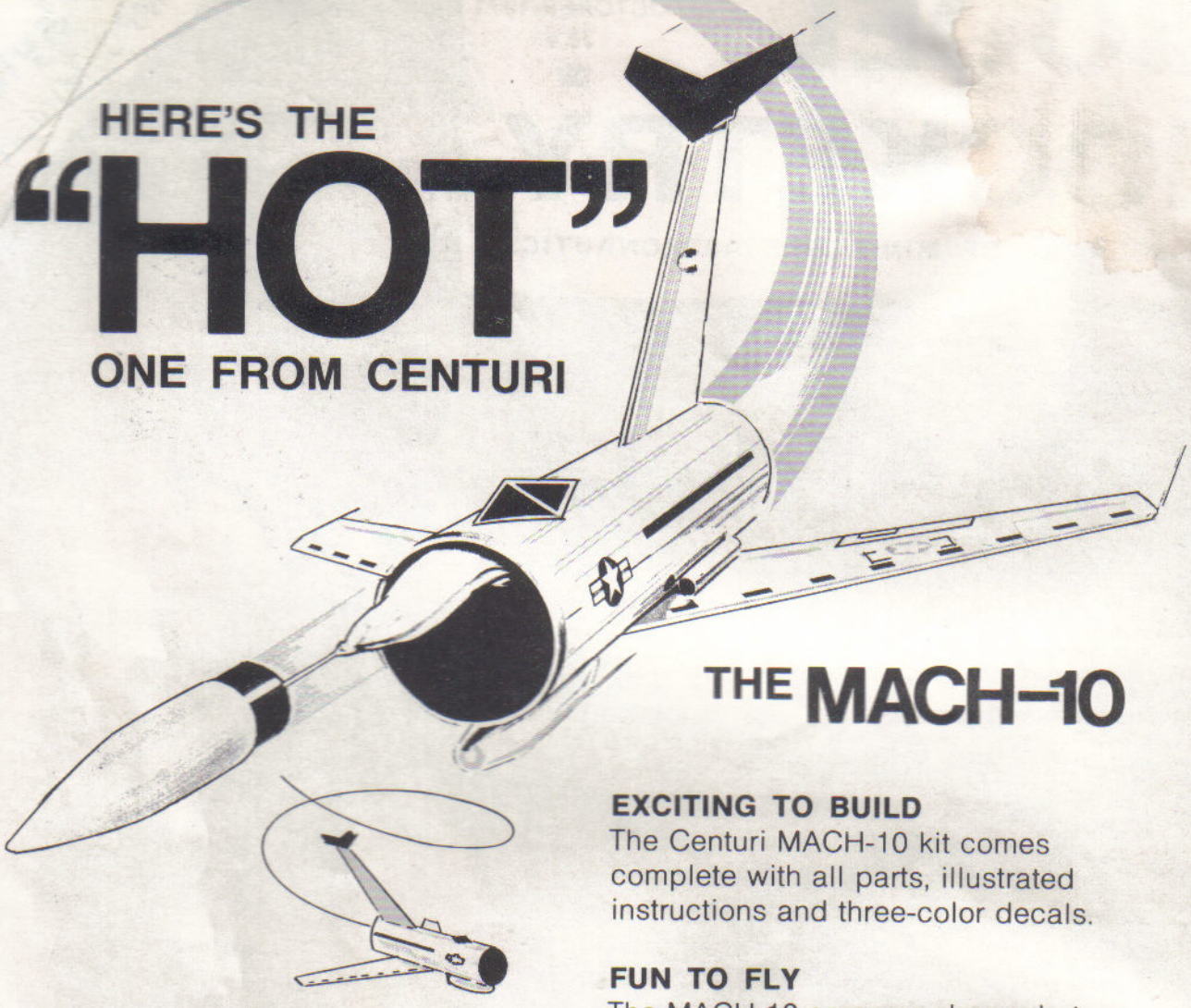
NARAM-13

RETAILERS: SEE PAGE 47 FOR
RETAIL DISPLAY ALLOWANCE PLAN

HERE'S THE

"HOT"

ONE FROM CENTURI



THE MACH-10

Model rocketeers everywhere are increasing their fun and knowledge by building and flying this amazing MACH-10 Rocket Plane by Centuri.

Only $2.50. The MACH-10 is available at your local hobby dealer today, or write direct to Centuri Engineering Company, Dept. 1988, M101, 3053 W. Fairmont, Phoenix, Az. 85001

Centuri

EXCITING TO BUILD

The Centuri MACH-10 kit comes complete with all parts, illustrated instructions and three-color decals.

FUN TO FLY

The MACH-10 screams skyward at speeds better than 100 M.P.H. Peeling off at peak altitude, the MACH-10 ejects a *target marker* (with streamer), then after a couple of loops, settles into a circular glide path earthward. Making a "wheels up" landing, the MACH-10 skids gently to a stop on its belly tank.

GREAT FOR COMPETITION

Here are three great ideas for neighborhood or club contests.

1. See who can drop the target marker closest to a prescribed ground target.
2. Compete for glide endurance times.
3. Try for spot landings on a "runway" marked out on the ground.

Model Rocketry

Volume IV, No. 1
October 1971

Cover Photo

This month's cover shows the first place B Division Super Scale model at NARAM-13. This model of the Long-Tom, an Australian sounding rocket, was built by Mark Wargo of Houston, Texas. Complete coverage of the 13th National Model Rocket Championships begins on page 10. (Cover Photo by George Flynn.)

From the Editor

A special committee of the National Association of Rocketry is presently considering the revision of the NAR "By-Laws." The By-Laws are the rules of procedure by which the organization is governed, and as such have an important effect on the relationship between the individual member and the association. There seems to be general agreement among those who have considered the question, that the By-Laws are in need of serious revision. However, we suspect that the majority of the membership is probably unaware of the contents of the By-Laws or the procedure for NAR decision making. With the important By-Laws Revision Committee now drafting proposals, all NAR members should obtain a copy of the By-Laws (available from NAR Technical Services for 25 cents), read them, and *comment on them.*

How well is the organization functioning? Are there areas which need improvement? *These are decisions which should be made by the MEMBERSHIP.* Since the By-Laws Committee was appointed in May we have been told on several occasions that the Committee would seek guidance from the membership on the major decisions. If the membership chooses not to get involved in this process, then each member must hold himself responsible if he does not like the changes which are made.

One area of increasing concern is the isolation which the present By-Laws provide between the membership and the Board of Trustees. The Board directs the operation of the NAR, however under the current By-Laws the membership has no control over the Board — no way to effectively protest Board decisions with which you disagree. Certainly the Board is elected by the membership, but in the three year period between elections there is absolutely no membership control.

The Board can, for example, amend the By-Laws at will and those ammendments remain in effect until the next general meeting (held only once every three years). More disturbing, following the precedent set at NARAM-12, the Board can keep such an ammendment in effect by merely not allowing it to come to a vote at the general meeting.

The Board, exercising its control over the

(Continued on page 5)

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Material submitted for publication should be accompanied by a self-addressed, stamped envelope if return is desired. Model Rocketry can assume no responsability for material lost or damaged, however care will be exercised in handling. Articles accepted for publication will be paid at the rates current at the time of publication. Letters, contest information, news, announcements, ect. are assumed to be submitted gratis.

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Printed in USA

Scale Data

I have seen photos of some very interesting and exciting rockets in your fine magazine, but I haven't been able to locate plans for these models. If you can help me, I would appreciate it very much. The rockets I would like to build are:

French Diamant
USSR Guideline
USSR Soyuz
Meteor III
Thor Delta
Black Brant
Nike-Apache
Nike-Hercules

I have built almost all of the scale models that I could get kits or plans for, but these are such sharp models that I just have to add them to my collection. Any information you can give me on obtaining plans for these rockets would be appreciated.

Larry W. Ball
Oklahoma City, Oklahoma

That's quite an order for scale data, but perhaps **MRm** *can be of some help. An article is in the planning stages on the French Diamant satellite launcher. Publication plans are not yet finalized, however we expect it will be included sometime before the end of 1971. Also in the early planning stages is an article on the Nike-Hercules missile, but publication of this one is not anticipated until sometime in 1972.*

Several of the other rockets you mentioned have already been published in **Model Rocketry.** *Detailed scale plans for the Nike-Apache were printed in the November 1969 issue (available from our Back Issues Dept. for 75d). Plans for the Canadian Black Brant III sounding rocket were printed in the September 1969 issue of* **MRm** *(also available as a back issue). A two part scale article on the Vostok, which uses the same basic booster rocket as the Soyuz, was featured in the July and August 1970 issues of* **Model Rocketry.** *Using these plans, you need only modify the spacecraft section to model the Soyuz. (These issues are no longer available from our Back Issues Department, but you may be able to locate copies at your library or from a rocketeer who has one.)*

Model Rocketry *has available, in our plans series, a scale drawing of the Thrust Augmented Delta (Thor Delta with 3 strap-ons). This single sheet plan is available for 50d, postpaid, from Plans, Model Rocketry, Box 214, Boston, MA 02123.*

Night Flying

One of the most inexpensive ways I have discovered to track a rocket at night is to take a model with a clear plastic payload section and fill the payload with fireflys. A good supply of fireflys can usually be found near a "rocket eating tree." Note, however, that this method works only in warm summer weather.

Mark London, Jr.
Montgomery, Alabama

Multi-Staging Techniques

On page 28 of the June 1971 issue of **MRm** there is a picture of Karel Verabecke holding a rocket which I am very interested in knowing more about. I was wondering if anyone could tell me how the 2nd and 3rd stages are ignited. I am going to use this concept for a semi-scale model of the Saturn-V to make the launch more realistic.

Brian Connolly
Silver Spring, MD

Several methods have been used to multi-stage model rockets when the engines are separated by as much as 10" to 12". The most successful method has been to duct the ejection gases of the first stage engine through a BT-5 tube (contained internally in the model) and into the nozzle of the second stage engine. Try it a few times on the ground before you use this method on your prize model, but several rocketeers are quite happy with the results.

A second upper stage ignition system of proven reliability is to use an AG-1 flashbulb (with the glass removed) triggered by a mercury switch. A complete description of this system is given in the article on "Building the Super-Titan" in the March 1970 issue of **MRm.** *Copies of this issue are still available from our Back Issues Department (Box 214, Boston, MA 02123) at 75 cents each.*

Watch for an article on multi-staging your Saturn-V in an upcoming issue of **Model Rocketry.**

Foxmitter Experiments

I would like to compliment you on your recent series of Foxmitter articles. I found them very interesting and helpful. For my science project next year I plan to use the Foxmitter and several of its sensors. The

theme for this project will be "The Effects of G-Acceleration Upon a Laboratory Mouse."

I would like to see more articles on aerial photography, model rocket transmitters, and other instrumentation published in **Model Rocketry**.

Jeffery Estes
Marble Hill, MO

Loop Gliders

I would be grateful if you could answer a few questions on "Infinite Loop" type gliders. Here are the topics:

1) Stability — How do the tubes act like fins? Is the only requirement for stability that the CG be ahead of the CP? How would you find the CP?
2) Glide Characteristics — How does it glide? If correctly developed, would loop gliders be more or less efficient than other gliders? Does it glide just in a straight line (as reported by Scott Brown, MRm November 1969)?
3) Construction — Are there any "rules of thumb" for designing a new loop glider? What about trimming?

I think this might make an interesting R&D project, possibly adding another facet to the wide range of boost/gliders. I would like to work on it myself; but, as you can see, I don't have enough information to start with.

Brian Duchinsky
120 Autumn Lane
Belleville, ILL 62223

We're afraid you already know most of what model rocketeers know about the subject of "loop gliders." No serious research on any area of this topic has been reported to **MRm**, *though the subject is wide open to experimentation.*

A simple (perhaps too simple) understanding of why the tube stabilized rocket is stable can be obtained by considering each cylindrical stabilizing tube as a series of thin, longitudinal "flat plates" attached together to form a tube. When flying at zero angle of attack a flat plate develops no lift. As a disturbing force moves the rocket's longitudinal axis from its direction of flight, the angle of attack causes the individual loop segments to develop lift which provides a force to restore the rocket to its original direction of motion. This is the same procedure which allows a fin to stabilize a rocket.

As for a determination of the loop model's CP, perhaps measurement in a wind tunnel would be the best way. Thus far none of the theory minded model rocketeers have developed the equations necessary for loop CP calculations.

From our observations, loop models enter a stable glide over a wide variety of trim angles of attack. Though the glide ratio is substantially poorer than a normal (winged) glider, this is partially compensated for by increased boost altitudes and increased structural strength.

The loop glider offers a wide open area for experimentation by research minded rocketeers.

—GJF

More Math and Computers

Please keep up the science, math, and computer articles. I realize you don't have room for all of the articles you receive, so please make some copies available and offer them for sale.

Scott Cummings
Minneapolis, Minn.

Model Rocketry *is planning to introduce a series of technical reports which are too long and/or too highly technical for general publication. Watch for an announcement of the availability of these reports in future issues of* **MRm**.

Styrofoam Finishing

Styrofoam is becoming one of the more promising and popular building materials for competition gliders. One thing novice styrofoam users quickly discover is that styrofoam is melted by some magic markers as well as dope. Rather than launching uncolored models, however, I have discovered that "El Marko" markers do not dissolve styrofoam. I hope this tip will help rocketeers make better and prettier competition models.

Geof Landris
Winnetka, ILL

MODEL ROCKETRY MAGAZINE TECHNICAL PUBLICATIONS

TN - 1 **$ 0.60** **Advanced Model Rocket Aerial Photography** - by Richard Fox and George Flynn: 6 pages, covering improving the Estes Camroc with a glass lens and a haze filter and using it for color photography; with many drawings.

TN - 2 **$ 1.25** **Boost Glider Performance** - by Douglas Malewicki: 14 pages, covering the theory of boost-glider performance and prediction of durations, with many graphs.

TN - 3 **$ 0.50** **Drag Reduction by Boat-Tailing** - by George Pantalos: 4 pages, covering the theory (with experimental verification) and techniques of drag reduction by the use of conical boat-tails.

TR - 1 **$ 2.50** **Fundamentals of Dynamic Stability** - by Gordon Mandell: 30 pages. A complete description of the theory governing the motions and stability of model rockets in flight, including information on designing to optimize stability. With many graphs and drawings.

ALL ARE AVAILABLE, POSTPAID, FROM:

MODEL ROCKETRY MAGAZINE, BOX 214, BOSTON, MASS. 02123

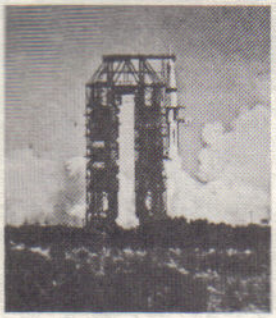
ARE YOU MOVING?

Every day we get a handful of address labels back from the post office with either a change of address on them or a note that the subscriber has moved and left no address. The magazines are thrown out and just the address label is returned.

Send address changes to Change of Address, Model Rocketry, Box 214, Astor Street Station, Boston, MA 02123. Please include the address label from the last Model Rocketry you received.

SPECIAL OFFER!

Beautiful, full-color photograph of the Apollo 7, Saturn 1B liftoff of October, 1968



This magnificent photograph of a most historic moment in the history of spaceflight was obtained by **Model Rocketry** editor George Flynn from an advance position not accessible to most Kennedy Space Center visitors. Showing the moment of liftoff, this 7 by 8 inch full-color print will make an inspiring addition to the album of any space enthusiast.

****

Full-color copies of the photograph, which is reproduced in black and white above, may be obtained by sending 50¢, or $1.00 for 3, to:

Saturn Photo
Model Rocketry
Box 214
Boston, Mass. 02123

Fort Wayne Area Rocketeers

I am writing this letter in hope of a response from rocket clubs in and around the Fort Wayne, Indiana area. The club of which I am a member has been in existence for two years. To get to the point, we want competition!

Why? It provides initiative, creates higher spirit, makes meetings more exciting, and contests are a lot of fun. So if any club is interested in competing with our club, please contact me.

Jeff Rose
3403 MonoGene Dr.
Fort Wayne, Ind. 46806

Noise Pollution Experiments

Your articles on the Foxmitter transmitter have been very helpful to me, and I am looking forward to the plans for the Foxmitter-3. I have begun to wonder, however, if most rocketeers realize just how valuable a tool they have.

Although I am a very active model rocketeer, I am also interested in studying our environment – especially noise pollution. I have done some previous work in this area, but the new transmitters available to model rocketeers offer an excellent opportunity for other areas of investigation. I now have an Estes Transroc which I plan to use for the purpose of studying noise pollution. Other modelers may find it worthwhile to keep their eyes open to new innovations in model rocketry.

Mark Pemberton
Shawnee, Kansas

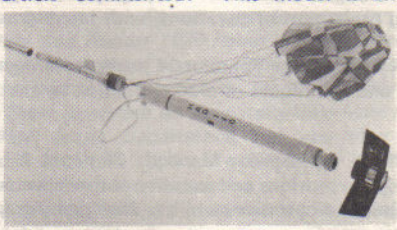
HAD Model Presented Australian WRE

Earlier this year the Australian Weapons Research Establishment, which designs and builds upper atmosphere sounding rockets, received a rather unexpected package. The box contained a 1/10th scale model of the Australian HAD Mk II sounding rocket which was sent to the Weapons Research Establishment by Mark Wargo, a model rocketeer then with New Jersey's Pascack Valley Section. Mark became interested in the HAD when a scale article on the rocket appeared in the April 1970 issue of **Model Rocketry**, and he did additional research which resulted in his building the flying scale model.

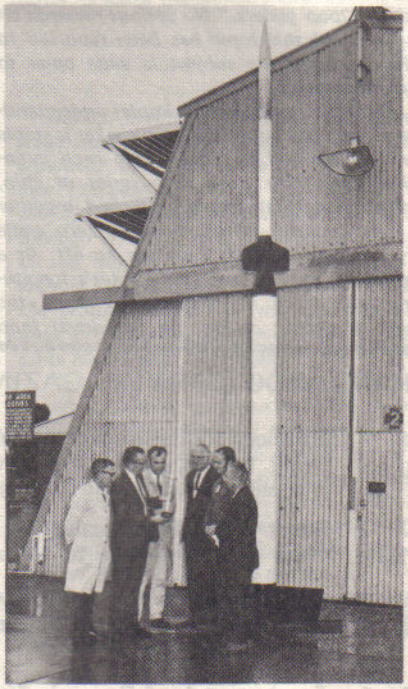
Since then Mark has sought additional information on other Australian sounding rockets. To show his appreciation for the assistance of the Weapons Research Establishment in releasing information concerning the Aeolus sounding rocket and its launcher, which he entered in Space Systems at NARAM-12, Mark presented the HAD model to the HAD Project Team. On April 29, 1971 those members of the original HAD Team still with the WRE gathered around a full-size HAD to examine Mark's model. Later Don Brenton, the Public Relations Officer for the WRE, prepared an article for the June 1971 issue of *Scodos,* a publication of the Department of Supply which is distributed to all the government operated scientific establishments in Australia.

Describing Mark's HAD model, the article commented: "This model is extremely well prepared . . . The whole has been painted in the authentic color scheme, and the attention to detail is remarkable." Non-rocketeers throughout the world are continually fascinated by the strict adherence to detail required for a good scale model.

This year Mark, now with Apollo-NASA, flew another Australian sounding rocket in Super Scale at NARAM-12. His Long Tom model, seen on this month's **Model Rocketry** cover, placed first in B Division with 1529 points.



Mark's model of the HAD 110 shows considerable attention to detail, especially in the first stage fin unit.



The original HAD Team (l. to r.) Allen Awkland, Phil Pearson, Brian Coward, Ron Bissell, Glen Secombe, and Don Paginton, examine Mark Wargo's 1/10 scale model of the HAD Mk II with a full-size HAD in the background.

minutes of a meeting, has the power to exclude from such minutes statements or incidents which might prove damaging to the re-election chances of a member of the Board. At the January 31, 1971 meeting in Chicago one trustee proposed that the then chairman of the Leader Administrative Council be *censured* for writing a letter to the NAR President suggesting that the Board meeting be held at a site more conducive to membership attendance at the meeting.

This trustee asked rhetorically: "What business is it of the membership where we hold our meetings?" His lack of concern for membership participation in the organization is, to say the least, quite disturbing.

More important, though, was the decision of the acting Secretary, upheld by the Board, to make no mention of this proposed censure action in the minutes of the meeting. Doesn't each member have a right to know that he risks censure merely for writing a letter to the NAR President? This Board member perfected his censure motion with the statement, "I have an important matter to bring to the attention of the Board." If he deemed it an important matter, it is quite difficult to understand why no mention of the incident is made in the minutes.

It is to the credit of the other members of the Board that they strongly opposed this censure motion. One trustee commented: "Any member has the right to say anything he wants to the President." However, each member of the Board must assume responsibility for his individual failure to insist that this motion be included in the minutes of the meeting. Only if the minutes accurately reflect what happened at the meeting can they be of any use to the membership. They lose their value if they are edited so as to present to the membership only that which the Board wants them to hear.

Another more serious charge of "covering up" improper action by a Trustee results from the decision of the Board to delete the name of a Trustee from the report of the Special Audit Committee. In commenting on the expenditures of NAR funds by this Trustee, the audit committee charged that "There is considerable doubt about the propriety and wisdom of many expenditures." The money involved amounted to a loss of about $2000 on an operation which in previous years had been profit making. That amounts to almost 50 cents from the dues of each and every NAR member. Nonetheless, the Board voted to delete the name of the Trustee charged with this misexpenditure from the report before the report was released to the membership. This action was taken by the Board after one member of the Board warned: "We already have a serious credibility gap with the membership. This action can only serve to enhance that gap."

Thus the individual member, under the current structure, is not being given sufficient information to enable him to evaluate the performance of the Board of Trustees. The Board takes actions which deny the members access to important pieces of information. Furthermore, the current By-Laws permit the Board to go into "closed session" and never report to the membership the subject matter discussed and the decisions made. What type of decisions does the Board make that need to be stamped "Classified?" Why does the Board fear to provide full information to the membership.

It can be charged that the Board has abused the wide powers given to it in the current By-Laws, and that more membership control is necessary in the new By-Laws. Since there is no way for the membership to insist on a By-Laws change, we can only make proposals and hope that the Board will see fit to put these proposals to a membership vote.

We hope that the By-Laws Committee will poll the entire membership on the following proposals which would provide the membership some control over their Board of Trustees, and expand the voting base of the membership to all those who pay the bills of the Association:

1) *All meetings of the Board of Trustees shall be open to attendance by any member of the Association, and a complete, unedited tape recording of each meeting shall be retained at NAR HQ for inspection by any member.* This proposal seems justified since the Board, by deleting items from the minutes, has abused the power it has to conceal information on statements and action of the Trustees from the general membership.

2) *On a petition from 2% of the membership, a vote to recall [remove from office] any Trustee shall be held within 60 days. A majority vote of the membership shall be necessary for recall.* The purpose is to allow the members to remove a Trustee who is guilty of serious violations, such as those charged by the Audit Committee, even if the Board favors his retention.

3) *All dues paying members of the Association shall be eligible to vote in any election held by the Association.* The purpose is to allow the Junior NAR members, who pay, in dues, more than 50% of the NAR's operating funds, to express their viewpoints on how the NAR spends those funds.

Other members, we're sure, will have other proposals to offer. We hope that each member will communicate his viewpoint on these issues to the By-Laws Committee, and we further hope that the Board and the Committee will be responsive to the wishes of the membership. If the needed reforms are not made, those members who do not express their opinions will have only themselves to blame.

* * * * *

Some NAR members may ask why we have not named the Board members referred to in the above editorial. The reason is simple, we feel that the Board has a responsibility to provide the membership with an accurate account of its operations. For months we hope that eventually the Board will see fit to provide a full account of these incidents to the membership. The important point is to secure passage of a revised set of By-Laws, not to take action against individual Trustees for "past offenses."

MODROC CALENDAR

Pascack Valley Regional – Oct. 9-10, 1971. Regional sponsored by New Jersey's Pascack Valley Section. Events: Space Systems, Swift B/G, Hawk R/G, Open Spot Landing, Pigeon Eggloft, Class 2 Drag Efficiency, Class 2 Streamer Dur., Class 2 Para. Dur. Contact: Victor Dricks, 1547 East 21st St, Brooklyn, NY 11210.

CARM-1 – October 24, 1971. Area meet, sponsored by the Vikings Rocketry Society, open to all NAR members from Virginia. Site: Hanover Air Park. Events: Class 1 PD, Class 2 SD, Pigeon Eggloft, Hornet B/G, Sparrow B/G, Swift B/G, Sparrow R/G, Parachute Spot Landing. Contact: Tom Hench, 4802 Kengsington Ave., Richmond, VA 23226.

MARS-6 – October 29-31, 1971. Regional meet, sponsored by Star Spangled Banner Section, open to first 100 NAR members who apply. Site: Aberdeen Proving Grounds. Events: R&D, Scale, Hornet B/G, Hornet R/G, Robin Eggloft, Class 0 Drag Eff., Predicted Altitude, Class 0 SD. Contact: Howard Galloway, 428 Ben Oaks Dr., Severna Park, MD 21146.

CFAM-2 – October 30, 1971. Central Florida Area Meet, sponsored by the Winter Park Aeronautics and Space Society, open to all rocketeers in the state of Florida. Site: WPASS Launch Field. Events: Pigeon Eggloft, Sparrow B/G, Open Spot Landing, and Class 1 SD. Contact Harold L. Downing, 2840 Cady Way, Winter Park, Fla. 32789.

NETS–2 – November 6, 1971. North East Technical Symposium sponsored by the Pascack Valley NAR Section. Site: Bloomfield, New Jersey Public Library. Tentative topics: Scale, B/G, Making Your Own Decals. Contact: Brian Skelding, 9 Appleton Rd., Glen Ridge, New Jersey 07028.

FLOP-1 – Nov. 6, 1971. Sponsored by the Pueblo (Colorado) Model Rocket Club, and open to all rocketeers. Events: Sparrow B/G, Class 0 Alt., Class 2 SD, and Robin Eggloft. Site: Pueblo, Colo. Advance registration before Nov. 1 required. Overnight lodging available with club members. Contact: Larry Clark, 39 Normandy Cr., Pueblo, Colo. 81001.

NERFAM-II – November 7, 1971. Area meet sponsored by the New England Rocketry Federation. Events: Condor B/G, Class 0 PD, Sparrow B/G, and Class 3 Streamer Duration. Contact: Patrick Griffith, Legion St., Milford, Mass. 01757.

Oklahoma Area Meet – November 14, 1971. Contest sponsored by the Oklahoma Model Rocket Society, open to all modelers from the state of Oklahoma. Events: Class 1 PD, Sparrow B/G, and Class 1 Streamer Duration. For information contact Mike Clay, 4609 N.W. 35th St., Oklahoma City, Oklahoma 73122.

SOLICITATION OF MATERIAL

In order to broaden and diversify its coverage of the hobby, MODEL ROCKETRY is soliciting written material from the qualified modeling public. Articles of a technical nature, research reports, articles on constructing and flying sport and competition models, scale projects, and material relating to full-scale spaceflight will be considered for publication under the following terms:

1. Authors will be paid for material accepted for publication at the rate of two dollars ($2.00) per column inch, based on a column of eight-point type thirteen picas wide, for text, six dollars fifty cents ($6.50) for drawings, and two dollars ($2.00) for photographs accompanying text. Payment will be made at the time of publication.

2. Material submitted must be typewritten, double-spaced, on 8½ by 11 inch paper with reasonable margins. Drawings must be done in India ink and must be neat and legible. We cannot assume responsibility for material lost or damaged in processing; however our staff will exercise care in the handling of all submitted material. An author may have his manuscript returned after use by including a stamped, self-addressed envelope with his material.

3. Our staff reserves the right to edit material in order to improve grammar and composition. Payment for material will be based on the edited copy as it appears in print. Authors will be given full credit for published material. MODEL ROCKETRY will hold copyright on all material accepted for publication.

Those wishing to submit material should send it to:

Model Rocketry Magazine,
Box 214,
Boston, Mass. 02123

FROM THE

LAUNCHING PAD

Over a year ago the Monroe Astronautical Rocket Society (MARS) in Rochester, NY published their "Purple Book" containing rules for several new model rocket contests. One event which they have found especially popular is LeMans Start, where each contestant attempts to achieve the shortest overall duration for putting his rocket on the pad, firing it, recovering it, and returning it to the judges. After seeing the event flown at the recent Canadian Model Rocket Convention we're sure many other clubs will want to give this exciting event a try. The complete LeMans Start rules are printed below.

Frequently **Model Rocketry** receives letters from rocketeers whose model rocket flying has been curtailed by local officials or parents who are concerned about the safety aspects of the hobby. The safety record of the hobby speaks for itself, but only if that record is widely known. The model rocket hobby suffers not from a poor safety record but from poor publicity of its excellent safety record.

The following letter from John Worth, Executive Director of the Academy of Model Aeronautics, serves as testimony to that record. The letter was written on June 3, 1971 Tim Skinner, Chairman of the HIAA Model Rocket Division. John Worth comments on the insurance policy covering NAR model rocket activities:

Dear Tim:

"It's a real pleasure to provide the following information concerning the safety record of the National Association of Rocketry.

'The Academy of Model Aeronautics extended its insurance coverage in 1965 to include coverage in 1965 to include NAR activities. We did so after considerable study involving the NAR safety code, NAR competition regulations and my own personal observation during many NAR activities — the latter both local and national in scope. We also examined the history of NAR, with particular emphasis on decisions and procedures involving safety.

We were particularly impressed by the strict adherence in all activities to such basic

LeMans Start Rules

1. LeMans Start comprises three events open to model rockets that are single staged and powered by a single engine, weighing no more than 85 grams at the moment of launch.
2. The object of the competition is to achieve the shortest possible total flight duration. Contestants shall be timed in seconds from the signal to start until the model is recovered and returned. The entry achieving the shortest flight time shall be declared the winner.
3. At the signal to start, the contestant will take his prepared model and set it up on the launch pad. After clearing the launch area, the firing officer will launch the model. The contestant will then recover the model and place it at a predesignated point at which time the timing will end.
4. If an electrical short occurs the contestant may repair it. If the short is the fault of the range crew, the contestant will not be penalized. If the ignitor must be replaced, the contestant will be penalized 20 seconds.
5. The contestant may adjust the launch system before timing begins.
6. All objects external to the model shall be permanently attached to the model. No crepe paper streamers or other flammable materials shall be attached to the model such that they may enter the rocket engine's exhaust.
7. The events authorized in LeMans Start are as follows:

Class	Total Impulse
Look-out	0.00 - 2.50 nt-sec.
Tired Runner	2.51 - 5.00 nt-sec.
Bye-Bye Birdie	5.01 - 10.00 nt-sec.

(Reprinted from "The Purple Book" of the Monroe Astronautical Rocket Society.)

safety factors as exclusive use of remote electrical ignition, exclusive use of tested and safety certified engines, rigid observance of range and countdown procedures. When we finally approved sharing our insurance protection it was with full confidence that we were accepting an inherently safe activity.

'This has been borne out by the actual record since 1965. It couldn't be better, not a single insurance claim processed! This might not be considered significant except that what has been involved is a record of thousands of model rocketeers launching hundreds of thousands of model rockets in hundreds of local, regional, and national meets.

'The record speaks for itself. I have no means of comparing this record with other organizations, but a zero claim record for six years is difficult to beat by any outdoor recreational and educational activity.'"

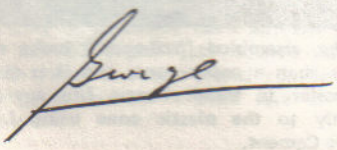
Twice since its creation, photos of the "Flying MPC Launch Pad" built by Kevin Flanagan and Brian Skelding have appeared in Model Rocketry. Each time we've received a barrage of letters asking for plans for this unique oddball design. Actually, even after seeing the launch pad fly, we weren't convinced it would work reliably. But after seeing it fly successfully at PVARM, *and* NETS, *and* PACT, *and* NARAM, *and* seeing photos of it flying on other occasions, we're convinced. A properly done conversion of the MPC launch pad will indeed fly safely and spectacularly. So here it is, beginning on page 28, a set of plans for the Flying MPC Lunar Lectric Launch Pad by its creator, Kevin Flanagan.

This year we are trying something new in our coverage of NARAM – more photos, and a breakdown in the contest standings so that the results of each event are on the same page as the text and photos of that contest. We hope you'll like this new format and that you will write in with your comments so we can plan our coverage of NARAM-14.

The non-contest modeler may think that the 12 pages in this issue devoted to NARAM-13 are a bit excessive. However, we suggest that even if you don't build for contests you should read through the NARAM report. You'll find quite a bit of useful information on the current trends in B/G design, payload models for the new mini-engines, and other techniques valuable even to the sport modeler.

It's surprising that even with 12 pages available for NARAM coverage only the highlights could be presented. We came back from NARAM with 211 pages of notes, 387 photographs, a stack of literature from the manufacturers, and 51 pages of R&D summaries. Condensing this down to the final torm which begins on page 10 took a week of writing and rewriting and even more time in the darkroom to select and print the photographs.

We hope you'll like the coverage!



A HIGH PERFORMANCE COMPETITION DESIGN FOR PEEWEE PAYLOAD

MINI-PAYLOADER

For Minijet Power

BY GEORGE FLYNN

The new MPC B-power Minijets open up a whole new area of PeeWee Payload competition. The "Mini-Payloader" is an attempt to capitalize on the advantages of this new engine, while providing a low-drag, easy-to-build competition rocket.

For high-performance it is important to use a boat-tail on this payload model, since the engine has a diameter of only 13mm while the payload is 19 mm in diameter. Use of a boat-tail can result in a base drag reduction of 65% over that of a standard cylindrical payload carrying model. Quite a gain in competition flying.

The key to the ease of the Mini-Payloader's construction is the use of two CMR NC-77 nose cones. One serves as a normal nose cone, while the second, cut off at the rear, functions as a pre-built boat-tail fairing. This eliminates the necessity of turning a balsa fairing on a lathe, or using a straight-tapered paper fairing.

The Mini-Payloader is a small model using a tapered boat-tail to go from the payload size tube to the half-inch Minijet tube.

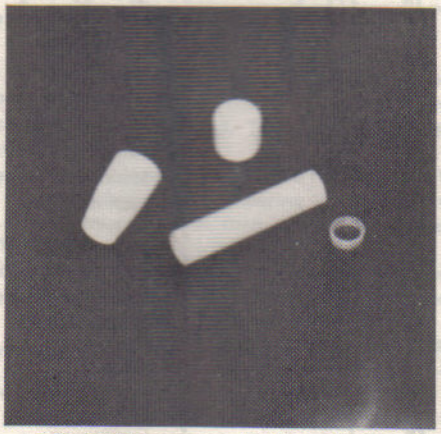
Construction

Construction begins with the tail cone. Cut off a 2-3/8" length of CMR RB-50 body tube. (This is a new tube, introduced last August, which slip fits around the Minijet engines.) Glue a thrust ring into the forward end of the RB-50 tube, and set the assembly aside to dry.

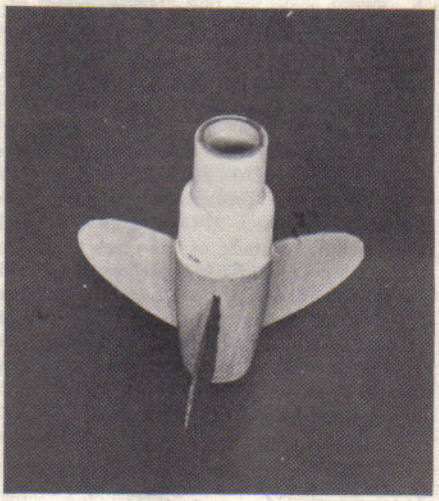
Mark a 0.550" diameter circle on the end of the plastic Nose Cone Adapter from one of the NC-77 nose cones. Use a sharp X-Acto knife to cut out the circle, and check the fit of an RB-50 tube through the hole. If it doesn't fit, use a round file (or sandpaper wrapped tightly around a pen) to enlarge the hole until the RB-50 just fits.

Wrap a layer of scotch tape around the bottom of the Nose Cone Adapter, insert the nose cone, and slide a 6" length of RB-50 onto the adapter. The entire assembly can now be placed in a CMR body tube cutter, and the tip of the nose cone can be cut away cleanly. To allow the RB-50 to project from the rear of this tail cone, 1" of the nose cone tip must be cut off. Test the fit of an RB-50 tube through the hole in the tail cone. If the hole is too small remove an additional section from the cone until a smooth fit is obtained.

Using Ambroid Liquid Cement, one of the few glues which will work on both plastic and paper, add a thin ring of glue around the inside of the smaller end of the tail cone. Slide the 2-3/8" engine tube into the tail cone until it is flush with the base. Add a ring of glue around the inside of the circular hole cut into the Nose Cone Adapter, and slide the adapter over the engine tube and into the shoulder of the Nose Cone to fasten the Nose Cone to the Nose Cone Adapter.



The Mini-Payloader "tail-cone" is easily constructed from CMR parts. The tip is cut off an NC-77 nose cone, and a circular hole is cut through the base of the NC-77 nose cone adapter. A length of RB-50 (Minijet size) tube is glued into the "tail-cone" and an engine block is glued into place in the RB-50.



The assembled "tail-cone" looks much better than a paper cone, and it is quite a bit easier to build. Plastic fins are glued directly to the plastic cone using Liquid Plastic Cement.

In all cases use only as much glue as is necessary for a good joint. Both Ambroid Liquid Cement and Liquid Plastic Cement cause the thin walled nose cone to melt. Any excessive application of cement will result in a mottled surface on your tail cone. Set the entire assembly aside to dry.

Assemble the other NC-77 nose cone according to the instructions supplied with it. Do not include the wire shock cord mount, since this cone will be mounted in front of the payload. Wrap a single layer of scotch tape around the Nose Cone Adapter to insure a tight fit into the RB-77 payload tube.

Cut a 3½" length of RB-77 body tube. Mark a 0.700" diameter circle on a sheet of shirt cardboard. Using an X-Acto knife, cut out this circle. Punch a 1/8" hole through the center of the cardboard disk. Run a circle of glue one inch from the top end of the RB-77 tube. Slide the cardboard disk into the RB-77 tube and allow the glue to adhere to the disk. The cardboard disk should be glued in place one inch from the top edge of the tube. This forms a payload compartment.

Cut a 12" length of shock cord and pass one end of the cord through the 1/8" hole in the payload section bulkhead. Fasten one end of the shock cord to the front of this bulkhead. Attach the other end of the shock cord to the section of RB-50 engine tube which projects from the forward end of the tail cone.

Using the fin template in the plans, cut three fins from 0.20" thick plastic sheet. (Plastruct STSS-1, priced at 22 cents for a 24" x 1¼" sheet and available at most hobby shops, is ideal.) Round the leading and trailing edges of the fins using 400 grit sandpaper.

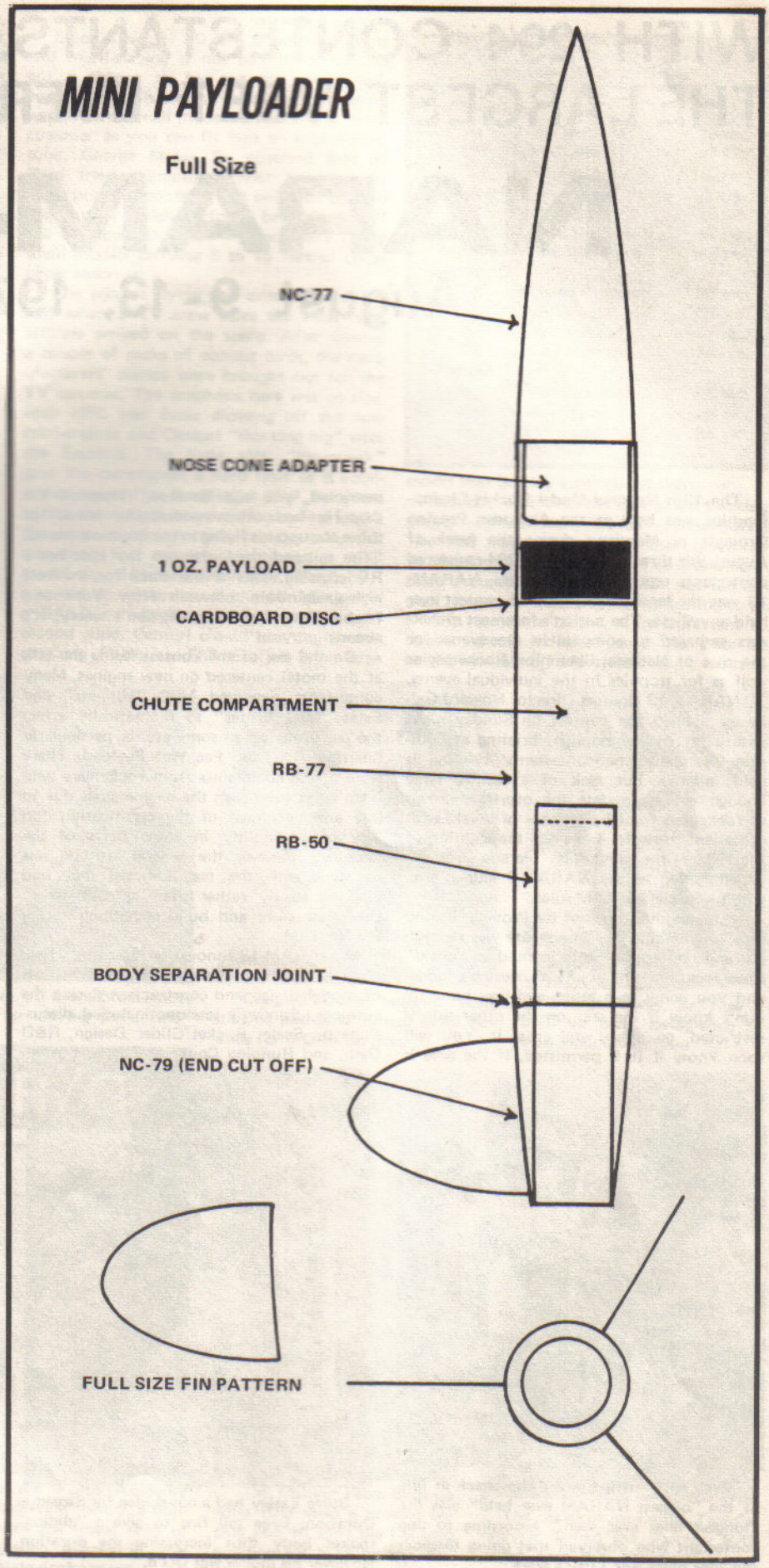
Mark the location of the three fins on the tail cone. The fins should be 120° apart and the trailing edge should be located 1/8" from the base of the tail cone. Apply a thin layer of Liquid Plastic Cement to the root edge of one fin, and hold it in place on the tail cone until the glue sets. Do the same with the other two fins. Brush a light coat of Liquid Plastic Cement along the root edge of each fin to form a secure bond. Do not use too much glue or the tail cone will dissolve. Set the entire rocket aside to dry.

Flying the "Mini-Payloader"

An 8" diameter parachute is sufficient for safe recovery of the Mini-Payloader. Since the chute is mounted ahead of the "break joint" the momentum of the ejected tail cone/engine assembly must pull the chute out of the rocket. Thus the chute must fit quite loosely in the model. Use ½ mill aluminized mylar for the chute — it is both strong and thin, making it ideal for this semi-rear-ejecting bird.

The Mini-Payloader should be flown with an MPC B3-5m Minijet engine. For test flying you can use an A3-4m, but don't be surprised if ejection takes place after arc over. A 3-second delay B would be ideal for the Mini-Payloader, but MPC has not yet seen fit to introduce this delay.

The Mini-Payloader is a high-performance competition model. It is designed to perform well only in relatively *calm air*. On windy days the B3 engine just doesn't put out enough thrust to keep this bird from weathercocking, so exercise a little care in flying this model.



WITH 294 CONTESTANTS, THE LARGEST MEET EVER

NARAM-13

August 9 - 13, 1971

by George Flynn

The 13th National Model Rocket Championships was held at the Aberdeen Proving Grounds in Maryland during the week of August 9th through 13th. With 294 registered contestants representing 29 states, NARAM-13 was the largest model rocket contest ever held anywhere. The nation's foremost rocketeers gathered to compete in ten events for the title of National Champion Rocketeer as well as for trophies in the individual events.

NARAM-13 Contest Director Howard Galloway opened the contest on Sunday night with a "formal" moonlight briefing at poolside. Normally the contestants' briefing is held indoors, but lack of a facility large enough to accomodate the overflow crowd of rocketeers forced a number of breaks with precedent. Howard explained the location of the field – the same APG "Parade Ground" which served as the NARAM-7 launch site, and the special NARAM rules.

It seems that much of the Proving Ground area surrounding the launch site was restricted, and contestants were warned to "avoid" these locations. "If you're recovering a model and you come to a fence and you honestly don't know if the area on the other side is restricted, go ahead and cross it. You will soon know if it is permitted. If the area is restricted, you will be *shot*," reported the CD. He had other encouraging words for those contestants flying in the duration events. "The railroad track through the base has a RR crossing. This is the track for the new high-speed train between New York and Washington. If you see it, don't worry, it's already got you!"

On the eve of the contest flying the talk at the motel centered on new engines. Many contestants expected MPC "Minijets" and Estes "Mini Brutes" to dramatically affect the performances in some events, particularly Sparrow R/G and Pee Wee Payload. There were a few complaints from rocketeers who hadn't yet even seen the new engines due to late announcement of the certification and lack of availability in some parts of the country. However the general attitude was to stick with the tested model they had planned to fly rather than to rush off to the range store and build something during the NARAM.

A NARAM-13 innovation was the scheduling of Discussion Groups on various aspects of model design and construction during the evenings. Sunday's sessions included discussions on Scale, Rocket/Glider Design, R&D Data, and Running Contests. The best attended of these was Jon Robbins' group on R/G Design which attracted about 50 rocketeers. Apparently many of them were still looking for tips for the relatively new Sparrow R/G event. One rocketeer commented after the talk that Jon's group was "Great, with any luck I'll have an R/G built by Tuesday."

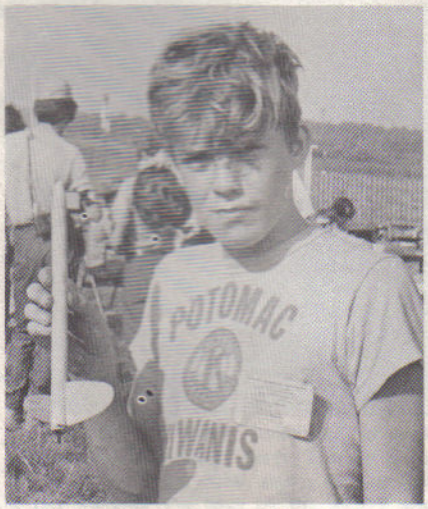
Most contestants got their first view of the NARAM field on Monday morning – the first day of the meet. The launch site itself was a 1500' by 1500' open field with no obstructions. It was a half-mile to the cornfield on the north, and a mile to the nearest restricted area on the south. The cornfield was "off limits" to all rocketeers except the owner of a bird which drifted into the area.

The Army provided a large range operations tent which served as the center of the launch activity. Several hundred feet to the east the manufacturers had their displays area – an array of trailers and a tent housing range stores, new product releases, and much literature from all the companies.

The formal opening cerimonies included a welcome and the launching of the first rocket by Col. Hodges, Commanding Officer of Aberdeen Proving Grounds. Surprisingly, with so many contestants and many little things to coordinate, the opening was only 8 minutes behind schedule. Contest flying started immediately with the Class III Streamer Duration event.

There was little wind on Monday morning, but the bright sunlit sky caused many of the

Even early in the week the check-in line at the "biggest NARAM ever held" was the "longest lines ever seen," according to one contestant who observed that going through the lines twice was a day's work.



Steve Easley had a novel idea for Streamer Duration, large tail fins to give a "gliding" rocket body thus increasing the duration. However his model was DQ'd.

Class III Streamer Duration

Division A		
1st	Kerry Mechtly	106 sec.
2nd	Tam Joines	76 sec.
3rd	Ricky Piester	65 sec.
Division B		
1st	Roy Green	105 sec.
2nd	Michael Manes	94 sec.
3rd	Michael Scarborough	89 sec.
Division C		
1st	Sanchez-Yurfest tm	159 sec.
2nd	Andrew Bennett	114 sec.
3rd	Jim Pommert	100 sec.
Division D		
1st	George Meese, Sr.	111 sec.
2nd	James Joines	107 sec.
3rd	Robert Thoelen	99 sec.

best flying C-powered streamer models to be lost after engine burnout. The timing teams and flight judges just couldn't keep the highest flying birds in sight to get a time on them. In addition, a surprisingly high percentage, about 25%, of the streamer models were DQ'd for failure to make a stable flight or for separating from their streamers. One contestant, Richard Brandon, actually managed to be DQ'd for both reasons as the streamer ripped off his unstable model.

The best of the SD flights was turned in by the C Division Sanchez-Yurfest Team from the Star Spangled Banner Section. Using a home designed model, they managed a 159 second duration with a 3" by 30' aluminized mylar streamer. All the other high duration flights were with the more conventional crepe paper streamers. Andy Bennett of the Turk's Head Organization of Rocketry captured second place with a duration of 114 seconds flying a 2" by 7½' crepe streamer in a 7" long BT-20 model. Third place went to George Meese, Sr. of the Annapolis Association of Rocketry who flew a 4½" by 6' crepe streamer in a "Break-Away" type model. This year a special "Dead Last But Finished" award was given in each event to the qualified flight with the worst performance. In Streamer Duration the DLBF award went to Rusty Lindgren of NARCAS with a 5 second duration.

Since Class III SD is a C powered event and multi-staging is not permitted, no one got a chance to try out the new "mini-engines" in this event. Nonetheless the trend was towards small models containing as much streamer as you can fit into an engine-sized tube. George Meese, Sr. observed that he "had tried aluminized mylar streamers in some previous contests, but switched back to crepe paper which performs better." Overall the Streamer Duration winners were flying small models carrying 6 to 15 feet of crepe paper streamer.

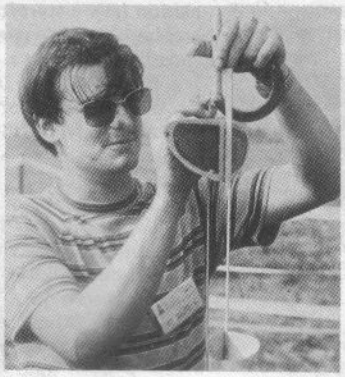
The contest flying was interrupted at 10 AM when a TV crew from the local NBC affiliate arrived on the scene. After filming a couple of racks of contest birds, the manufacturers' demos were brought out for the TV cameras. The emphasis here was on *size*, with MPC and Estes showing off the new mini-engines and Centuri "thinking big" with the Enerjets. The little MPC "Pipsqueek" gave the cameraman a hard time as it accelerated quickly on the Minijet B3-7. For some of the contestants who were from areas where the new engines weren't yet on sale, this was their first opportunity to see a mini-model fly. SAI flew their new "Bat-Baby," a scaled down version of the Mini-Bat, with a ½A3-3 mini-engine, and it turned in a 20 second glide. Centuri closed out the demonstrations flying an F67 Enerjet in a large model that quickly went out of sight.

Sparrow Rocket/Glider

Division A		
1st	Kerry Mechtly	75 sec.
2nd	Paul Chilcoat	41 sec.
3rd	Mike Turtora	12 sec.
Division B		
1st	Bart Hunter	108 sec.
2nd	Jeffrey Risberg	47 sec.
3rd	David Shucavage	45 sec.
Division C		
1st	Michael Thomas	62 sec.
	Craig Streett	62 sec.
2nd	Gary Lindgren	57 sec.
3rd	John Lane	55 sec.
Division D		
1st	William Feleccia	98 sec.
2nd	Kuhn Team	89 sec.
3rd	Al Lindgren	85 sec.

Monday afternoon the first of the tracking events — Predicted Altitude — was flown. The 300 meter baseline had been measured by the Army, and in an effort to insure complete accuracy they had gotten out topological maps to select tracking locations at exactly the same height. A measurement to double check indicated that the error in height was only 0.12 feet, which isn't too bad.

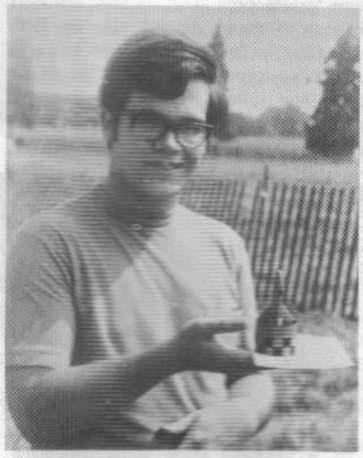
Bill Fileccia used the free-flight technique of downthrust (note pod angle) and side thrust to build this "no moving parts R/G" which turned in 98 seconds.



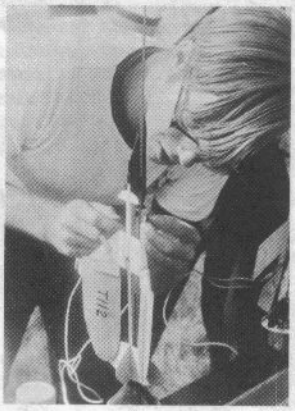
Craig Streett's built-up wing moving pod R/G turned in 62 seconds for C Division first.

George Meese, Sr. flew a built up wing, swing-wing to a 35 second duration.

SPARROW R/G



Gary Lindgren's gliding loop model used a BT-70 tail ring as a lifting surface and turned in 57 seconds.



The Air Force Academy "45° flop-wing" entry, a flop-wing with the lower drag of a swing-wing, spiraled in after incomplete deployment.

The Medina Team built-up wing R/G used a moving engine pod to shift the CG into position for a 19 second duration.

The Blackistone-Smith Team's Valkyrie earned the Sparrow R/G "Dead Last But Finished" award with 5 seconds.

The most unusual predicted altitude entry was Doug Plummer's "ZNT-3," a ring finned model which missed its mark by 47.3%.

As in most recent Regionals it took a perfect prediction (0% error) to get a first in A, C, and D Division. George Meese, Jr. of the Annapolis Association of Rocketry, Daniel Meyer of NOVAAR, William McKinnon, and the Philmon Team of the Rockville Rocketeers all managed 0% errors to capture first place. B Division first place went to Kevin Flanagan of Pascack Valley who bought an MPC Pioneer at the range store, assembled it on the range, assumed a 0.6 drag coefficient, borrowed a Malewicki chart, and *guessed* an altitude. His 3% error earned him B Division first. Perhaps the most novel of the Predicted Altitude flights was Doug Plummer's F52 powered ZNT-3, a multiple tube stabilized model, which missed its mark by 47.3% giving Doug 52nd place in C Division. Even that wasn't "good" enough to net Doug the "Dead Last But Finished" award which went to the Butterworth Team with a 68.5% margin.

Tuesday's flying got off to a slow start with no activity on the range a half-hour after the scheduled 8:00 AM starting time. Most of the contestants used the extra time to get their Sparrow R/G's in trim. Spent engines for use in trimming the R/G's were in high demand on the field, with a couple contestants offering as much as $1.00 each for a Minijet or Mini-Brute casing. Rocketeers clustered around trying to beg or borrow the casing as soon as you got your glider into trim.

Quite a number of unusual designs showed up on the NARAM range for the R/G event. Most contestants accepted the "fact" that *something must shift the CP or CG* of the model to transition from boost to glide. Thus swing-wings, flop-wings, flex-wings, canards, and a weird assortment of other models made an appearance.

Representing the swing-wings there was, of course, Jon Robbins' Ground Hog R/G, this time the Ground Hog 50 which used a "burning string" deployment system rather than the moving piston system which he previously used. The model had the same 36" span and 1½" chord as the Ground Hog 16 (MRm September '71), but used a thicker, undercambered wing. Flying with a Mini-Brute A, the model turned in 60 seconds for 6th place in D Division. Tom Wuellette of Three Rivers flew a similar swing-wing using an 18" span and 2" chord, and also flying with a Mini-Brute, however, Tom's model only remained aloft for 16 seconds giving him 16th place in D Division.

Merely using the ejection charge to move the engine rearward an inch or so to shift the CG was another popular technique. Marc McReynolds of the Arevelos Rocket Association flew a styrofoam, elliptical wing glider employing this "engine shift" to a 172 second timed flight. That's when the timers lost it, but Marc followed it for almost 10 minutes on the ground before he gave up the chase. Unfortunately, he didn't recover the glider, disqualifying what would have been a sure first place.

Craig Streett of CSAR used the same technique, moving his engine back 1½" at ejection, to take first place in C Division. His cut-out, elliptical wing R/G worked perfectly to turn in a 62 second duration. His father, Lee Streett, used the same system on a styrofoam elliptical wing glider, but it made a large loop, pulled out only 10 feet above the ground, and managed only a 7 second glide. Dr. Gerald Gregorek also of CSAR used the "burning thread" method to move his engine pod backwards, and managed a 28 second duration on his cut-out wing R/G.

Predicted Altitude

Division A		
1st	George Meese, Jr.	0.0%
2nd	Steve Honecker	1.2%
3rd	Peter Beck	2.6%
	Frank Mendyk	2.6%
Division B		
1st	Kevin Flanagan	3.0%
2nd	Michael Manes	4.4%
3rd	Peter Korzun	4.7%
Division C		
1st	Daniel Meyer	0.0%
	William McKinnon	0.0%
2nd	Medina Team	0.4%
3rd	Randy Gilbert	1.2%
Division D		
1st	Philmon Team	0.0%
2nd	Kennedy-Gibbs Team	0.6%
3rd	Carol Meese	3.0%

Instead of moving the engine backward, Howard Kuhn of NOVAAR moved the wing forward on his R/G to shift the CP to glide trim. The wing on this small model, with about an 8" span on a swept wing, slid forward on a rail on this "universal R/G" designed to be powered by ½A to B mini-engines. Howard's model, which will soon be kitted by CMR, took 2nd in D Division with 89 seconds.

The old style rear-delta wing B/G using a movable elevon for trim control made a reappearance in Sparrow Rocket/Glider. Mark Wargo of Apollo-NASA used this technique on a glider reminiscent of the Estes "Space Plane," a very early contest winning boost/glider. In previous flying Mark had managed 25 seconds on this bird, but the best he could do at NARAM was 19 seconds for 10th place in B Division. Harry Stine's Aero-Katt, also a delta wing with operating elevons, powered by a Minijet A took 14th in D Division with a 24 second glide.

Gary Lindgren of the Fanwood Association of Rocketry used a gliding "tail ring" model — a small rocket using a BT-70 ring fin. The engine moved backward to establish a glide, and Gary's model turned in a 57 second flight for 2nd place in C Division. Two other "loop type" models — BT-20 Infinite Loops — by Carl Guernsey and Dan Nardone of NARCAS were DQ'd for not gliding though they turned in 15 second durations, quite a bit longer than some of the qualified flights.

The one contestant who didn't think it was necessary to move anything in an R/G took first place in D Division. Bill Fileccia applied years of experience as a free flight powered airplane builder to the R/G problem. In powered free flight the airplane ascends almost vertically on a high powered motor, then levels out and goes into a glide when the motor stops running. To provide proper trim the engine is angled down to compensate for wing lift during the climb. He applied the same principle to his hand-launched glider type R/G. The engine, a Minijet A3, was mounted to give 5° downthrust on the big (18" span, 4" chord) glider. Since the glider was trimmed for a left turn, 3° right thrust was also added for straight boost. The flight was ideal with the downthrust allowing the R/G to climb almost vertically then transitioning to a turning glide after burnout. Nothing moved, thus dispelling the idea that some sort of a shift is necessary, and Bill

Tracking Exceeds Expectations

Tracking, which has been a serious problem for the previous two NARAM's, was quite a bit above average at NARAM-13. First, the Army's cooperation in precisely measuring the baseline and selecting two stations at equal altitudes assured that there would be no repeat of the NARAM-11 and -12 difficulties. Second, the assignment of overall responsibility for NARAM tracking to a single individual, Howard Kuhn, assured that one person would be consistently supervising the tracking operations.

Operating under Howard was tracking Crew Chief Dave Thurber who manned the "Tracking West" position throughout the four days of tracking. At "Tracking East" the duties were rotated between Guppy, Sam Atwood, and Andy Elliott, with Mark Shaw manning the headset. With such a small tracking crew it was possible to maintain efficient operations throughout the day. On the other end of the phones Robert Cherney took care of data recording with assistance from Jim Backlas and Glen Hendricks, while Paul Sanchez, Ira Perlow, and Trip Barber reduced the data. From there the cards went to Dottie Galloway and Judy Barrowman who sorted the cards and determined the winners.

The tracking teams went out early in the day to set up the scopes and practice on the timing events. As a result they scored impressively well when it came to tracking the 566 rockets successfully flown in the three altitude events. The closing rates were 89% in Pee Wee Payload, 77% in Egglofting, and 75% in Predicted Altitude.

Many of the tracking team members registered at the meet as "Non-Contestant Participants," not flying in the contest but offering their services as range support crew. For his four days of tracking at the meet, without flying any rockets, Dave Thurber was presented the NARAM-13 "Good Sportsmanship Award."

took first in D Division with a 98 second duration.

The best Sparrow R/G flight was turned in by Bart Hunter of the West Covina Titans. He flew a modified "hand launched glider" design which the club has been using for over a year in B/G events. The pod was changed to accept a Mini-Brute, and the CG shift technique was employed to establish glide trim. The model was relatively small, with a 14" span, and turned in a 108 second duration.

The Bruce Blackistone-Pam Smith Team, a combined NARHAMS and SSB effort, flew a mid-pod Valkyrie canard R/G, a configuration which Bruce has popularized over the last few years. It looked like the model was going to be unstable, but Bruce dismissed this with the comment: "If I'm wrong [about stability] and there are enough pieces left, I'll put a big weight on the nose and fly it again." As it turned out the model boosted beautifully, but the canard failed to deploy giving the Valkyrie a "high sink rate" and capturing for the Blackistone-Smith Team the Dead Last But Finished award with a 5 second duration.

Overall, there were 72 qualified flights in Sparrow R/G. Of these only 9 turned in durations of a minute or more, while 18 stayed in the air for 10 seconds or less. The results indicate that there's a great deal more work to be done with rocket/gliders.

Next on the schedule was the Robin Egglofting event. Robin was a popular event during the contest year, and many contestants were aware of the rather spectacular results being turned in by Ohio modelers in this event. At the June Midwest Model Rocket Regional in Columbus, the best performances turned in by Ohio rocketeers were about 50 meters higher than the best flights at other Regionals across the nation. The question being asked was "Can they repeat these performances?"

The only common feature of the egglofters was their use of the CMR egg capsule. Since the capsule was introduced two years ago it has gained national acceptance as the standard in egglofting. Only about 25% of the models flown used something other than the CMR capsule to hold the egg, but many contestants used paper fairings at the rear of the CMR capsule to optimize the shape of their models.

Just about every type of thrust augmentation device and/or drag reduction device was used in the eggloft event. The most successful was Jon Robbins' "closed-breech" launcher. The launcher tube was only slightly larger than the egg capsule, and his two-stage model got quite an assist from the four foot breech tube. Despite a severe tip-off which seemed to occur when the piston separated from the model, Jon's egglofter reached 192 meters for 2nd place in D Division Eggloft. Chalk up one place for Ohio, but not with the kind of spectacular altitudes at MMRR.

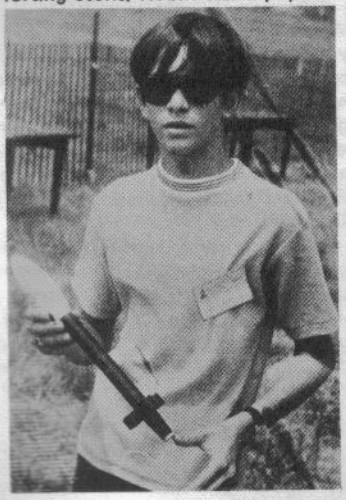
Immediately behind Robbins in the standings was Jon Randolph of the North Royalton Rocket Society with a two-stage model quite similar to the one which netted him 311 meters at MMRR. It's a standard model, with the "secrets" being a highly polished surface and a pop-off launch lug. Unfortunately, Jon's pop-off didn't pop, and he carried the extra weight and drag of the lug through second stage ignition. Even with this handicap, Jon finished 3rd in D Division with 173 meters, giving Ohio another Eggloft place.

First place in D Division Eggloft went to the Englund Team (YMCA Space Pioneers) flying a standard, single-stage eggloft model using a CMR capsule. Their 1st place altitude

Robin Egg Lofting

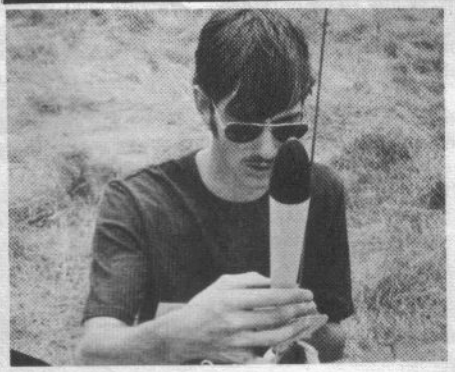
Division A		
1st	David Insinga	197 m.
2nd	Rod Simons	191 m.
3rd	Mark Hopkins	166 m.
Division B		
1st	John Omachel	209 m.
2nd	S.A. Smargiassi	192 m.
3rd	James Kerley	186 m.
Division C		
1st	Bursynski-Fornshill	256 m.
2nd	Paul Shelton	223 m.
3rd	William Chilcoat	217 m.
Division D		
1st	Englund Team	197 m.
2nd	Jon Robbins	192 m.
3rd	Jon Randolph	173 m.

ROBIN EGGLOFT

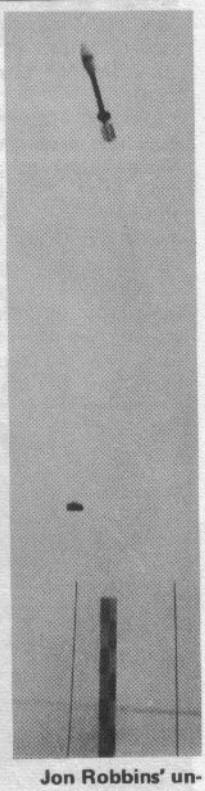


Steve Setzer's ring stabilized egglofter was a sure choice to go unstable, but it flew beautifully to 166 meters for 8th place in B Division.

Harold Mayes flew his low aspect ratio finned model to an altitude of 163 meters for 5th place in D Division.



Ed LaCroix's egglofter used a full length fairing to preserve attached airflow and reduce drag.



Jon Robbins' unusual two-stage, breech launched egglofter, reached 192 meters.

Don Carson checks in his unique conical egglofter. The model used no fins, employing a cone's natural CP and the forward CG caused by the egg to insure stability. Actually it pinwheeled unstably 10 feet over the pad.

Randy Black's egglofter, using a standard CMR cone, was one of the shortest egglofters at the meet.

"Pink Book" Revision

At a special meeting on Monday night at NARAM the Pink Book Revision Committee reviewed the changes they are proposing for the 1972 Sporting Code. About 75 NAR members attended the session, chaired by Committee Chairman Dr. Sven Englund, and listened to the proposed new rules.

The most drastic revision was in the area of Sanctioned Competitions. The present classification of Section, Area, and Regional Meets would be abandoned in favor of "Section Meets" (between members of one Section) and "Open Meets" (between two or more Sections, or between NAR members in a geographical area). Only five events would be permitted at either a Section or Open Meet.

The events would be divided into four categories (with the weighting factors indicated in parentheses):

Group A: Space Systems (8), Super Scale (7), Quadrathon (6), Scale (5), Scale Altitude (4), Apollo Egglofting (4);

Group B: Plastic Conversion (3), Boost/Glider (3), Rocket/Glider (3), Gemini Egglofting (3);

Group C: Predicted Altitude (2), Drag Efficiency (2), Design Efficiency (2), Parachute Duration (2), Altitude (2), Payload (2), Mercury Egglofting (2);

Group D: Drag Race (1), Spot Landing (1), Streamer Duration (1).

At either Section or Open Meets events could be selected as follows — no more than 1 from Group A, no more than 3 from Group B, no more than 3 from Group C, no limit from Group D.

A Section could hold no more than 5 Section Meets in the Contest Year. An individual could compete in any number of meets, with the scores from each contestant's five best meets only being counted towards the National Championship.

The Committee also revamped the current Egglofting categories, replacing them with Mercury, Gemini, and Apollo Egglofting, carrying one, two, and three eggs respectively.

In the Boost/Glide event the Committee proposed reinstatement of the "return of glider" rule.

The Plastic Model rules would be revised to allow conversion of kits of "guided missiles, rocket vehicles, or space vehicle" only.

A heated discussion of the merits of each proposal followed the presentation.

was 197 meters. However, Lee Streett's egglofter, which made it to 213 meters, just missed closing by less than a percent which would have given Lee first place and another Ohio triumph.

Some of the more novel egglofters didn't fare so well. Don Carson of the Robert Goddard Model Rocket Society tried a no-fin conical egglofter. He hoped to take advantage of the fact that the CP of a cone is 2/3 of the way back from the tip to the base. Using the egg as a noseweight he expected to keep the CG ahead of the CP, and reduce drag by eliminating the fins. However the model climbed to only 10 feet, and began "pinwheeling" unstably above the pad for a DQ.

George Helser made use of the piston launching system which he developed in an R&D project to get his egglofter off to a good start. The liftoff was good, with a noticeable increase in acceleration, but the model was DQ'd for flight performance and no altitude was reported.

A unique "ring finned" model by Steve Setzer of the Metropolitan Area Rocket Society was given little chance of success by those "in the know." Everyone knew that those four 1" long loops about 2½" forward of the base just wouldn't provide enough damping to keep the model from "coning." Needless to say, they did, and Steve took 8th in B Division with 166 meters.

The best of the Robin flights were quite good, with ten models reaching altitudes of 200 meters or higher. Generally these were single-stage, C-powered models using a CMR capsule. However, the fact that there were 11 flights of less than 100 meters, including three in D Division and three in C Division, indicates that we're still having problems with stability and design on non-standard models.

The third day of NARAM dawned on a less promising note than had the first two. The winds were up, the sky was overcast, and the weather bureau indicated storm activity for early afternoon with a possible chance of thunderstorms all night and into the next day. The week before NARAM the entire Maryland area had been subjected to almost continuous rain, with the nearby city of Baltimore reporting severe flooding. Now it looked like the contest might be interrupted by bad weather.

On reaching the field, Dave Hendricks of the ABM Section observed that "you can tell it's time to fly Eagle, the wind is up." Contestants were hand launching gliders all over the field trying to re-trim them to glide in the 10 to 15 mph gusting wind. Just looking around the field you could see that Eagle was going to be interesting — the entries ranged from a 15 nt-sec powered hand-launched glider to a 40 nt-sec Enerjet powered parasite!

Many of the Eagle entries were simply scaled up versions of kits or published designs. The Bumble Bee was represented by Mike Micci's 1½ size version using a cut-out, monokoted wing. This model flew beautifully, with just a slight arc over, and turned in an 88 second duration taking 9th place in C Division.

The YMCA Space Pioneers came in force with double-size versions of the canard wing MPC Delta-Katt. Harry Stine's model turned in a good, straight boost and went into a flat glide for an 88 second duration and 4th place in D Division. The team entry by Connie and Ellie Stine didn't fare as well as their "Delta-Tigah" — that's what the 2x Delta-Katt is being called — power pranged off in the direction of the MPC tent.

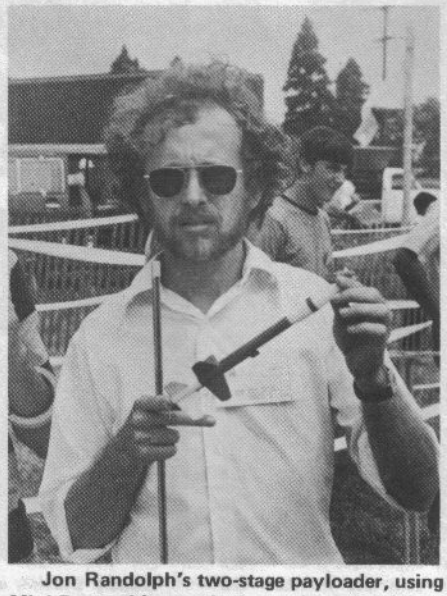
Flying a "Maxi-Mini-Bat," a double size version of SAI's Mini-Bat, Floyd Beebe of the Viking Rocket Club had an arcing boost, and only managed a 10 second duration.

Bill Werre of the Laural Association of Rocketry flew a D4-2 powered "Maxi-Manta," a 1½ size version of the Manta, which had been previously flight tested with a B engine. The wings were solid balsa, constructed from a 2-ply laminate with the layers at 90° angles for increased strength. The model held together with no problem, and turned in a 77 second glide.

Doug Plummer flew a parasite version of the Manta, similar to his record setting Condor from PACT-1. This glider was a 5/6th size Manta parasite lofted on a standard booster. "I'm counting mainly on the boost," Doug explained. "Some of these other gliders glide

Pee Wee Payload

Division A		
1st	John Hopkins	177 m.
2nd	Jeff Gordon	171 m.
3rd	Mark Hopkins	170 m.
Division B		
1st	Bart Hunter	198 m.
2nd	Peter Covell	196 m.
3rd	Peter Korzun	171 m.
Division C		
1st	Andrew Bennett	215 m.
2nd	Ed LaCroix II	211 m.
3rd	Andrew Elliott	204 m.
Division D		
1st	Jon Randolph	240 m.
2nd	Frederick Dunn	202 m.
3rd	Leslie Butterworth	201 m.



Jon Randolph's two-stage payloader, using Mini-Brute A's, reached an altitude of 240 meters for first place in the event.

Second place in Pee Wee went to Andy Bennett who flew a single-stage model from a piston launching augmenter.

great, but in this weather [gusty winds] I want to see them boost." Apparently they boosted well, because Doug's 77 second duration was only good enough for 13th place in C Division.

Howard Kuhn also flew a parasite Manta, using a normal sized glider, which deployed beautifully quite close to apex. The model went into a stable 79 second glide for 7th place in D Division.

Lee Streett's "Pig Bat," a parasite Mini-Bat (actual size) on a booster which looked like a 1/8th scale Black Brant III tied Howard for 7th in D Division. The model flew with a D6-0, ½A6-2S tandem to give it the needed delay, and the glider caught a weak thermal for its 77 second duration.

Flying the only design ever published or kitted which is recommended for Eagle, John Belkewitch of Pascack Valley used a Cox D8-3 to power his Thunder Bird. The model had an excellent boost, and managed a 71 second duration to take 11th place in D Division. Another Thunder Bird was flown by Karen Celentano of North Shore. Her model, also powered by a Cox D8-3, turned in a 31 second duration.

Peter O'Neill of Gemini used a Space Dart specially strengthened with a spruce boom as an Eagle entry. This D-powered model went out of sight after 85 seconds, giving him 10th place in C Division.

Certainly the most unusual of the Eagle B/G's was the swing-wing by Mike Angelo of Phillipsburg. Mike used a two-stage Omega to boost his "swing-wing feather," a glider composed of three feathers, one serving as the boom and the other two hinged to serve as wings. For the first time one of Mike's unusuall feather creations worked well, turn-

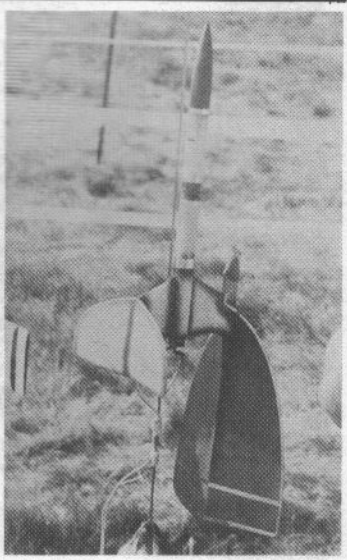
Eagle Boost/Glide

Division A		
1st	Leslie Lindgren	107 sec.
2nd	Fred Weiner	90 sec.
3rd	Mike Joines	70 sec.
Division B		
1st	Gregory Lindgren	112 sec.
2nd	Paul Day	88 sec.
3rd	Steven Hudson	71 sec.
Division C		
1st	Russell Rasmussen	279 sec.
2nd	Timothy Bray	126 sec.
3rd	Doug Smith	125 sec.
Division D		
1st	Kennedy-Gibbs tm	124 sec.
2nd	Fehskens-Biales tm	97 sec.
3rd	Fox tm	93 sec.

The Blackistone-Smith Valkyrie canard B/G, powered by an E5, turned in 57 seconds.

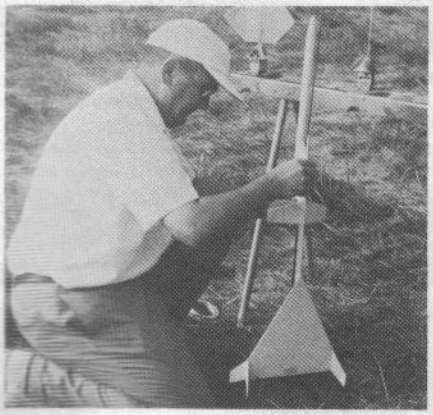
Brian Dolezal's flop-wing B/G used a two-stage (A5-0s, C6-3) pop-pod.

Clyde Howard's "Mach Schnell" delta wing glider, powered by a D13, was DQ'd by a red baron.



Bill Filleccia flew an uprated "Lunar Patrol" — a large version of the MPC kit employing only a single parasite and a fixed fin.

EAGLE B/G



Harry Stine has been "converted" to canards with his "Delta-Tigah" which took 4th with 88 seconds.

The Klouser Team flew a built-up wing "Apparition" failed when the pod stripped a few feet in the air.

Mike Micci's 1½ size Bumble Bee turned in an 88 second flight.

John Belkewitch flew the Thunder Bird to a 71 second duration.

Mike Angelo's swing-wing "Feather," lofted in an Omega, turned in 45 seconds.

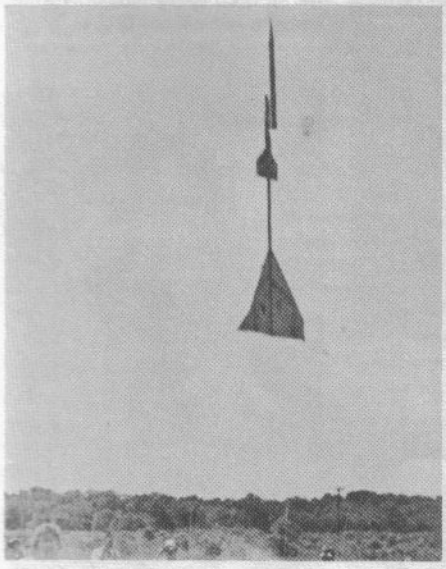
Flying a Manta parasite, a 5/6th version of his record setting Condor from PACT-1, Doug Plummer managed a 77 second flight.

The Air Force Academy Team prepared a "flying scale Harry Stine" as a NARAM demonstration. Reminiscent of the Estes Astron Spaceman, only much larger, "Harry" was powered by a D13 and made an excellent straight-up flight.

ing in a 45 second glide.

The best Eagle of the day was a flight by Russell Rasmussen of the West Covina Titans. His model was a large parawing contained entirely within the carrier rocket during boost. The "glider," constructed from several sections of chute material, floated away after deployment at apex. The model was timed at 279 seconds before it was lost giving Russ 1st place in C Division.

Overall, the Eagle flights were much better than expected, with far fewer prangs than had been seen in high-powered B/G events at recent meets. The good times, a minute or more, are still only what you would expect of a well done A or B powered model, but at least they weren't disintegrating all over the sky. A total of 74 Eagles were flown successfully, with a majority of those which glided at all turning in one minute plus durations.



One of the most spectacular of NARAM demos was this F67 Enerjet powered flight of Bruce Blackistone's Valkyrie canard B/G. Just seconds after this photo the model shreaded. Then came the PA announcement: "Bruce requests that anyone who recovered a piece of that last model please return it to him at the Army trailer so he can conduct a post flight analysis."

As the sky got even cloudier, Pee Wee Payload was the next event on the NARAM schedule. Quite a few MPC B3-5m Minijet powered models showed up in the check-in lines for this event, and their successful flights proved the lifting power of the new mini-engines.

Andy Bennett flew his single-stage Pee Wee model from a piston launcher (of the type described by George Helser in the R&D summaries). The model was a standard design, and the piston gave it quite an extra boost giving Andy 2nd place overall in the event with an altitude of 215 meters.

By 2:15 PM the sky was getting darker, and there were many payloaders yet to fly. At 2:25 PM the Army announced: "We are expecting a thunderstorm, as you can see, with winds gusting to 45 knots." Almost simultaneously, the trackers reported they were getting wet, and the scopes were quickly dismantled effectively ending the contest for the day.

The rain hit quickly, trapping many contestants in the Range Tent, the MPC Tent, and at other locations on the range. To keep those rocketeers in the MPC tent entertained, Harry Stine led a discussion group on Scale. The data reduction team, Dottie Galloway, Judy Barrowman, and Elaine Sadowski, had spent the entire week in the Galloway's "red van," so they were well prepared to just close the door and drive off across the now very muddy field. Ed Pearson, whose car was loaded with the Coke supply for the range store, had less luck driving away — his car began sinking in the mud and it took a group of 12 to 15 rocketeers to push him out.

The 56 rocketeers and their families who were camping in the bivouac area were hardest hit by the storm when tents were ripped off the ground by the gusting wind. Those who were lucky enough to still have tents after the storm found themselves with a lot of water on the "floor." By 3:15 the rain had stopped, and the range was reopened for demonstration flying, but Pee Wee Payload was put off until Thursday morning.

The best of the payload flights was Jon Randolph's. Jon was flying a scaled down version of his MMRR egglofter, using Mini-Brute A3-0 and A3-6 power. His plastic payload capsule was formed from CMR nose cones, and the model was impressively finished. It's 240 meter altitude gave it a 38 meter margin over the next nearest D Division entry.

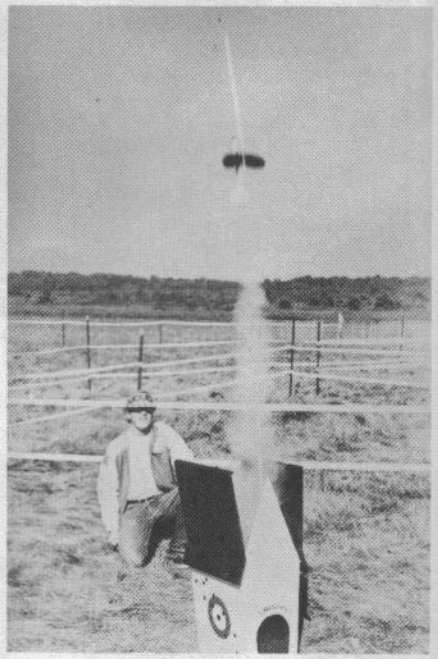
The Dead Last But Finished award went to the Blackistone-Smith team also flying a two-stage payloader. The second stage on their model failed to ignite, resulting in a 35 meter altitude. How they managed a qualified flight without second stage ignition, and consequently without a recovery system on the one ounce payload, is still subject to some debate.

Also on the Thursday schedule were the scale qualifying flights. The models for this event as well as Space Systems had been turned in on Monday, and Herb Honnecker's judging crew had been at work ever since. Overall, the Scale models were up to the standard set at NARAM-12, and the quality of scale modeling seems to be on the way up, a sharp reversal of the trend in the late 1960's.

With the new mini-engines as well as the high-powered Enerjets introduced at NARAM-12, there were two conflicting trends in scale building. Harry Stine's 1/10 scale model of the Astrobee-D, powered by a Minijet, stood only 15½" high. On the other hand, Richard Sternbach's 1/3 scale Astrobee D stood over 4 feet tall. With almost everything imaginable being modeled, there was an excellent selection of scale birds this year. In fact, among the top eight winners there was only one instance of duplication.

In A Division Jeff Gordon of CSAR took first in Scale with an excellent model of the Nike-Tomahawk. This bird, standing approximately 20" tall, netted 511 scale points. Ricky Piester, the youngest contestant at the meet and son of Centuri President Lee Piester, took second in A Division Scale with his 1/10 scale model of the IQSY Tomahawk.

Chuck Krallman of CSAR took the B Division Scale title with his 16" tall model of the Astrobee 1500. Chuck has been build-



Last year, at NARAM-12, Doug Malewicki flew his "Snoopy" B/G with a long pod. This year the glider flew out of its very own dog house.

Scale

Division A		
1st	Jeff Gordon	511 pts.
2nd	Ricky Piester	500 pts.
3rd	Billy Stine	460 pts.
	Leslie Lindgren	460 pts.
Division B		
1st	Charles Krallman	787 pts.
2nd	Mark Wargo	736 pts.
3rd	Steve Setzer	643 pts.
Division C		
1st	Scott Layne	793 pts.
2nd	John Drake	651 pts.
3rd	Brian Dolezal	597 pts.
Division D		
1st	Jon Randolph	840 pts.
2nd	Kuhn Team	827 pts.
3rd	Norman Wood	802 pts.

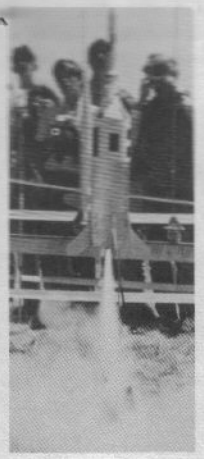
ing Astrobee 1500's for scale for about two years now, and suspects he may now have built more of them than the prototype manufacturer. Each year they get a little better, and his 787 scale points edged out the nearest competitor by 50 points. Mark Wargo's 1:16.5 Nike-Tomahawk took second in Scale with 736 points.

Scott Layne of the Dayton Rocket Research Association repeated his NARAM-11 and NARAM-12 Scale victories by taking first in C Division with 793 points. His F-powered 1/30 scale Little Joe II also gets a little better each year. The model uses a rolled balsa tube, carved balsa heat shield on the capsule, and numerous other hand made parts. John Drake's Aerobee model took second in C Division, trailing Scott by almost 150 points.

Making it a clean sweep of first places in Scale for Ohio rocketeers, Jon Randolph

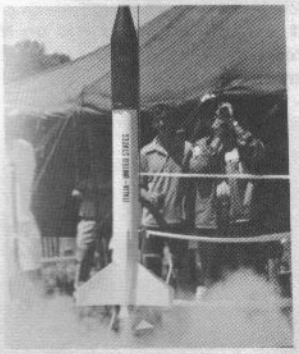
The attention to detailing on the bolt heads of Jon Randolph's D-Region, in 1:4.86 scale, explains why he took first in Scale.

Howard Kuhn's Javelin took 2nd place even after a premature impact resulting from difficulties with his D18.

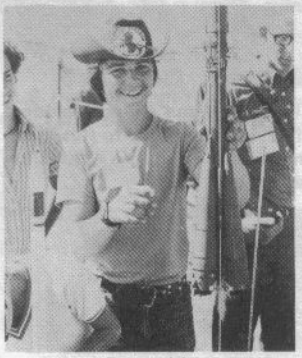


Scott Layne's Little Joe II attracted a crowd of photographers at liftoff.

The D-Region was quite popular. Steve Setzer checks in his 3rd place B Division model.



Greg Scinto's D-powered Shotput lifts off.



Stuart Zaherek's entry was a D18 powered Vostok.

SCALE

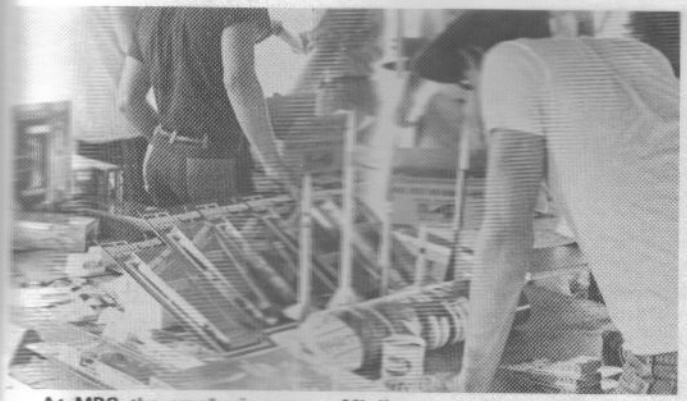
The Fleischer-Pearson Vostok, in 1:58.82 scale, turned in an excellent flight on an Estes D 13-3. This model showed good detailing on the strap-on weld patterns.

Al Lindgren's Falcon scale model placed 6th in D Division with 641 points.

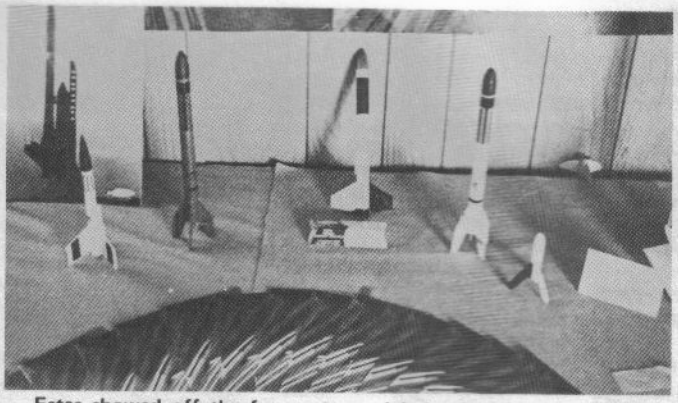
John Langford's model of the Mercury-Redstone, built from the Estes kit, showed good detailing on the hard to assemble escape tower.

The Astrobee-D's ranged in size from Harry Stine's 1:10 Minijet powered model . . . . . .

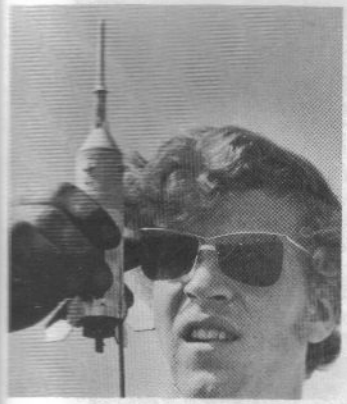
. . . to this F100 powered, 1:3 scale model by Richard Sternbach.



At MPC the emphasis was on Minijets, and the six models in the Miniroc line. NARAM marked the introduction of booster Minijets – A3-0m and B3-0m.

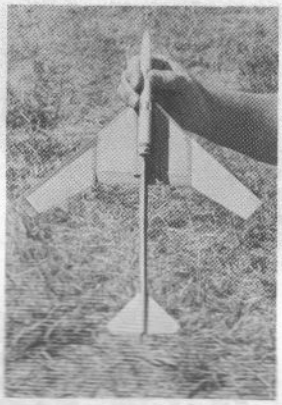


Estes showed off the four new models in their Mini-Brute line – (left to right) Screamer, Mini-Bertha, a bonus model available on mail orders, another Mini-Bertha, and the Mosquito.



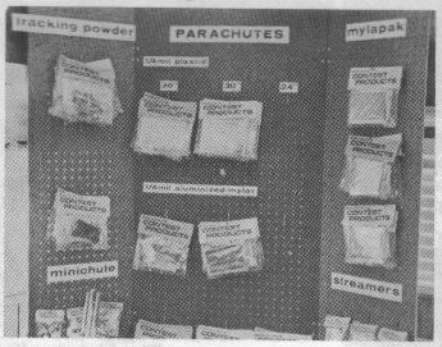
The Cox demo flying included the five plastic ready-to-flys now on the market. Here the Little Joe is readied for launch.

CMR will soon kit the movable-wing R/G which took 2nd in Sparrow R/G at NARAM. (Left) The wing slides back for boost, (right) then moves forward for glide.

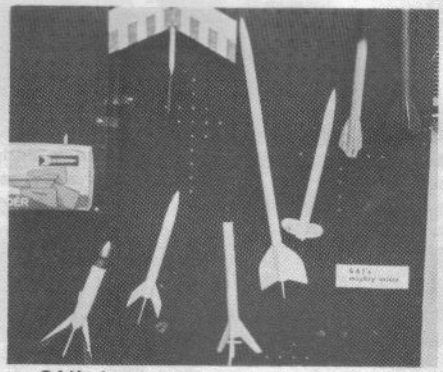


The emphasis at Centuri was on the Enerjets, with many demo-flights to show their lifting power.

DB Industries introduced three new foam wing B/G kits, for ¼A, ½A, and A power.



Contest Products introduced new aluminized mylar chutes and streamers in time for NARAM PD.



SAI's latest attempt in the model rocket field is these kits for mini-engine power.

Class I Parachute Duration

Division A		
1st	Leslie Lindgren	102 sec.
2nd	John Kennedy	82 sec.
3rd	Mike Joines	74 sec.
Division B		
1st	Thomas Burris	199 sec.
2nd	Gary Jacobsen	146 sec.
3rd	Bart Hunter	128 sec.
Division C		
1st	Brian Dolezal	305 sec.
2nd	Hinman-Nielsen tm	221 sec.
3rd	Bruce Shay	202 sec.
Division D		
1st	G. Harry Stine	175 sec.
2nd	Shirley Lindgren	172 sec.
3rd	David Hendricks	163 sec.

edged out Howard Kuhn for first in D Division Scale. Jon's 1:4.86 model of the D-Region Tomahawk, standing about 3½ feet tall and powered by an Estes D13-3, trailed the Kuhn Team model on the static judging. However Howard's 4 foot tall model of the NASA Javelin lost all its flight points when it became one of the models to fall out of the sky on D18-power. Jon's model turned in a perfect flight giving him an 840 to 827 victory over the Kuhn Team.

On Thursday afternoon the Class I PD models were flown in a light breeze with few thermals. A couple of rocketeers were "lucky" enough to lose their PD models to a thermal, but most came down fairly quickly. Of the 135 flights, 83 had durations of less than a minute.

The winning PD model was a highly boat-tailed altitude model built by Brian Dolezal of North Royalton. The 9" long model, powered by an MPC Minijet A, used a ¼ mil aluminized mylar chute 20" in diameter. He caught one of those weak thermals and managed a 305 second duration.

On Friday morning was the event everyone wanted to see – Super Scale with its highly detailed scale models complete with their launching complexes. During the static judging quite a few of these models (as well as the Scale models were DQ'd for lack of a recovery system. The rules are clear. The model must be submitted for judging in flight condition, but a number of contestants just failed to read them. One of the most spectacular models at the meet, a Vostok complete with the Russian gantry, was DQ'd for this reason. The results seem to establish the obvious: rocketeers who build good Scale models generally build good Super Scale mod-

els, as the Super Scale contests for first generally involved the same rocketeers who fought it out in Scale.

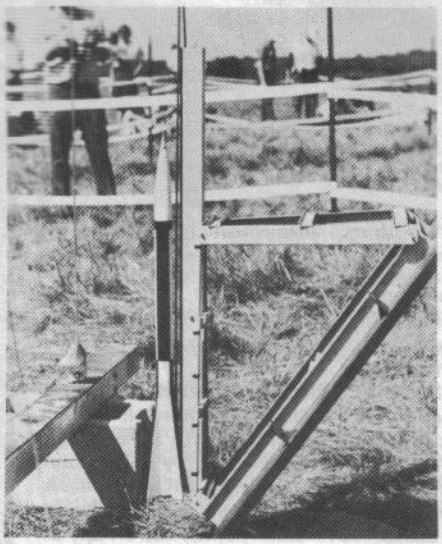
In A Division Jeff Gordon, who took first in Scale with a Nike-Tomahawk, flew a smaller Nike-Tomahawk off its Wallops Island launcher and netted 1058 points. Second was Billy Stine with a small model of the Asp going off the Redwing configuration launcher.

B Division was again a contest between Chuck Krallman and Mark Wargo, but this time it was Mark who came in first. Mark's

Super Scale

Division A			**Division C**		
1st	Jeff Gordon	1058 pts.	1st	Scott Layne	1663 pts.
2nd	Kerry Mechtly	1058 pts.	2nd	Brian Dolezal	1177 pts.
	Billy Stine	925 pts.	3rd	Lundberg-Kasper tm	1056 pts.
3rd	Brad Willmore	621 pts.			
Division B			**Division D**		
1st	Mark Wargo	1529 pts.	1st	Kuhn Team	1944 pts.
2nd	Charles Krallman	1220 pts.	2nd	Jon Randolph	1729 pts.
3rd	Gary Jacobsen	1139 pts.	3rd	Al Lindgren	1542 pts.

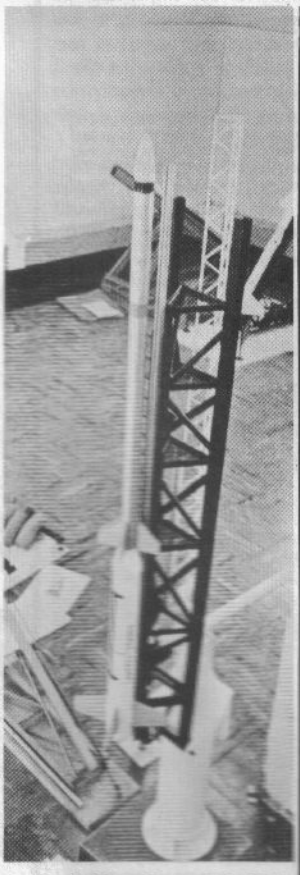
Scott Layne's Little Joe II captured first in C Division with 1663 points.



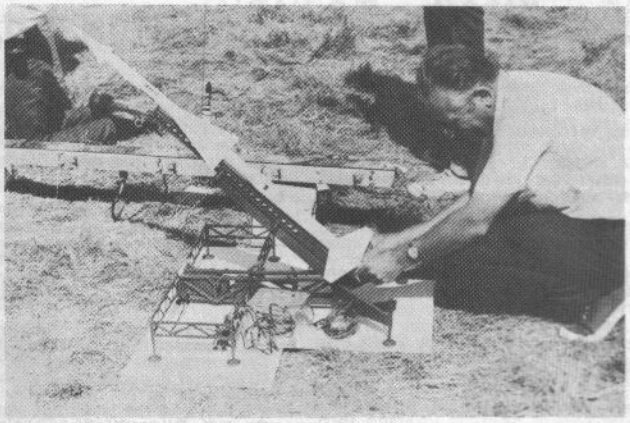
Jon Randolph's Asp model accumulated 1729 points.

Second place in B Division went to Chuck Krallman's Astrobee 1500 with 1220 points.

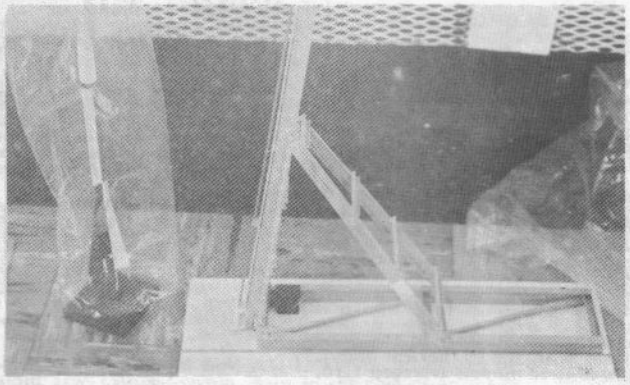
SUPER SCALE



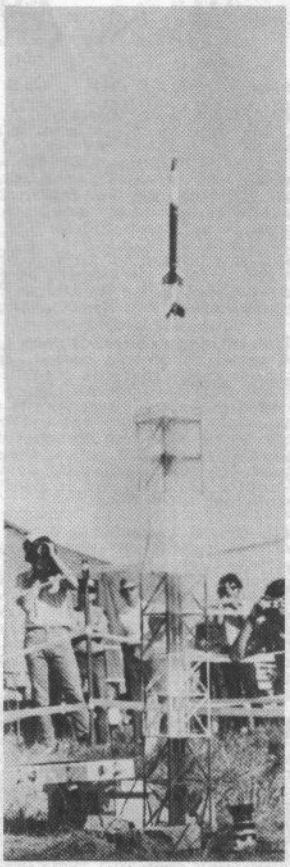
Craig Streett's model of the Nike-Tomahawk took 4th in in C Division with 999 points.



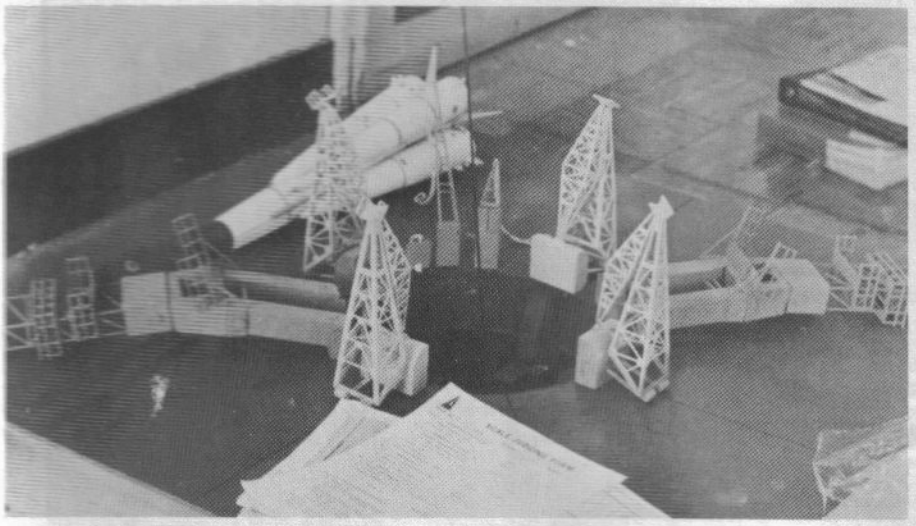
Al Lindgren's Nike Ajax featured an operable upper stage giving the spectators an opportunity to see a two-staged scale model fly.



Harry Stine's entry was a Minijet powered Asp standing only 13" tall.



John Drake's Aerobee rocket and tower accumulated 820 points.



Robert Cherney's Super Scale "Vostok" complete with a detailed launching gantry was the most impressive model in the scale room. However, it didn't get to fly since he failed to include a recovery chute for the judging.

model was an Australian Long Tom sounding rocket in 1:11,684 scale. The model made a perfect flight off a highly detailed Australian launching pad (see front cover) netting Mark 1529 points. Chuck Krallman's Astrobee 1500 model, flown off a Wallops launcher, took second with 1220 points.

In C Division it was Scott Layne with a Scale Little Joe II, flying off the NASA White Sands launcher, in first place with a score of 1663 points. Second went to Brian Dolezal with 1177 points for his IQSY Tomahawk flying from the NASA Wallops Island launcher.

D Division was the expected contest between Howard Kuhn and Jon Randolph. However Howard made up for Jon's Scale victory by taking first in Super Scale by a 200 point margin. Howard's model, a Nike-Tomahawk flown from the NASA Wallops Island launcher, earned 1944 scale points. Jon's Asp, an Operation Redwing version, took second with 1729 points.

The 3rd place D Division model was particularly interesting since it was one of the few multi-staged models at the meet. Al Lindgren flew his Nike Ajax off the standard military launcher, and turned in a spectacular flight performance with a perfect staging over 100 ft. in the air. The model received 1542 pts.

Research and Development demonstration flying followed the Super Scale. Here some of the new innovations, introduced in the NARAM-13 R&D reports, had their first public presentations. Phil Gust launched a Rockoon, a balloon carrying a rocket aloft before "high-altitude" ignition. For the demonstration ignition was planned at only 100 feet. However the ignition system, a mechanical timer, battery, and model airplane glow

Research & Development

Division A
(No Entries)

Division B
1st John Langford
2nd Aron Insinga
(No Other Entries)

Division C
1st Andy Elliott
2nd Bruce Shay
3rd Michael Micci

Division D
1st Chris Williams
2nd Trip Barber
3rd Brian Beard

NARAM-13 R&D SUMMARIES

The Effect of Turbulators BY ANDREW ELLIOTT
Using multiple-strobe photography techniques the use of turbulators to reduce flow separation on B/G wings was investigated in the 20,000 Reynolds Number range. On a large (18" span) glider with a fine sanded (but otherwise unfinished) wing (at 23,000 RN) the wood grain itself was apparently inducing turbulent flow, and the addition of a .02 inch thick wire across the span (0.15" from the leading edge) resulted in a decrease in lift. On a smaller (11" span) glider with a finished wing, straight edge and sawtooth edge turbulators, cut from a double thickness of masking tape, were tested at 14,000 RN. The results were inconclusive, but a rise in lift coefficient was observed with the sawtooth turbulator outperforming the straight edge.

The Ultimate Closed Breech Launcher BY IRA PERLOW
A variation on the normal closed breech technique eliminating the problem that the breech tube must be greater than the fin span, thus reducing efficiency from that of an engine-size breech launcher. In this launcher the fins are mounted on the top of the assembly, and only the cylindrical rocket body is inserted into the small diameter breech tube (increasing the efficiency). The fin unit is "picked up" as the rocket accelerates out of the breech tube. No altitude tracking data is reported, but visual observations indicate that the unit is significantly more efficient than normal launching techniques.

The Piston Launcher BY GEORGE HELSER, JR.
A modification to the closed breech technique to gain higher efficiency by using a smaller breech tube. The piston assembly consists of a BT-50 tube (18" long) sealed at one end, and a BT-20 piston (18" long) with AR-2050 rings mounted on each end. The BT-20 "piston" slips into the BT-50 launcher. A stop at the forward end of the BT-50 prevents removal of the BT-20, but it can slide freely over an 18" range. The rocket is mounted on top of the retracted BT-20. At ignition the piston moves forward with the compressed exhaust gasses providing additional acceleration.

Investigating Conical Stabilizers BY JEFF CHANDLER
The properties of the conical stabilizer — a tail cone used in place of fins — was investigated by altitude measurement of several models. Drag coefficients were obtained from the Altitude Prediction Charts. The drag coefficient was found to be inversely proportional to the stabilizer diameter — thus a larger diameter tail cone gives a lower drag coefficient (though not a lower total drag since this is dependent on frontal area). In addition, drag coefficients were found to be directly proportional to the cone angle (the angle the tail cone makes with the cylindrical body). Drag coefficients for small conical stabilized models averaged 1.10.

Methods of High Altitude Ignition BY TOM LYON
To allow multistaging of scale models with long distances separating the engines, a high altitude ignition system was designed. A photoflash bulb in the base of the upper stage engine is used as the igniter. The bulb is triggered by a switch located just above the first stage engine, which connects a photoflash battery to the bulb.

The Use of $TiCl_4$ to Aid in Tracking BY BRUCE SHAY
Titanium tetrachloride ($TiCl_4$) ejection produces a much denser "smoke" than the ejection of the same weight of talcum powder. Several systems for ejecting the $TiCl_4$ were investigated.

Computer Analysis of B/G Design Optimization BY MICHAEL MICCI
A program accepting parameters for weight, type of engine, wing area, aspect ratio, efficiency factor, parasite drag coefficient, and lift coefficient was used to determine the calm air flight duration. Graphical analysis for a variety of wing areas allowed the optimum wing area to be determined for a glider with C_d = 0.2, AR = 4, e = 0.4, and the specified weight. Results are:

Engine	Glider Weight	Optimum Flight Dur.	Optimum Wing Area
½A	0.2045 oz	74.0 sec.	6 sq. in.
A	0.303 oz	100.3 sec.	8 sq. in.
B	0.456 oz	137.2 sec.	8 sq. in.
C	0.681 oz	155.3 sec.	18 sq. in.
A (R/G)	0.583 oz	74.6 sec.	8 sq. in.
B (R/G)	0.686 oz	114.2 sec.	10 sq. in.

In all cases, the significant effect on total duration was boost altitude rather than descent velocity, thus very low wing areas result.

Model Rocket Recovery Systems BY TANCRED LIDDERDALE
In a series of wind tunnel tests it was determined that for streamers of equal area, those with lower length to diameter ratios have higher drag. In addition, research into other recovery systems indicated that the parawing concept has a better lift to drag ratio than any simple parachute design.

Achieving High Altitudes Through Rockooning BY PHIL GUST
In order to increase payload-altitude capability, a system to allow model rockets to be launched from a free balloon was investigated. The 32 cubic foot balloon, constructed from polyethelyne drop cloth material, filled with helium, can carry 7 ounces of rocket and launch system aloft. A mechanical timer triggers the ignition system (a model airplane glow plug activated by two "AAA" batteries), and the rocket fires directly through the top of the balloon.

A New Method of Studying Ignition BY ARON INSINGA
A movie camera was mounted directly below a model rocket engine to allow a study of how igniters work.
(Continued on page 47)

plug to ignite a Sure-Shot wick, failed, and the balloon drifted off into the sky.

Ira Perlow demonstrated his "Ultimate Closed Breech Launcher" — a system to accelerate a finless rocket through a small breech tube, then have it pick up its fin unit as it leaves the tube. The system worked well, however no tracking data was available to confirm increased performance.

Bruce Shay flew his Titanium Tetrachloride "smoke-trail" model. Using the same technique used on the Nike-Smoke sounding rocket, Bruce ejected $TiCl_4$ into the air giving a dense white tracking "smoke." The demonstration was quite impressive, however the weight of the system (about an ounce) does limit its usefullness.

A number of other R&D reports contained information of interest to the serious model builder. Michael Micci's investigation of Boost Glider Optimization is particularly interesting in that the results strongly suggest that almost all competition boost/gliders are *drastically oversize.* Using a computer simulation Mike studied the overall duration, which is a direct function of both boost altitude and glide performance, for several standard B/G categories. His results indicated, for example, that for an A engine 0.3 oz. weight B/G the optimum size is only 8 square inches. Compare that with the typical 20 to 30 square inches which is considered "standard."

George Helser's Piston Launcher, which he used on almost all of his competition birds, is a variation on the closed breech launching method in which the piston is mounted inside the breech tube, but the rocket sits on an extension of the piston on top of the breech tube. This design allows use of a minimum diameter breech launcher and permits the rocket to use normal fins. During the contest flying the Piston Launcher contributed a noticable increase in acceleration as the models lifted off.

Andy Elliott investigated the use of turbulators to increase the performance of B/G wings. His project, using a multiple flash free-flight recording technique, indicated that on small gliders (11" span test model) the use of a strip of masking tape about 5% of the chord back from the leading edge gave an increase in the wing lift coefficient.

The special South Seattle Rocket Society "Grand Spoof Award" was presented to G. Harry Stine for his assistance in the "Honest Ivan" demonstration. Frog Dust awards "one Hairy Stein" to Harry.

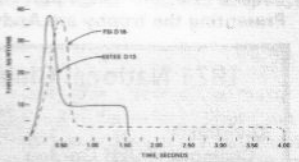
D18'S CAUSE SCALE PROBLEMS

A number of rocketeers experienced difficulties with the FSI D18 series engines at NARAM-13. The most serious of these problems came in Scale where underpowered models would climb to 30 to 100 feet into the air on the D18's sharp peak, and then literally fall out of the sky on the low sustaining thrust. This is reminiscent of what happened to George Pantalos' scale TAD at the International Meet last fall. The problem doesn't result from any difficulty with the engine itself, only a misunderstanding of its characteristics. Under the commonly accepted definition (the number after the letter class designation representing the average thrust), the FSI "D18" is more accurately a "D5".

Using the thrust-time curves (published by the NAR Standards and Testing Committee in the October 1970 "Model Rocketeer" and reproduced below) it is evident that the "D18" burns for 4 seconds and has a total impulse of 20 newton-seconds or less, giving it an average thrust of 5 newtons. The misleading designation of "D18" was arrived at by averaging only the peak and not the 3½ second sustaining thrust.

Many rocketeers, including a few NARAM scale modelers, have assumed that the D18 has more "lifting power" than the Estes D13. However, as a real D5, the FSI D18 exhibits considerably less lifting power than the D13. When contestants tried to power 300 to 450 gram scale models with the D18 they quickly learned of the necessity for carefully examining the characteristics of an engine before using it.

Stuart Zaharek's heavy "Vostok" scale model falls out of the sky on a D18.



Chris Williams reported on the design and construction of a 3-channel multiplexed mod-rocket transmitter. The unit has the capability of telemetering the outputs of three separate resistance type sensors to the ground. Using a multiplexed unit, rocketeers can correlate sensor measurements to gain a better understanding of model rocket performance. Chris' transmitter weighs only 2.5 ounces

'HONEST IVAN' FLYS AGAIN

Writing in MODEL ROCKETRY on the history of clustered model rockets, Harry Stine described a rather public demonstration of "Honest Ivan" — the first seven engine cluster. Harry said: "Honest Ivan figured prominently in NARAM-1 as a demonstration bird. It was part of a rather grand spoof that was staged for the benefit of the spectators. Unhappily, that sort of thing isn't done at NARAM's any more because we are now too intensely serious about model rocketry, we have become overly impressed with ourselves, and we know better than to try a 7-engine cluster in a demonstration.

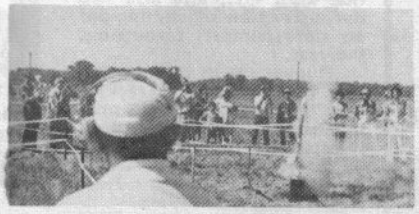
Taking him up on this, the South Seattle Rocket Society staged the return of Honest Ivan at NARAM-13. The purpose of the demonstration was to inject a note of humor into the flying day. Several SSRS members marched out to the launch pad and set up what to all outward appearances was a perfect replica of the original Honest Ivan. Harry Stine, who was in on the spoof, was invited to the PA system to describe the launch.

"As you may know from reading my 'Old Rocketeer' column in MODEL ROCKETRY magazine, the original 'Honest Ivan' was developed in 1958 to determine how many model rocket engines could be clustered and with what degree of reliability. It used a cluster of 7 standard 18 mm engines because we had previously managed to successfully launch the TFB-3 with a cluster of 3 18 mm engines. Honest Ivan made 4 flights and proved that the reliability of clusters went down as the number of engines in the cluster went up . . . a sort of perverse or inverse relationship actually probably on a cubic curve. Honest Ivan made its last flight at NARAM-1. Today, it returns to NARAM-13, again in the role of an R&D model to prove something different. I am told that it is a "3D Tandem" model. I am not certain what that means, but let us proceed into the count-down in

"(In Russian dialect) We have on the launch pad the glorious hero model rocket Honest Ivan . . . Is Tracking East ready? Da, Tracking East is ready, and we will launch. We do not want Tracking West, only Tracking East! We do not trust any western tracking station, only eastern tracking stations! Safety is go! Pyat!, Chetyre!, Tri!, Dva!, Odin!, Start!"

Nothing happened, the model sat on the pad. From the base of the model came red, white, and blue smoke, . . . but the model still sat on the pad.

Stine's commentary continued: "We're not sure what's happening," then he reached over and pushed a second button. As Honest Ivan sat on the pad the nose cone lifted off. In typical Russian space tradition, Stine proclaimed the mission of Honest Ivan "a complete success, meeting all test objectives," as the nose cone arced across the sky. The return of Honest Ivan certainly marked the return of some humor to the NARAM. South Seattle indicates they will present a "NARAM Grand Spoof Award" to the demo at NARAM-14 which tops their NARAM-13 effort.



G. Harry Stine provides commentary as smoke pours forth from the base of "Honest Ivan" as the nose cone lifts off.

Jon Robbins (left) was awarded the "Maxi-Bumble Bee," a special trophy for the modeler furthering the cause of boost/gliders, for his development of the Ground Hog swing-wings. Presenting the trophy are Andy Elliott and Guppy.

The YMCA Space Pioneers of New Canaan, Connecticut took home the Championship Section banner for their accumulation of 10,788 points, an all time record, during the contest year.

1971 National Champions

Division A		
Champion:	Jeff Gordon	1369 pts.
Reserve:	Kerry Mechtly	1272 pts.
Division B		
Champion:	Charles Krallman	1242 pts.
Reserve:	Mark Wargo	1211 pts.
Division C		
Champion:	Gary Lindgren	1355 pts.
Reserve:	Bruce Shay	1007 pts.
Division D		
Champion:	Jon Randolph	1791 pts.
Reserve:	G.H. Stine	1069 pts.
Team		
Champion:	Stine Team	1111 pts.
Reserve:	Kuhn Team	1069 pts.
Section		
Champion:	YMCA Space Pioneers	10,788 pts.
Reserve:	NOVAAR	7,227 pts.

including batteries and payload capsule, and has an in-flight range of ¾ mile. The entire unit was wired on fine perfboard to allow the completed unit to fit in a 20 mm body tube.

At the close of NARAM-13 flying there was an awards banquet at the NCO Club at Aberdeen Proving Grounds. Trophies were presented for the first place winners, ribbons to the other winners, and special awards to the "Dead Last But Finished" contestants.

When the points were all added up the National Champions were announced, and you might say that Connecticut and Ohio dominated the standings. Named A Division National Champion was Jeff Gordon of CSAR (Columbus, Ohio), while Kerry Mechtly, also of CSAR, was Reserve Champion. In B Division, and also of CSAR, Chuck Krallman took the National Championship, with Mark Wargo of Apollo-NASA (Houston, Texas) as Reserve Champion. Gary Lindgren, repeating from last year, brought the C Division National Championship to the newly formed Fanwood, New Jersey), and the Reserve Championship went to Bruce Shay of Fairchester (Stamford, Connecticut). Jon Randolph of North Royalton (Cleveland, Ohio) was named D Division National Champion, with G. Harry Stine of the YMCA Space Pioneers (New Canaan, Connecticut) Reserve Champion.

The National Team Championship went to the team of Connie and Ellie Stine of the Space Pioneers, while the Reserve Team was Howard and Craig Kuhn of NOVAAR (Fairfax, Virginia). The Section National Championship went to New Canaan's YMCA Space Pioneers, a repeat of their win four years ago. Reserve Section honors went to NOVAAR.

A number of "special awards" to deserving rocketeers were made by individuals and clubs. The "Bumble Bee Award," an enlarged cardboard Bumble Bee over 3 feet long, was presented to Jon Robbins for the developmental work which he put into the Ground Hog series of B/G's and R/G's during the year since NARAM-12. Last year's award went to Howard Kuhn for his similar developmental program which has resulted in Mantas of all sizes dominating the contest skies.

To the "Old Rocketeer," G. Harry Stine, the South Seattle Rocket Society presented their first annual "NARAM Grand Spoof Award" for his assistance in bringing back "Honest Ivan" to entertain the crowd. Harry's trophy was, most appropriately, a "Hairy Stein" – a beer stein decorated with hair from a rocketeer who made the mistake of going to sleep one night while everyone else in the room was still awake.

A special award was presented to Sgt. Maj. Barber and Lt. Fitzwater of the U.S. Army Aberdeen Proving Grounds in recognition of their assistance in making NARAM-13 a success. As the Contest Director, Howard Galloway, noted: "Sometimes I had to call them two or three times a day to change the schedule, or ask for something else we needed, but they were always ready to see what they could do to help."

After the banquet the 294 contestants, friends, and range crew, left for home hoping, perhaps, that by next year some new way can be cevised to keep the check in lines from growing as long.

LAC Newsletter Trophy Presented

Each year, to stimulate interest in Section newsletters, the Leader Administrative Council awards a trophy to the best Section Newsletter. The trophy, donated by North American Rockwell, was awarded in past years to "Zog-43" (NARHAMS), and "Contrail" (Three Rivers). This year the team of judges selected the South Seattle Rocket Society's newsletter, "Modroc Flyer," as the most outstanding Section newsletter. This dittoed monthly, sent to SSRS members and NAR Sections, contains news, plans, construction tips, etc., and also had the distinction of coming out on time (almost) throughout the year.

Runner up in the newsletter contest was "Tracking West" of the Tri-City Cosmotarians. Honorable Mentions went to "Igniter Current" from Fairchester, and the "Royal Rocketeer" of the North Royalton Rocket Society.

This year special mentions were given to newsletters with a particularly impressive feature or article. These special mentions went to: "Starburst" (Steel City) for "good conveyance of the news," "Emanon" (YMCA Space Pioneers) for Barbara Stine's "Reminiscences on the NAR," and "Splashdown" (Aerospace Research Association of Northwestern Pennsylvania) for the article "Model Finishing is No Accident."

The 1971 LAC Newsletter Award is presented by Elaine Sadowski (second from left) to the South Seattle Rocket Society. Accepting are (l. to r.) Mike Medina, Tony Medina, Jess Medina, and Chris Pocock of the "Modroc Flyer" staff.

SCALE DATA:

AERO-HIGH

Australian Sounding Rocket

by Tancred Lidderdale

The Aero-High is a two-stage, solid-propellant sounding rocket developed by the Australian Weapons Research Establishment. Its primary purpose is to carry out "chemical seeding" experiments at altitudes between 100 and 200 kilometers. Observation of the glow clouds caused by the sudden release of chemicals are used to determine physical and chemical properties of the atmosphere.

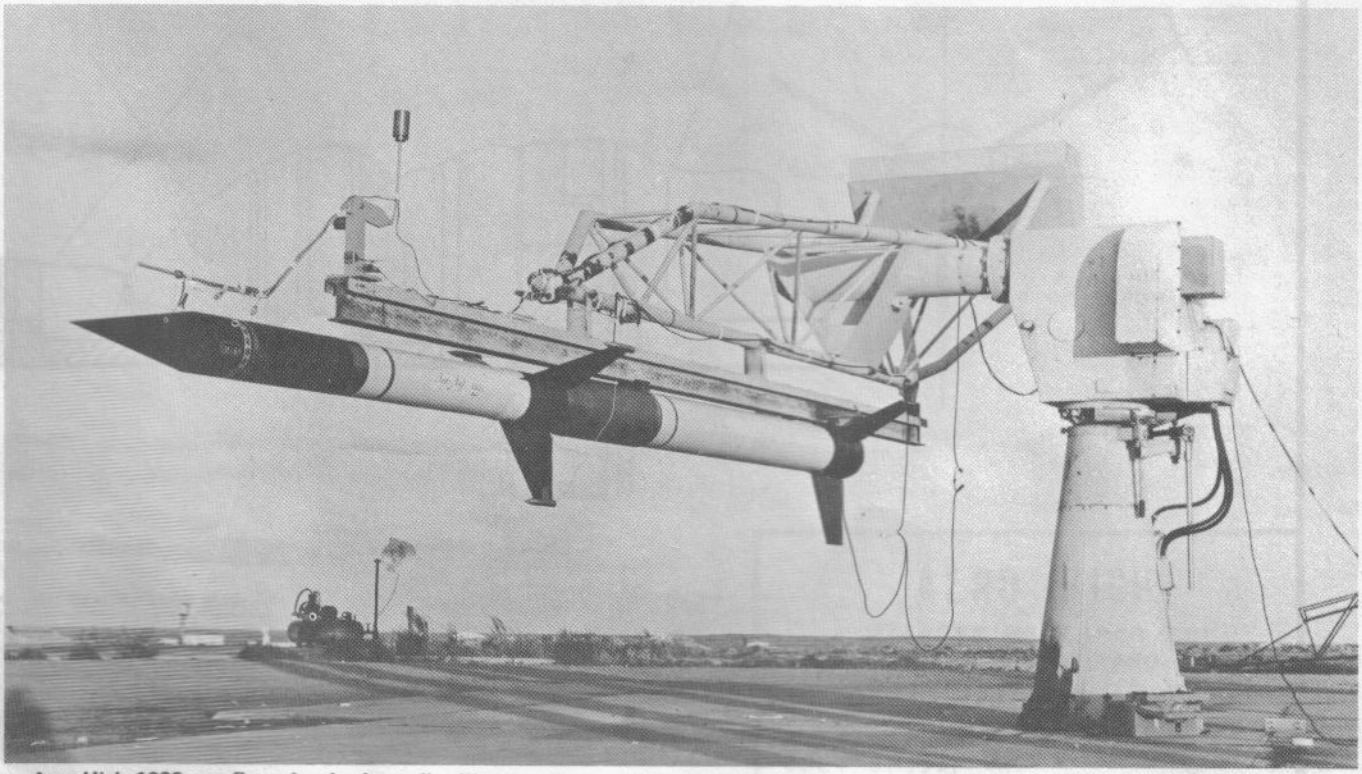
Aero-High Round 1006, launched in September 1968, was designed to carry a 45 pound payload to a little over 210 km. The vehicle weighed approximately 900 pounds at liftoff, and of this 260 pound was upper stage weight. It reached a maximum speed at burnout of the second stage of 5,000 miles per hour.

The Aero-High stands 260.42" from the base of the first stage nozzle section to the tip of the nose cone. The first stage motor is 8.30" in diameter. Both motors have cylindrical fairings around the rear section to allow fin mounting. To aid in tracking, a flare, 11.1" long and 1.25" diameter, is attached to the tip of each of the upper stage fins.

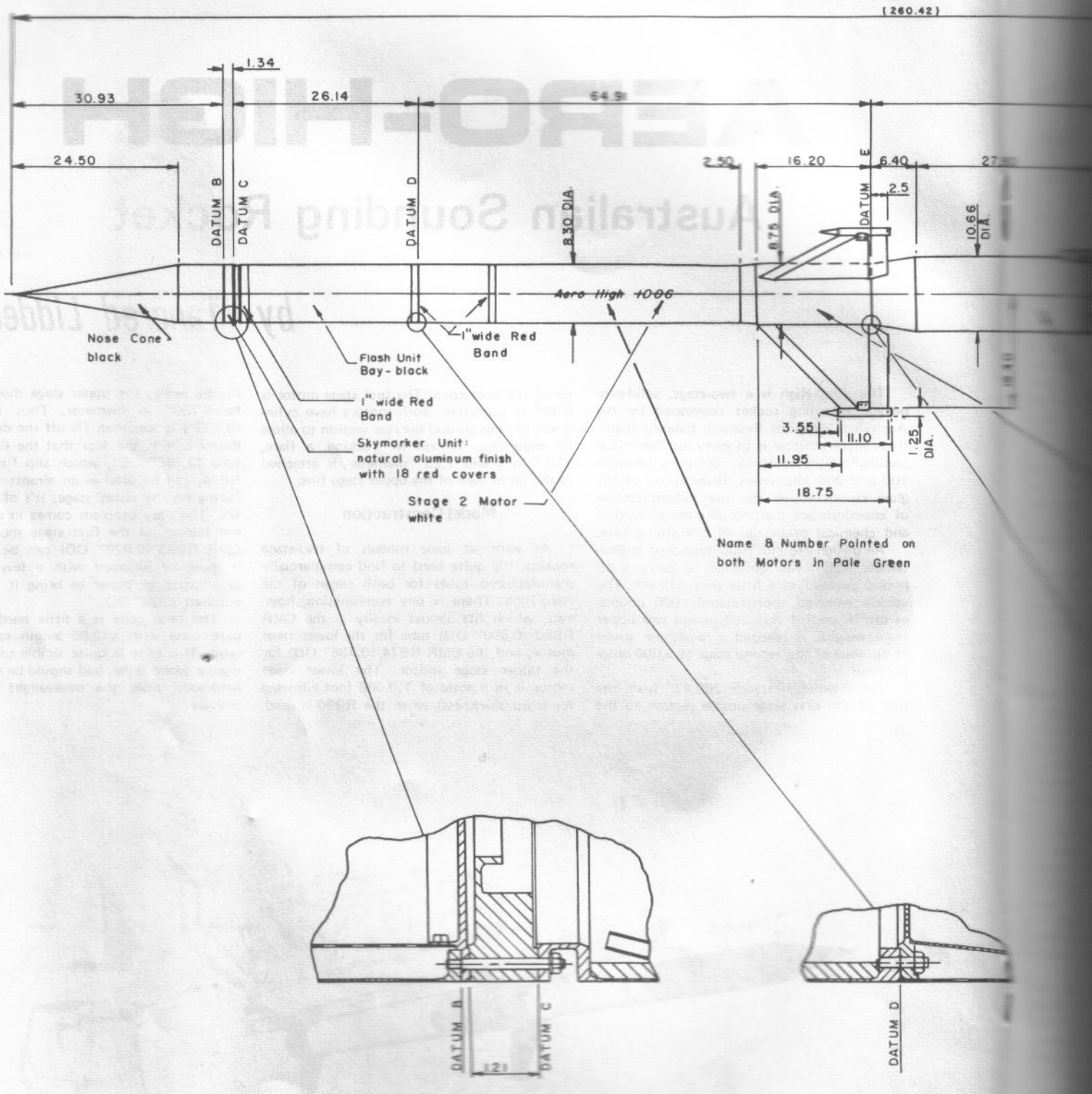
Model Construction

As with all scale models of two-stage rockets, it's quite hard to find commercially manufactured tubes for both stages of the Aero-High. There is one combination, however, which fits almost ideally – the CMR RB90 (0.890" OD) tube for the lower stage motor, and the CMR RB74 (0.736" OD) for the upper stage motor. The lower stage motor is in a scale of 1:0.088 (not allowing for paint thickness) when the RB90 is used. In this scale, the upper stage motor should be 0.730" in diameter. Thus the RB74 (0.736") is less than 1% off the desired size. Better still is the fact that the CMR RB77 tube (0.766" OD), which slip fits over the RB74, can be used as an almost perfect fin fairing on the upper stage. It's off by about ½%. The only problem comes in duplicating the fairing on the first stage motor – the CMR RB93 (0.920" OD) can be used, but it must be wrapped with a few layers of of silkspan or paper to bring it up to the required 0.979" OD.

The nose cone is a little harder. It is a pure cone with a 2.95 length to diameter ratio. This cone is quite simple to turn on a regular wood lathe, and should be made from hardwood since the noseweight is needed anyway.

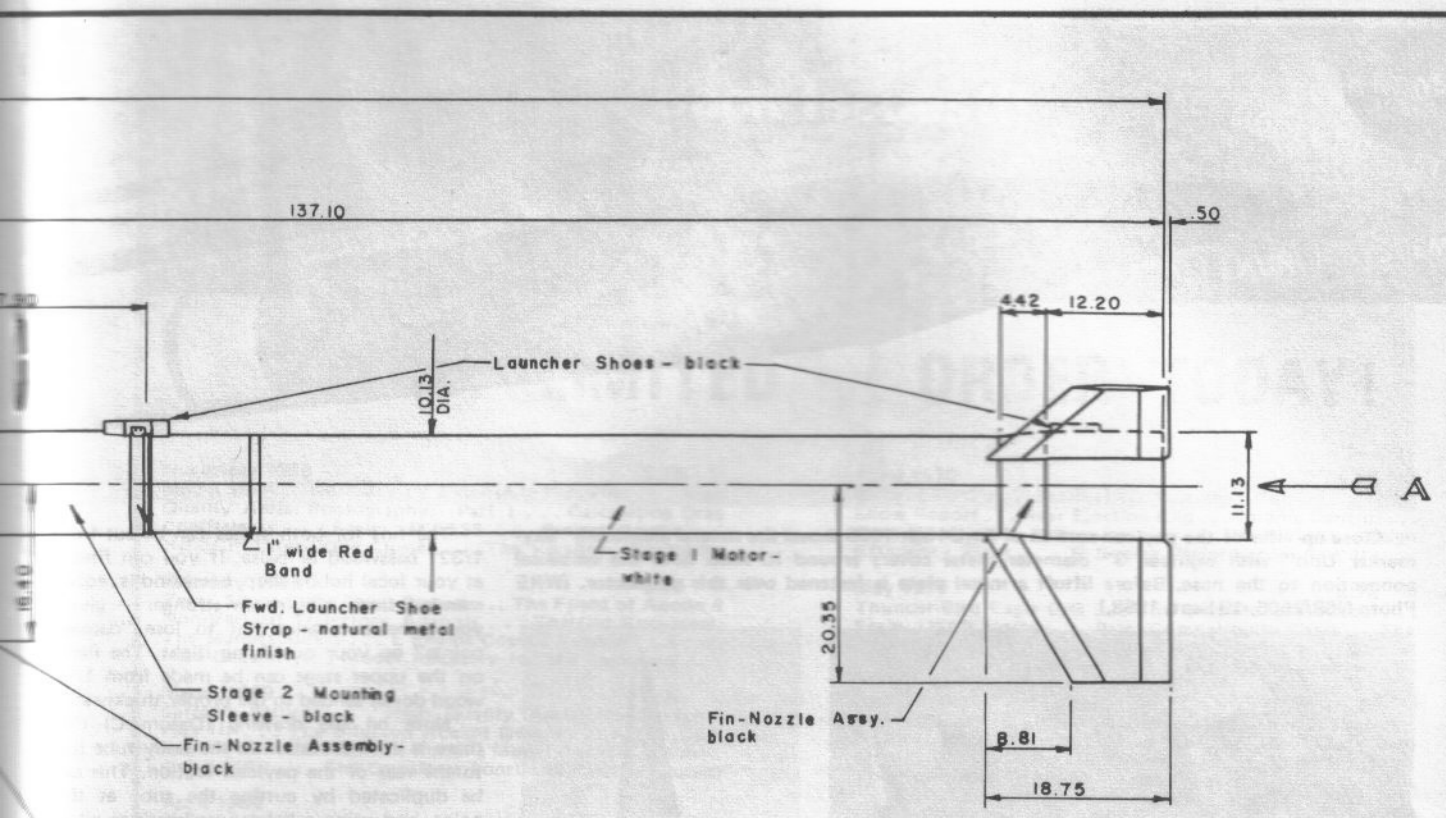


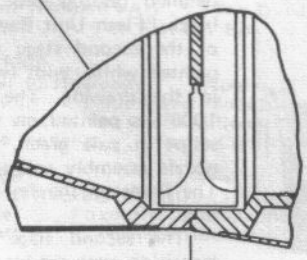
Aero-High 1006 was flown by the Australian Weapons Research Establishment in September 1968. Note the pale green script lettering "Aero-High 1006" down the side of the upper stage. Flares and mounting brackets on the upper stage fin tips are natural aluminum.



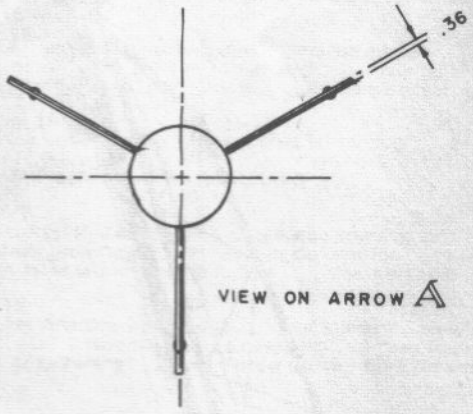
ALL DIMENSIONS IN INCHES

THIS DRAWING IS NOT TO BE USED FOR MAKING MODELS FOR SALE COMMERCIALLY





1st & 2nd Stage Fins



SCALE: 1 to 8 & 1 to 1

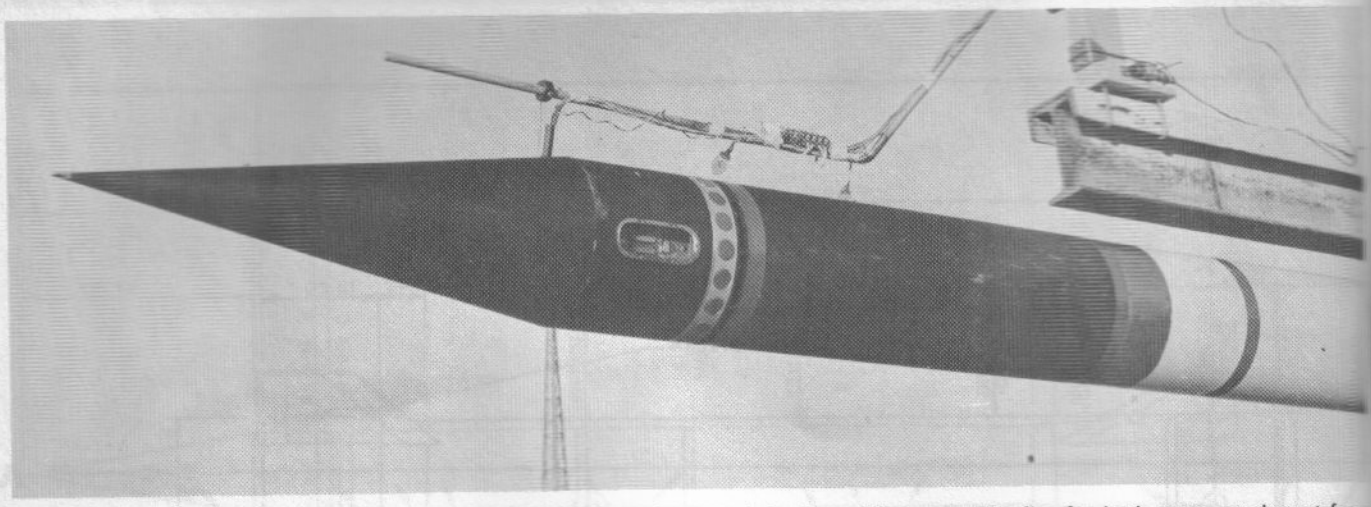
SOURCES: DRAWING NOS. HL-11348, HL-11485, AND HL-11495.

AERO HIGH

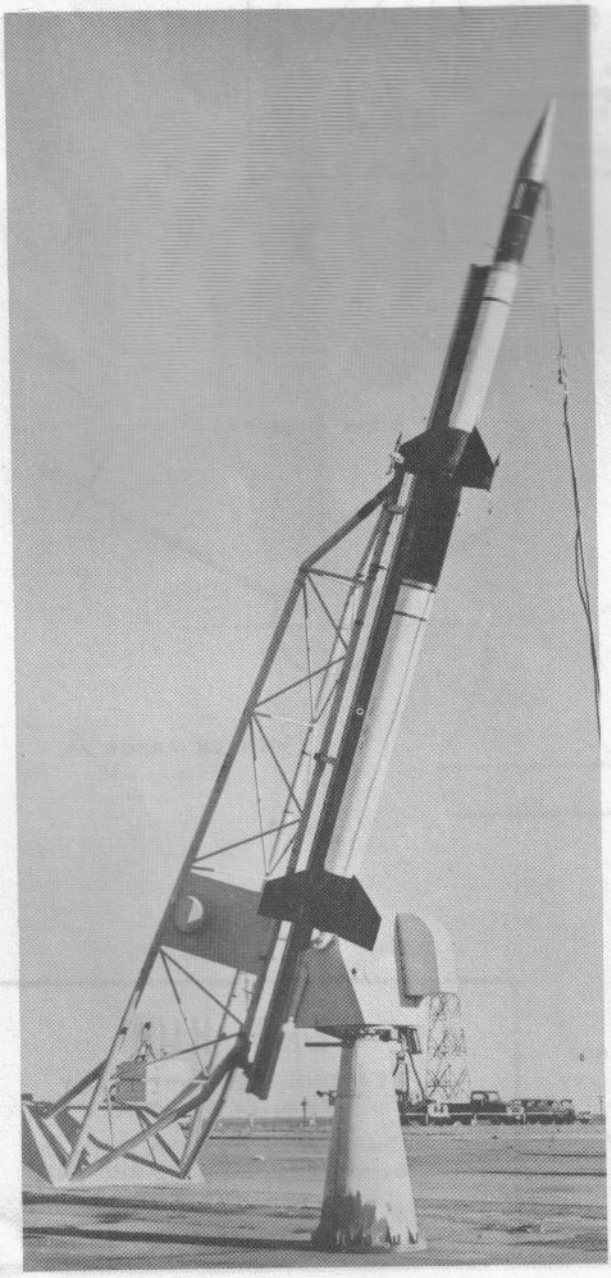
WEAPONS RESEARCH EST.
AUSTRALIA

Drawn by - Jancred Lidderdale

JULY 3, 1971



Close up view of the payload section of Aero-High 1006 shows the natural aluminum "Skymarker Unit" with eighteen 3" diameter metal covers around it. Also note the umbilical connection to the nose. Before liftoff a metal plate is fastened over this connector. (WRE Photo N68/2505, 19 Sept. 1968.)



Aero-High 1005/2, flown in August 1967 was basically the same as round 1006, except for differences to the payload section. This unit had swept back antennas on the forward end of the payload section, and smaller antennas perpendicular to the rocket body at the rear of the payload section. The nose cone was unpainted aluminum, with a different taper than on round 1006. (Left, WRE Photo ER1134I, 30 Aug. 1967; Right WRE Photo ER1134F, 30 Aug. 1967)

The fins for both stages can be cut from 1/32" basswood or balsa. If you can find it at your local hobby shop, basswood is recommended since it is much stronger — giving you a better chance not to lose "damage points" on your qualifying flight. The flares on the upper stage can be made from 1/8" wood dowel sanded to the proper thickness.

Note on the drawing (Datum C) that there is an indentation in the body tube just to the rear of the payload section. This can be duplicated by cutting the tube at this point, and using a balsa nose block to allow the tube sections to be separated.

The launcher shoes can be constructed from scrap balsa wood, and the shoe straps can be made from the thin adhesive backed metal foils on sale at most large hobby shops.

Color Pattern

The color scheme of Aero-High Round 1006 is both interesting and attractive. Starting at the top, the nose cone is painted black. Next comes the "Skymarker Unit," a cylindrical band with a natural aluminum finish, with 18 small (approximately 3" diameter) red covers mounted around the outside (see detailed photograph). A 1" red band and black "Flash Unit Bay" are mounted on top of the second stage motor. This motor is painted white, with two red bands as shown in the drawing. The lettering "Aero-High 1006" is painted on the rocket in a fancy script in pale green. The second stage fin nozzle assembly and the fins are both black. The flares on the fin tips are natural aluminum.

The second stage mounting sleeve and transition cone are black, while the first stage motor is painted white. A 1" wide red band is located behind the forward mounting shoe. The first stage fin-nozzle assembly is painted black. The launching shoes are black, and the forward launcher shoe strap is natural aluminum.

Data Sources

Drawings HL-11348, HL-11485, and HL-11495, Weapons Research Establishment, 1967.

Photos ER1134F and ER1134I, August 30, 1967, and N68/2500 and N68/2505 September 19, 1968.

Aero-High Fact Sheet, Weapons Research Establishment.

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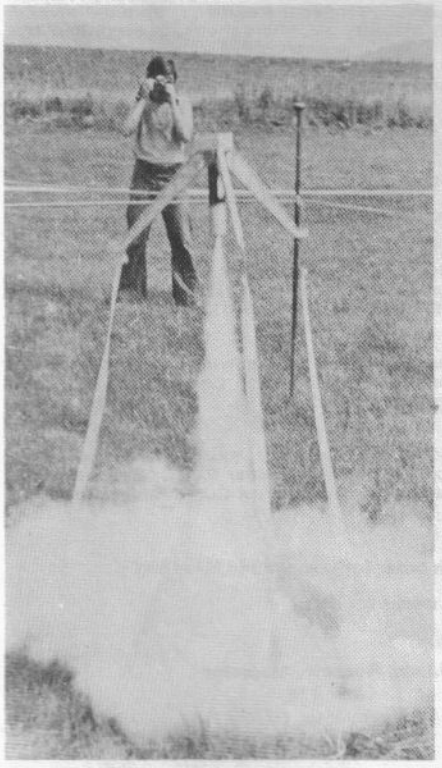
The MPC Flying Lunar-Lectric Launch Pad

An Oddball Rocket to Amaze the Spectators

by Kevin Flanagan

When the first announcements appeared, MPC called it a *Flying* Model Rocket Launch Pad. This prompted a rash of statements among rocketeers in my club about suing MPC Flying Lunar Lectric Launch Pad (MPCFLLLP for short) was created.

The flight conversion only took a few hours, and since that momentous day the MPCFLLLP has been flown in demonstration flights at several Area and Regional contests, a Convention, and even NARAM-13. Surprisingly, considering its strange appearance, every one of its flights has been a success. The model even got rave reviews in the Steel City newsletter, in which Dick Fox reported (in the coverage of PACT-1): "I was standing in the launch area and heard the countdown, but all the pads were empty. The count reached zero, and then the launch pad *took off*!"



Liftoff! The Flying Launch Pad makes a perfect flight even though launched "zero length." Streamers from each leg of the pad stabilize the model during flight, and an Estes D-engine supplies the power. This model is a real attention getter, but flights should be made only on calm days.

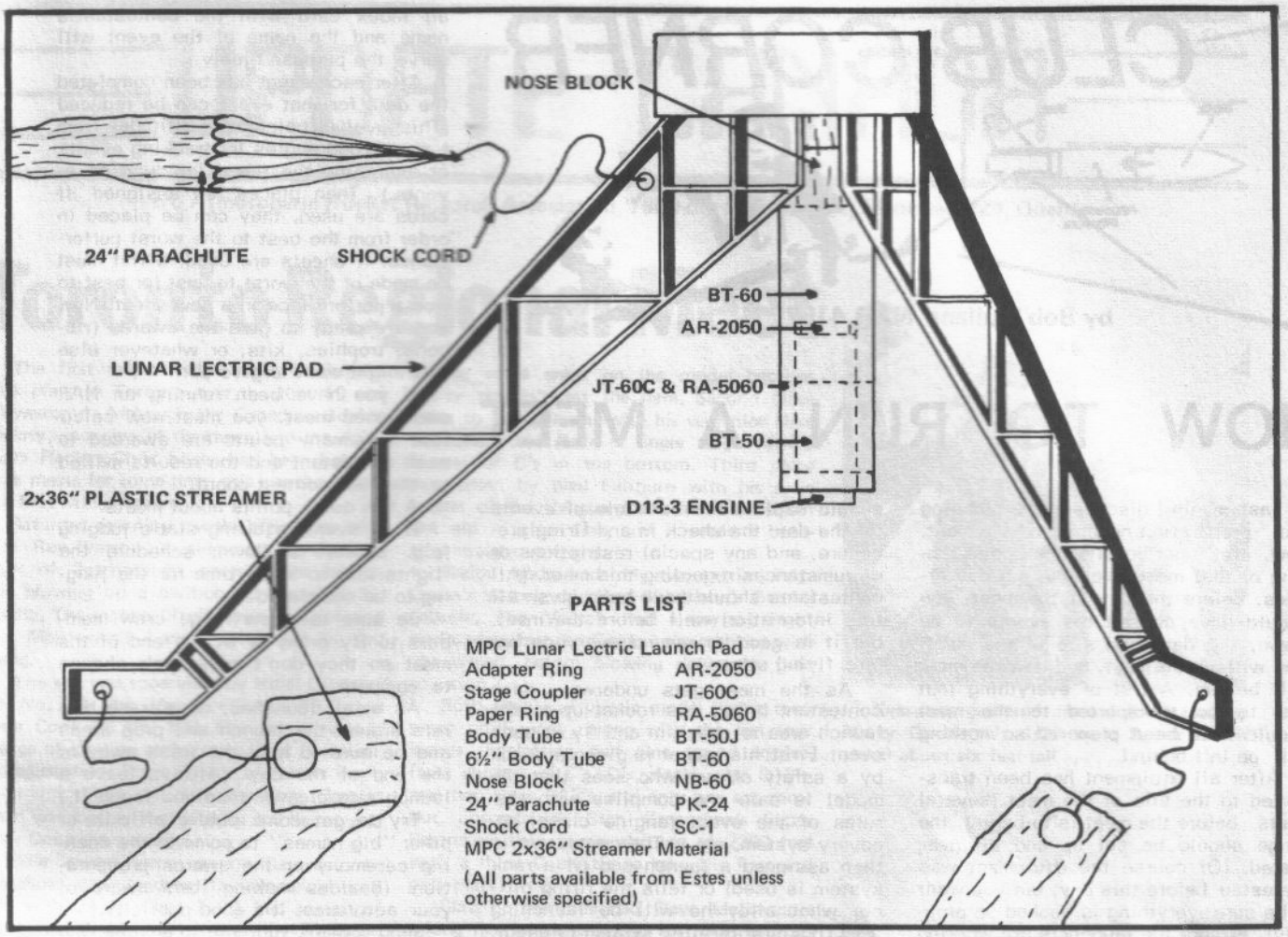
For those of you who would like to try building your own MPC Flying Launch Pad, I'll try to retrace our steps. First assemble the launcher, permanently mounting the legs in place with liquid plastic cement. Let this assembly dry.

Meanwhile, the engine mount (for an Estes D) is assembled from BT-50 and BT-60 tube. Glue an AR-5060 adapter ring to each end of a BT-50J engine tube. Add an AR-2050 ring to the front end of the BT-50 to serve as an engine block, and glue the entire engine mount into one end of a 6½" length of BT-60.

Next eliminate the following items from the standard Lunar Lectric Launch Pad – the two blast deflectors, launch rod, microclips, tilt adjuster, wind vane, and gantry (Making all the legs the same).

Now take an NB-60 balsa nose block, and draw a circle around the cylinder, half way down the side. Cut three notches 120 degrees apart and ½" wide going from the top of the block down to the line previously marked. Slide the nose block into the base of the

The MPC Launch Pad is flown from the ground. Care must be taken to choose a suitable blast deflector (in this case a bent soda can) to eliminate the hazard of a grass fire. The streamers are spread out over the ground so that they will not tangle during boost or get burned by the rocket's exhaust. The BT-60 tube houses the D-engine as well as a 24" recovery chute. You can expect flights to 50 feet or more when powered by a single D engine.



PARTS LIST

MPC Lunar Lectric Launch Pad	
Adapter Ring	AR-2050
Stage Coupler	JT-60C
Paper Ring	RA-5060
Body Tube	BT-50J
6½" Body Tube	BT-60
Nose Block	NB-60
24" Parachute	PK-24
Shock Cord	SC-1
MPC 2x36" Streamer Material	

(All parts available from Estes unless otherwise specified)

launch pad to make sure the legs fit into the notches, and carefully slide the nose block into place.

Cut or file a small notch into each side of the launcher's feet. Tie a 36" x 2" plastic streamer to each foot, using the notches to keep the shroud line from slipping off. These streamers serve to stabilize the model during boost.

Drill a small hole near the top of one of the legs and tie an 18" length of elastic thread to the inside of the BT-60 as you would with a normal shock cord. A 24" chute is attached to the shock cord. During boost it is stored in the BT-60, after ejection it serves to slow down the descending launch pad. The streamers on the legs also slow down the model during descent.

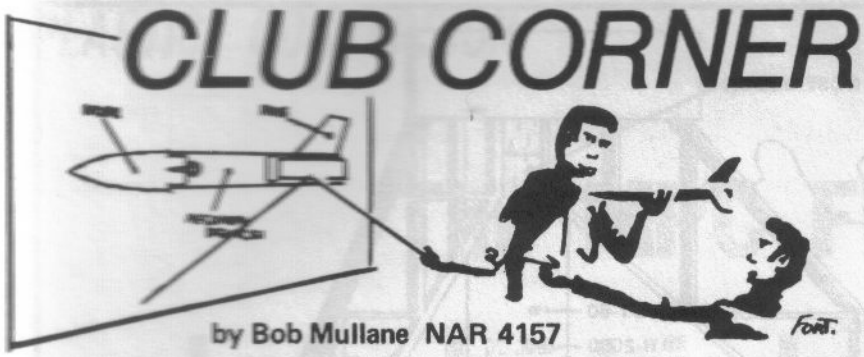
For those of you who haven't yet realized it, the time of truth is near. Your MPC Flying Lunar Lectric Launch Pad is now ready to fly. This model should be flown with a D13-3 engine only! Also, since no guide rail is used, the model should be flown only on *calm* days – with winds not exceeding 5 mph.

The pad is launched from a flat area of the ground. A metal blast deflector should be placed under the engine nozzle, and the micro clips are attached. Once again check those winds. Spread the streamers out over the ground so that they will not tangle in the grass or get burned by the engine exhaust.

Consider all flying launch pad flights "heads-up" launches. This one has been successful on all of its demonstration flights, but it's a good precaution nonetheless.

If it hasn't occurred to you yet, how about entering the MPC Flying Launch Pad in "Plastic Model" at the next contest. Now let's see, how about a two-stage Porta-Pad, or a flying Servo-Launcher? I wonder . . .

CLUB CORNER



by Bob Mullane NAR 4157

HOW TO RUN A MEET

Last month I discussed the planning and preparation necessary for a meet. Now, let's get down to the actual running of that meet when the big day arrives. Before the day of the meet, you should have chosen the events to be flown, the date and site of the meet, who will run the meet, and how the meet will be run. A list of everything that has to be transported to the meet should have been prepared so nothing will be left behind.

After all equipment has been transported to the site of the meet (several hours before the meet is to begin), the range should be set up and all gear tested. (Of course the equipment was pretested before this day, but you want to be sure everything is hooked up properly). Be sure the launchers are working properly (if you are using racks), that the trackers are set up and calibrated (calibration should be checked frequently throughout the meet), and that the PA system and communication to the trackers are functioning. Make sure the launch area is properly marked and roped off and that all tables and chairs for range personnel are in the right places. If the club has a range store or snack bar, be sure that it is set up where it won't interfere with the operation of the range, but still is in a location where everyone will be aware of its existence.

As the contestants arrive, they should turn in their entry blanks and contest fees. If flight cards are used for data recording, the contestant should be given the cards for his flights and he should bring them with him later as he checks in for the event. If a system of sheets is used for data recording, the contestant's name should be added to the list. (If entry in the meet is limited to only club members, this sign-up can be done at a club meeting several days before the meet.) If a misfire alley system is being used, the contestants should set up their pads as they arrive. The pad and firing system should be given a complete check by the Range Safety Officer at this time.

When all contestants have signed in and the time to start the meet has arrived, a briefing should be held by the Contest Director (CD). The CD should explain the schedule of events for the day, the check in and firing procedure, and any special restrictions or circumstances regarding this meet. (All contestants should have been given all this information well before the meet, but it is good to *remind* everyone before flying starts.)

As the meet gets underway, each contestant brings his rocket up to the launch area to check in and fly in each event. First, his rocket is given a check by a safety officer who sees that the model is safe and complies with the rules of the event (engine class, recovery system, etc.). The contestant is then assigned a launch pad (if a rack system is used) or tells the firing officer what alley he will be launching from (if a misfire alley system is used). The contestant's flight card is marked to indicate what position he will be firing from, and he proceeds to set up his rocket on the pad. If racks are being used, the cards can be placed on a clip board in the order of pad number (1,2,3, etc.) and the rockets are flown in that order after they've all been set up and the racks cleared of people. If misfire alley is used, a board with spring type clothes pins numbered to correspond to the alley positions can be used to hold the cards. In misfire alley, the contestant stands at his pad when he is ready to fire and the launch control officer gives a countdown for the contestant, who then fires his own rocket. In a rack system, the launch control officer fires the rocket. The launch controller sees to it that the proper flight card is given to the data recorder just before each flight.

Once the rocket has been launched the data recorder marks the flight data for that event (duration time, angles from the trackers, etc.) on the card. If flight sheets are used, the data is recorded on the sheet. (At this point you can see that cards are probably more convenient than sheets since the card has followed the rocket through the various phases of the flight check in and launch. There is a greater tendancy to record the data on the wrong line of a data sheet than on the wrong flight card. The card doesn't have to be complex, an index card with the contestant's name and the name of the event will serve the purpose nicely.)

After each event has been completed the data for that event can be reduced (This involves calculating altitudes from the recorded angles for tracking events or averaging the times for duration events.). Then places are assigned. If cards are used, they can be placed in order from the best to the worst performance. If sheets are used, a list must be made of the worst to best (or best to worst) performance on a new sheet. Now you are ready to give the awards (ribbons, trophies, kits, or whatever else you might want to give out).

If you have been running an NAR sanctioned meet, you must now calculate how many points are awarded to each contestant and the results mailed to the NAR contest board.

A few quick points about meets:

If an event requiring static judging (*e.g.* scale) is flown, schedule the flights last to allow time for the judging to be completed.

Be sure to allow range crew members to fly proxy or at the end of the meet so they don't miss their chance to compete.

As at all launches, have trash barrels around the launch and prep areas and be sure to haul the trash away at the end of the day. (Always leave a launch site cleaner than you found it.)

Try to get some public officials or other "big names" to come to the opening ceremony or the awards presentation. (Besides making them aware of your activities, it's good publicity.)

Send a thank-you note to anyone who helped out with the meet (especially the owner of the launch site).

After the meet, evaluate the results and the way it was run and make your next meet better.

****

In the past few days, a new booklet arrived in the "Must Read" box on my desk. The booklet titled *Guide for Aerospace Clubs* is available from Estes Industries for 50¢ per copy as catalog number 711-BK-19. While I haven't had a chance to read it entirely yet, it looks really good and like something that is an essential part of reading material for any officer of a model rocket club.

See you next month.

UPDATE CANADA

c/o Atmospheric Rocket Research Association, 7800 des Erables Ave., Montreal, 329, Quebec

Toronto Regional Meet

The first major rocket meet in Ontario took place in Toronto over the June 19 and 20 weekend. Although the Canadian Rocket Society, sponsors of the meet, and the Agincourt Rocket Club, hosts, had been holding large meets for some time, this was the largest and first with speakers.

Saturday morning saw the official opening with Ron Watson, an alderman for the borough of Scarborough, pressing the button and blowing up a beribboned Canadian Big Bertha. The second liftoff was successful, and the Meadowvale Launch Site was in full swing.

The site was supervised by Hillel Diamond FS No. 13, Joe Waydo FS No. 177, and Peter Cook FS No. 128. Eric Denver was in charge of ignition and arming. Paul Bonisteel, of registration. Steve Racey and John Pugh, communications and data reduction. Saverio Prato was in charge of judging and liason, and Peter Copp ran tracking.

Four events were run on Saturday. In parachute spot landing, Danny Lewis took first with 24 ft. Class 2 PD had several of the better flights carried away by thermals; but Kevin Shin took first with a 269 second flight.

Sparrow and Hawk had only 6 or 7 entries each, as B/G's are still taking their time getting developed in the Toronto area. Both events were marred by Red Barons, prangs, and ill trimming. Peter Cook's Dragon took first in Sparrow with a 34 second flight. Dave McDermott's Sky Dart won out in Hawk with a 53 second flight.

Scale judging on Saturday brought out some very nice birds, but Marty Goodman's six foot 1/25 scale Soyuz stole the show. Detailing was intricate on the nose, but lacking in some areas on the model because Marty couldn't get the data. Second place went to Dan Stevens with his very nice Nike Hercules. Dan flew it single stage with a cluster of C's in the bottom. Third place was taken by Neil Fairburn with his scale model of the Vanguard. He flew it without the aid of clear fins, and it made a beautiful straight up flight.

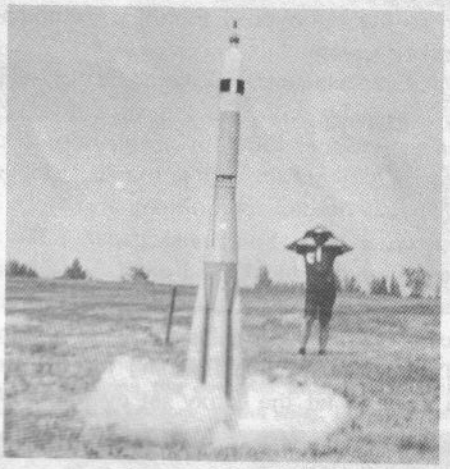
Plastic model had only two entries, Fritz Gnass's Vostok, and Paul Shindman's Gemini capsule. The Vostok had a perfect flight on Sunday, but the Gemini played hairy with the crowd, before plowing down the field to a stop.

Both scale and plastic model flights took place on Sunday, along with the last four events. Egglofting had nine varied entries, from clusters of C's, D's, single stage D13's, and two stage D13's, and only one egg came out unscratched. Stan Greenspan's Super Scrambler flew to an altitude of 2300 feet with a three D cluster to take the first and only place.

Class 1 Altitude had Dave McDermott taking first place with 835 feet. All modrocs had to have a standard weight limit, making the competition fairly tight. In Single Payload, the CD, who was supplying the payloads, seemed to run out of them. This brought use of a large clump of trim clay, which disappeared after the contest, much to its owner's dismay (and blood-curdling anger). First place was nabbed by Greg Misumi with a 940 foot flight.

R&D had several transmitter flights, a ten foot rocket, and a head? Nobody could figure out what Stan Greenspan was trying to develop with his flying mannikin head. It was awarded an aspirin. Mike Botts took first.

Everyone gathered around for a look at Marty Goodman's 1/25 scale Soyuz which stood about six feet tall . . . . . .



. . . and made a perfect liftoff and flight, powered by a cluster of six engines in the core, to take first in Scale at TRRM-1.

TRRM-1 Results

Chute Spot Landing		
1st	Danny Lewis	25 ft. 0 in.
2nd	Greg Misumi	28 ft. 2 in.
3rd	John Porter	72 ft. 3 in.
Class 1 PD		
1st	Kevin Shin	269.1 sec.
2nd	Steve Blackman	249.6 sec.
3rd	Stan Greenspan	195.6 sec.
Sparrow B/G		
1st	Peter Cook	33.9 sec.
2nd	Jim Dickson	27.8 sec.
3rd	Greg Misumi	11.6 sec.
Hawk B/G		
1st	Dave McDermott	52.7 sec.
2nd	Roy King	27.8 sec.
3rd	Paul Shindman	24.3 sec.
Class 1 Altitude		
1st	Dave McDermott	835 ft.
2nd	Mike Botts	785 ft.
3rd	Seaghan Hancocks	760 ft.
60 Nt-Sec Egglofting		
1st	Stan Greenspan	2300 ft.
Payload		
1st	Greg Misumi	940 ft.
2nd	Gary Dale	785 ft.
3rd	Jack Freimanis	865 ft.
R&D		
1st	Mike Botts	
2nd	Gary Dale	
3rd	Stan Greenspan	
Plastic Model		
1st	Fritz Gnass	Vostok
2nd	Paul Shindman	Gemini
Scale		
1st	Marty Goodman	Soyuz
2nd	Dan Stevens	Nike-Hercules
3rd	Neil Fairburn	Vanguard

Saturday and Sunday nights featured lectures, movies, and discussions. Noor Shaikh delivered a paper on Rocketry and Space Flight, a curriculum unit for High School students from the College of Education, University of Toronto. Dr. David Turner, noted biochemist and authority on space physiology spoke. Sev Prato gave a detailed analysis of five Cineroc films. This involved film time running and speed, burnout altitude and velocity and total altitude.

Hillel Diamond gave a talk on the principles of Telemetry and Communications, then took everybody outside and demonstrated his static test stand. Some strange engines produced very interesting thrust curves.

The meet concluded with awards, and Greg Misumi taking the first place trophy. Plans are being made even now for an even larger meet next year.

Finishing Techniques:

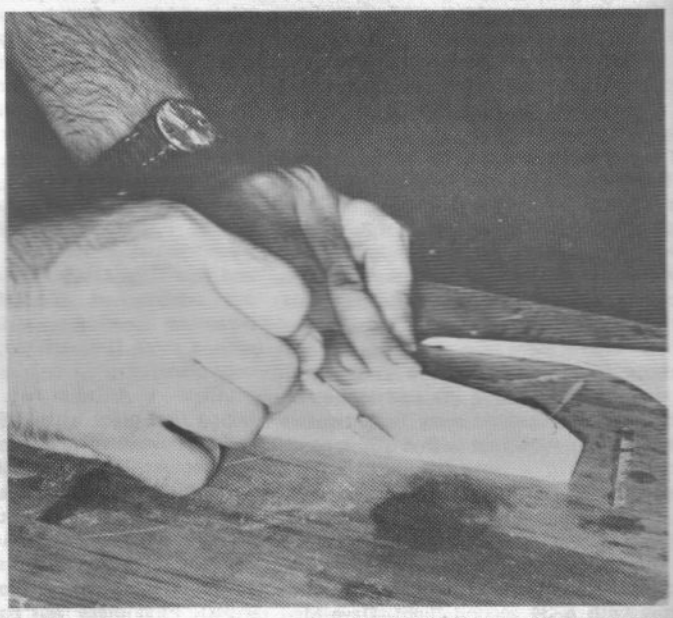
Styrofoam B/G Wings Finished the Easy Way

by Jerry Jones

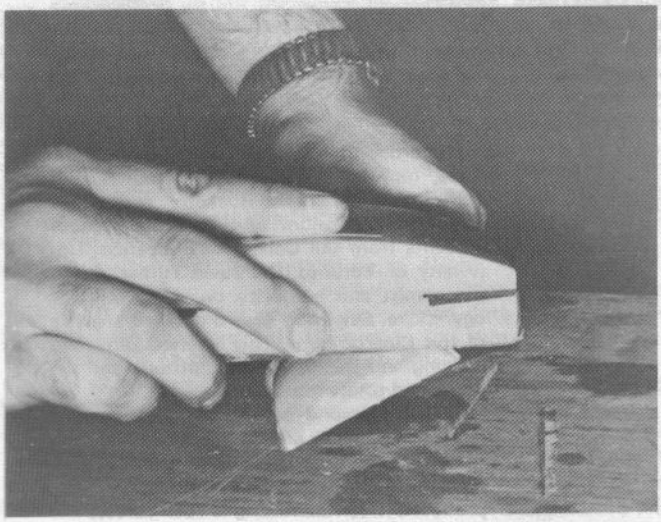
The big problem with styrofoam wings is the inability to put a glassy smooth finish on the styrofoam surface. Normal finishing materials such as dope and balsa fillercoat dissolve the foam wing section rather than filling it. However, there is a technique which will fill the styrofoam smooth, and give it an even harder and stronger surface. This is done with only a small increase in weight (about 20%), and the increased strength allows you to use thinner foam so the Hobbypoxy Finishing Method actually permits a weight decrease.

The basic wing material should be high-density styrofoam. This is available from DB Industries (Box 2835, Dept MR, Mansfield, Ohio 44906) in pre-airfoiled rectangular wings, or from a local plastic supplier in uncut blocks.

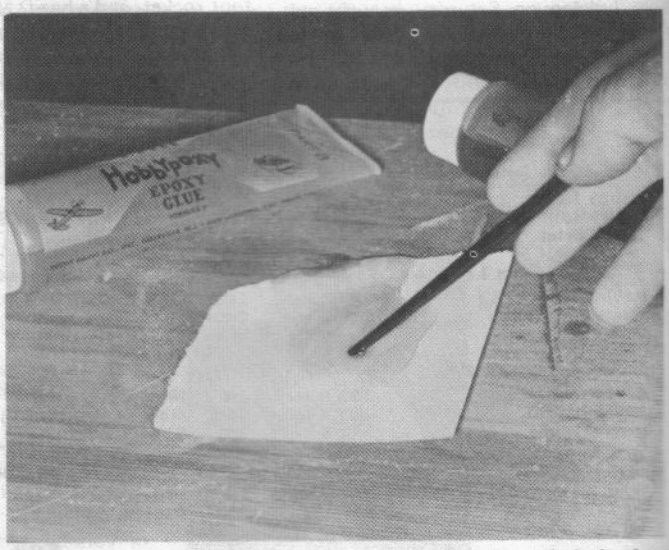
Materials needed for finishing are: Hobbypoxy Formula II epoxy, a paint brush, wax paper, a long balloon, sandpaper, a sanding block, and an X-Acto knife. The finishing technique is quite easy, but plan on one or two tries before you really start getting "professional looking" wings. Also, don't leave your wing finishing for the last minute, since you have to let the epoxy set overnight after application.



1. Mark the wing shape on a sheet of styrofoam, and use a sharp X-Acto knife to cut out the wing.

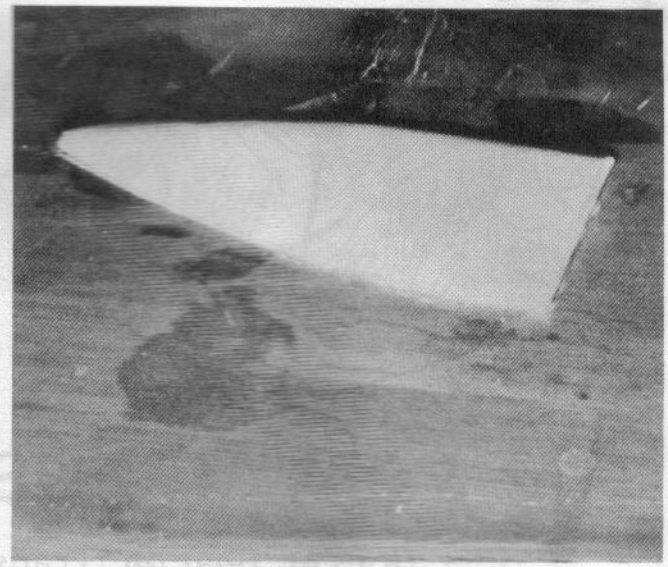


2. Rough sand the airfoil and tip taper using 280 grit sandpaper on a sanding block. Be careful or you will dig deep grooves into the soft styrofoam. Fine sand the entire wing with 400 grit sandpaper until a smooth surface is obtained.

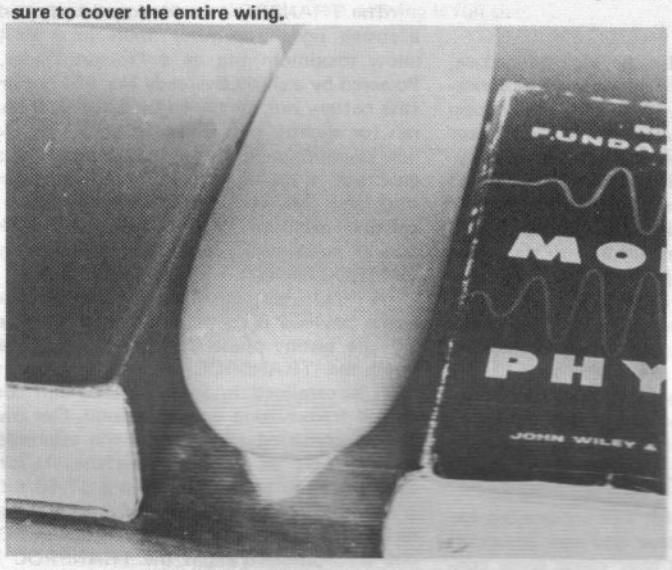


3. Mix a batch of Hobbypoxy Formula 2. This is a relatively slow setting epoxy, so you will have some time to work with it. If necessary, heat the mixture to about 80° to thin it slightly.

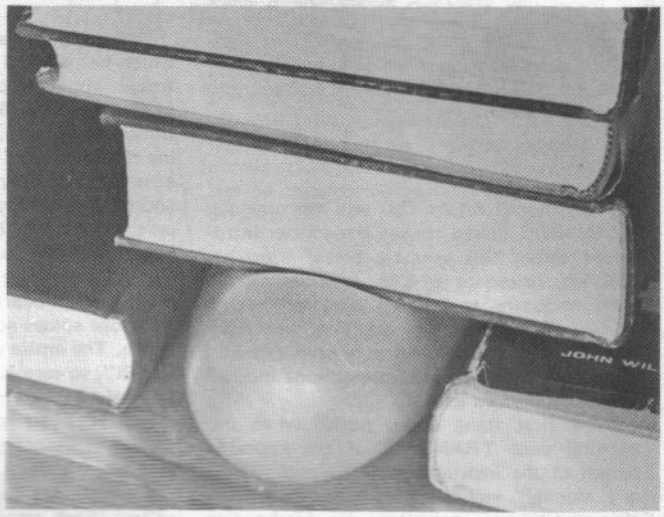
4. Brush a thin coat of epoxy over both sides of the wing. Make sure to cover the entire wing.



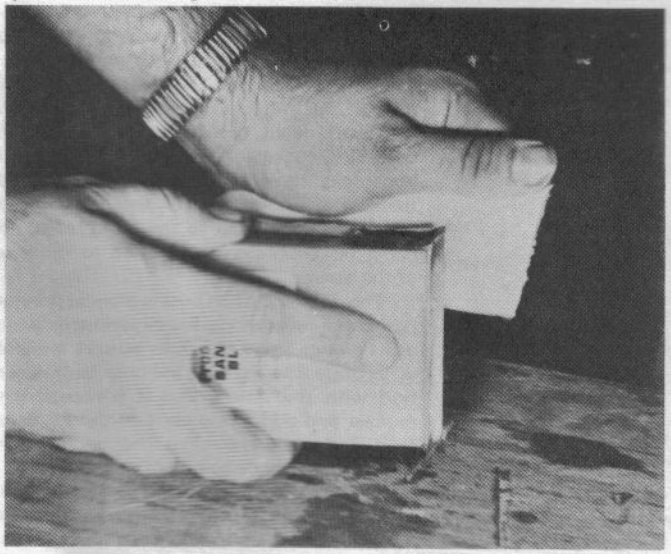
5. Cover the work board with wax paper, and lay the bottom of the wing flat on the waxed surface.



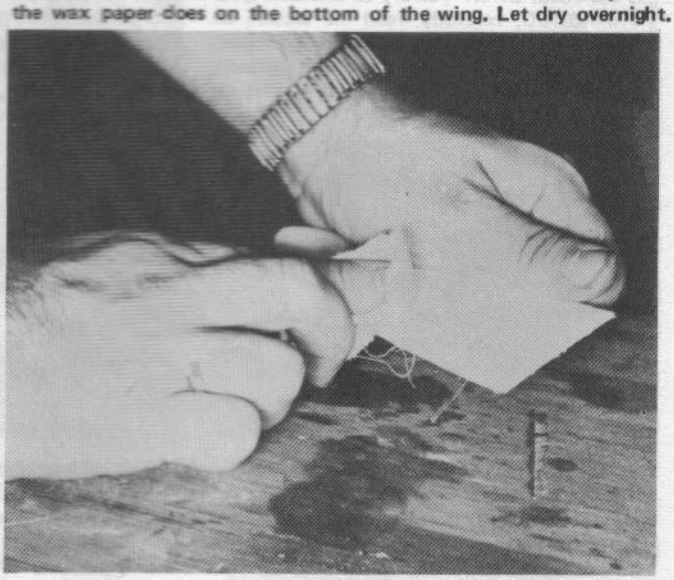
6. Inflate a long balloon (larger in all dimensions than the wing), set up books on both sides of the wing, and set the balloon in place over the wing.



7. Pile books on top of the balloon until it is pressed firmly over the entire surface of the wing. The balloon conforms to the wing airfoil and taper, giving the epoxy a smooth surface just as the wax paper does on the bottom of the wing. Let dry overnight.



8. With the exception of the leading and trailing edges, the resulting wing should have a glassy smooth surface. Using 400 grain or finer sandpaper the leading and trailing edges are smoothed out.



9. The entire wing can then be polished using standard wax giving a glass-like finish. If desired, a coat of Hobbypoxy colored paint can be added over the epoxy finish before waxing.

FLIGHT TEST

by George Flynn

The Estes "TRANSROC"

Model Rocket Beacon Transmitter

Flight Test's usual columnist, Jon Randolph, is on vacation this month to allow him time to build his NARAM-13 models. Jon will return next month.

* * * * * * *

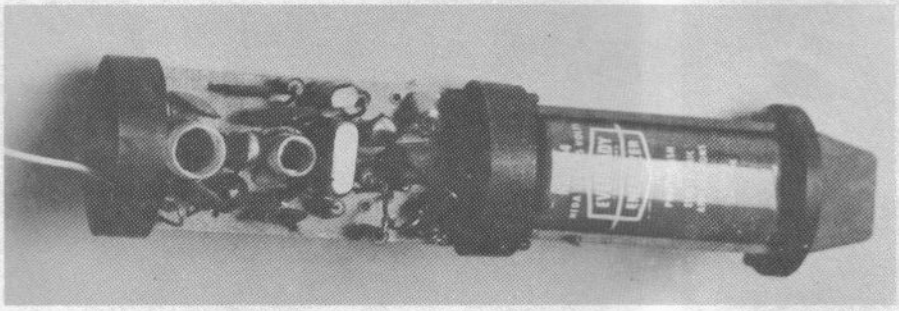
This month *Flight Test* will examine the TRANSROC model rocket transmitter introduced earlier this year by Estes Industries. The kit, priced at $14.95, includes all the parts necessary to build a working "rocket finder" transmitter. In addition, accessory modules for data telemetry of spin rate and temperature as well as a microphone module are available from Estes.

The first thing you'll notice when unpacking your TRANSROC is the imposing length of the instructions. A 54 page "Owner's Manual" includes step-by-step construction procedures as well as troubleshooting tips and operating suggestions. In addition a 12 page "Electronic Kit Builder's Handbook" is included. Before you try to assemble your TRANSROC, carefully read the section on soldering techniques in the Builder's Handbook. Good soldering technique isn't difficult, and the TRANSROC should work right off if it is properly assembled.

Using the assembly checklist procedure, which has worked out well for the major electronic kit producers, the assembly section of the Owner's Manual guides the rocketeer through each step. Oversize drawings specifying the location of each part also help to avoid errors in assembly. The instructions are clear and easy to follow, with descriptions of each part so even the beginner with no electronic experience can assemble the unit.

When soldering components to the TRANSROC circuit board be especially careful not to bridge solder across any of the conducting bands. The entire circuit board is only 13/16" by 1¾", so care is required to avoid bridging. A total of 26 components are soldered to the PC board — an operation which should take the average rocketeer 1½ to 2 hours. Don't rush the project!

Overall the Estes kit instructions are excellent. Each step is clear and easy to understand. Only one area may cause some confusion. Step 44 concerns hooking battery leads to the PC board. After working on the top of the board for 43 steps, suddenly you find yourself attaching these leads on the bottom. But there is no view of the bottom in the instructions, and some rocketeers have accidently connected these leads backwards. Watch out for this one! Connect the black lead to the same edge of the board as the tantalum capacitor and you'll have no problems.



Estes Industries packs quite a few parts into their "TRANSROC" Rocket Finder Transmitter. The entire circuit board (left) measures only 13/16" by 1¾" and contains 26 components. The two variable inductors (cylindrical parts along the centerline) are pre-mounted on the board, and the only tuning required is adjusting the slugs in these coils to maximize the output signal. Assembly on the "TRANSROC" is simple enough that the average 12 year old rocketeer should be able to put it together without difficulty. Using the recommended Eveready 504 battery the unit will put out its "rocket finder" signal for more than a day before the battery is exhausted.

Once assembled, your TRANSROC should put out a strong signal on the CB channel marked on the crystal. A normal walkie-talkie (using a crystal on the same frequency) will provide good reception. Estes claims a ground range of "up to 500 yards" for the TRANSROC. Normally such claims for any CB unit can be taken with a grain of salt. But our testing of the TRANSROC gave it a ground range of over ½ mile into a $30 superhetrodyne walkie-talkie. A half-mile range works out to better than *800 yards*.

We didn't have an opportunity to test the "5 mile range in flight" claim, but you will have no trouble hearing the TRANSROC's signals from two-stage D13-powered models. (Lack of a suitable field precluded testing with an Enerjet F, but based on its performance with D's it looks like this transmitter will have sufficient range for anything a model rocketeer can legally use to fly it.)

The TRANSROC was designed to provide a strong signal for many hours in order to allow maximum use as a "rocket finder." Powered by a single Eveready No. 504 battery (the battery recommended by Estes), our unit ran for slightly over 26 hours before the signal strength went down measureably. That gives you a lot of time to locate a lost payload and the TRANSROC should prove a valuable addition to any CINEROC model just to make sure you can get the expensive CINEROC back.

An important qualification of any rocket borne payload is its "shock resistance." During the testing phase Earl Estes, who developed the TRANSROC, reports that several units streamlined in from altitude and continued transmitting on the ground. Our own testing consisted of dropping the assembled unit 35 feet to a concrete surface. As long as the transmitter is encased in a BT-50 tube it's quite shock absorbent, and only the most serious prang will give you any problems. On one D13 powered flight the TRANSROC in its payload capsule free-fell from over 1000 feet and the transmitter would have continued functioning, had the battery not fallen loose at impact.

For those rocketeers who don't feel up to the two hour electrical assembly task, a completely assembled TRANSROC is available for $21.95. Actually, purchase of the assembled unit might not be a bad idea for the beginning rocketeer who has no interest in home electronic projects, since if you add the cost of a soldering iron (needed to assemble the TRANSROC) to the kit ($14.95) you come up with something close to the price of the assembled unit.

The TRANSROC Owners Manual provides numerous suggestions for experiments which can be done using the three sensors available as separate kits. Perhaps the only fault we can find with the unit is that it is necessary to remove and add a few parts to the PC board each time you want to change from the rocket-finder mode to one of the sensors.

There is no doubt that the TRANSROC, as well as the previously introduced Estes CAMROC and CINEROC, will provide new challenges for rocketeers interested in more than just the "smoke and noise" of a successful liftoff.

Reader Design Page

This month's Reader Design, the Spin Point, was designed by Charles Ruhl of Richmond, Indiana. The Spin Point uses helicopter-type recovery to bring it back close to the pad, even on high-altitude flights. To prep this bird for flight, attach a streamer to an A8-3, B6-4, or C6-5 engine and place it in the engine holder, which is made by replacing the 2¾" BT-20 in an Estes EH-2060 with a 4½" one. Make sure that the fin lock tabs are pushed tightly against the engine, so that the spin tabs are straight back. Wrap a piece of tape around the end of the engine if necessary to ensure this fit. At apex, the engine will kick out and the spin tabs willl be released to be pulled against the fin stops by the elastic thread. The Spin Point then spins back to earth. This drawing is full size.

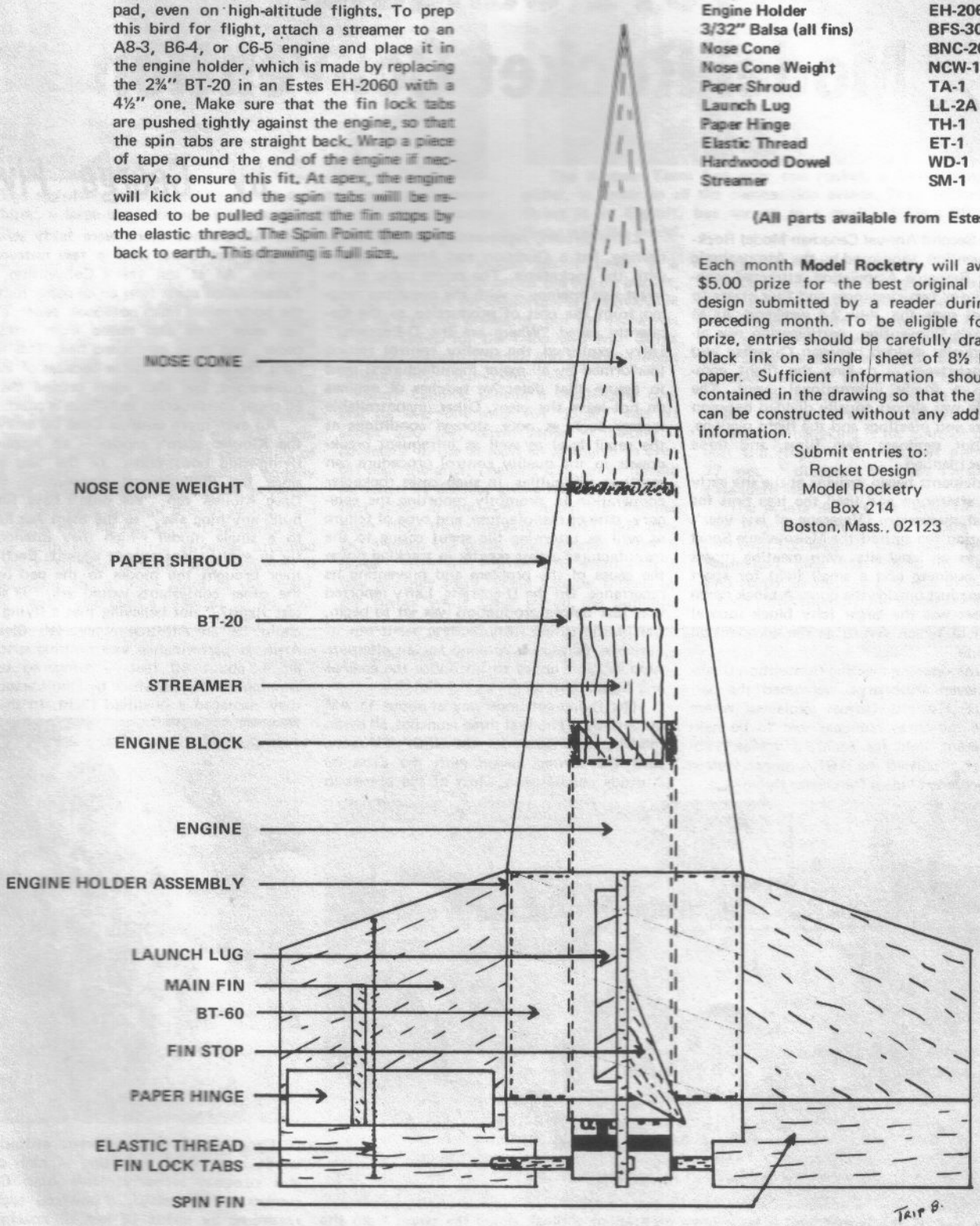
PARTS LIST

Body Tube (inner)	4½" BT-20
Body Tube (base)	1½" BT-60
Engine Holder	EH-2060
3/32" Balsa (all fins)	BFS-30
Nose Cone	BNC-20R
Nose Cone Weight	NCW-1
Paper Shroud	TA-1
Launch Lug	LL-2A
Paper Hinge	TH-1
Elastic Thread	ET-1
Hardwood Dowel	WD-1
Streamer	SM-1

(All parts available from Estes)

Each month **Model Rocketry** will award a $5.00 prize for the best original rocket design submitted by a reader during the preceding month. To be eligible for this prize, entries should be carefully drawn in black ink on a single sheet of 8½ by 11 paper. Sufficient information should be contained in the drawing so that the rocket can be constructed without any additional information.

Submit entries to:
Rocket Design
Model Rocketry
Box 214
Boston, Mass., 02123



With contestants from two provinces and four states, an international contest at:

1971 Canadian Model Rocket Convention

by George Flynn

The Second Annual Canadian Model Rocket Convention, sponsored by the Atmospheric Rocket Research Association, attracted rocketeers from two provinces and four states to Montreal over the July 2-4 weekend. As at last year's Convention, participation was almost equally divided between Canadian and U.S. rocketeers — making the flight competition a truely international event. The schedule was almost equally divided between seminars and meetings and the flight sessions, with four seminars, two films, and three launches planned.

Participants began arriving at the site early Friday afternoon and used the free time for informal discussions. Veterans of last year's Convention recognized the Maisonvieue Sport Center as an ideal site, with meeting rooms in the building and a small field for sport launching just outside the door. A block down the street was the larger (city block square) open field which served as the competition flying site.

At the opening meeting Convention Chairman Steven Kushneryk welcomed the participants, Richard Carmel explained where each of the three launches was to be held (a different field for each), and Max Yablonovitch discussed the ARRA launch system (a relay system "ideal for cluster flying").

Larry Brown, representing Centuri Engineering, led a Question and Answer session with the rocketeers. The prime topic of interest was engines — with the questions ranging from the cost of production to the frequently asked "Where are the D-Enerjets?" Larry explained the quality control testing (performed by all major manufacturers) used to assure that defective batches of engines do not leave the plant. Other uncontrollable factors such as poor storage conditions at the retail level as well as infrequent breakdowns in the quality control procedure can result in difficulties. In such cases rocketeer cooperation in promptly reporting the category, date of manufacture, and type of failure as well as returning the spent casing to the manufacturer assists greatly in tracking down the cause of the problem and preventing its recurrance. On the D-enerjets, Larry reported that just before production was set to begin, the plastic casing manufacturer went out of business. Centuri is looking for an alternate supplier, and hopes to introduce the engines at a future date.

The flying got underway at about 11 AM on Saturday. The first three launches, all demo models, were flown for the CFCF TV crew, then the contest began with the Class 00 Altitude competition. Most of the entries in this ½A altitude event were fairly standard designs, but there were a few noteworthy models. As at last year's Convention, Max Yablanovitch again flew an all-paper rocket — the body rolled from notebook paper, a conical nose cone also rolled from notebook paper, and three cardboard fins. This superlight model went unstable because of lack of noseweight, but Max again proved that the all paper construction technique is practical.

An even more unusual Class 00 entry was the Klouser team's model — an Apparition flying-wing boost/glider. In the two weeks since the Phillipsburgh Convention, which Dave Klouser ran, "We didn't have time to build anything else," so the team was limited to a single model which they intended to fly in every event except eggloft. Each time they brought the model to the pad one of the other contestants would ask: "Is that a test flight?," not believing that a flying wing could be an Altitude entry. It's Class 00 Altitude performance was nothing spectacular — about 40 feet — compared to the winning 240 foot altitude by Don Larson, but they managed a qualified flight. In the alti-

The site of the launch was a large open park about a block down the street from the Convention center.

Canadians have a different attitude towards small field egglofting — high power and streamer recovery. Here Alan Cantor returns his two-stage, D-powered eggloft recovered by about 15 feet of streamer to keep it inside the field.

The egglofters were quite varied with one and two stage D-powered birds, a large black Enerjet E powered model, and even a cluster of C's.

The Klouser Team had only one rocket, a flying wing boost/glider, to enter in all the competition events. They backed out of flying it in Eggloft, but turned in a qualified Class 00 Altitude flight with the model.

tude events the Contest Products red tracking powder was quite popular, and put out a good "cloud of dust" at apex.

Egglofting, Canadian style, was somewhat different with several competitors using streamers rather than chutes on their egg capsules. In the small launch field (power through 80 nt-sec permitted), with a light breeze blowing, the streamer models managed an easy recovery, but some of the U.S. rocketeers were skeptical about the possibility of safe recovery. With CMR capsules equally popular on both sides of the border, however, those fears were quickly proven wrong. Paul Shindman flew his two-stage, D-powered egglofter with only a large streamer attached to his CMR egg capsule, and recovered it undamaged for a third place in the event. Alan Cantor also used a streamer on his two-stage D-powered model, which turned in a beautiful boost, but broke the egg on impact. Exact altitudes for Egglofting are unavailable due to tracking problems, but the event was a clean sweep for the Canadians with Curtis Ritchey, Richard Carmel, and Paul Shindman finishing first, second, and third.

Spot Landing proved a challenging contest for everyone since the "target" was set about 250 feet down range — making it necessary to use at least an A engine to even get near the area. The best spot lander missed its target by *66 feet* giving Norman Wachholz first place in the event. Again the Klouser team flew their Apparition B/G, but they DQ'd when the glider disintegrated under A power. With the Hornet B/G event only a few minutes away, Steve Klouser picked up the pieces while Dave mixed the 5-minute epoxy.

Actually the Klouser glider was more epoxy than balsa when it flew in Hornet, but it did (barely) turn in a qualified flight with a 7 second duration. David Schenck took first place in the event with a 106 second duration on his Wasp B/G. However this model was almost destroyed in flight when a bird circling the area attacked the glider — apparently mistaking it for another bird. The best U.S. flight in the Hornet event was a 77 second duration by Don Larson flying a standard Manta.

The Manta did a little better in the Sparrow B/G competition, giving Don Larson a first with 103 seconds. Once again the Klouser team had their often-shredded Apparition B/G ready to fly,... and this time it didn't shred! Unfortunately the shroud line tangled,

CANADIAN MODELROCKET CONVENTION COMPETITION RESULTS

LeMans Start

1st	Ferenc Roka (MARS)	20.5 sec.
2nd	Max Yablanovitch (ARRA)	21.7 sec.
3rd	Norman Wachholz	23.6 sec.

Hornet B/G

1st	David Schenck (CPRA)	106.0 sec.
2nd	Donald Larson (NOVAAR)	76.4 sec.
3rd	David Bourne (SOAR)	39.0 sec.

Sparrow B/G

1st	Donald Larson (NOVAAR)	103.7 sec.
2nd	Roderick Simons (NOVAAR)	50.0 sec.
3rd	Ferenc Roka (MARS)	45.0 sec.

Streamer Spot Landing

1st	Norman Wachholz	66.0 ft.
2nd	Ferenc Roka (MARS)	94.5 ft.
3rd	Max Yablonovitch (ARRA)	111.0 ft.

Plastic Model

1st	William Bourne (SOAR)
2nd	Paul Shindman (CRS)
3rd	Frank Rabzel

Class 00 Altitude

1st	Donald Larson (NOVAAR)	250.0 ft.
2nd	Paul Schindman (CRS)	240.0 ft.
3rd	Robert Staehle (MARS)	235.0 ft.

Class 0 Altitude

1st	Frank Rabzel	460.0 ft.
2nd	Barry Nicolle	320.0 ft.
3rd	Thomas Geiger (SOAR)	295.0 ft.

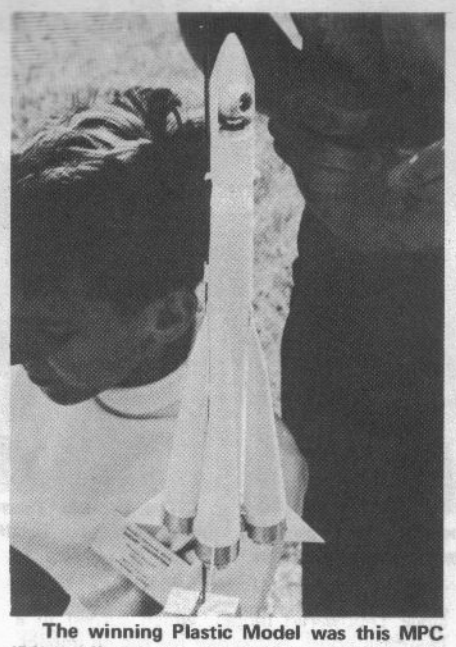
Egglofting

1st	Curtis Ritchey (MSC)	*
2nd	Richard Carmel (ARRA)	*
3rd	Paul Schindman (CRS)	*

(* Technical tracking difficulties prevent determination of the actual altitudes of winning Eggloft flights.)

ARRA Atmospheric Rocket Research Assoc. (Montreal)
CPRS Canadian Progressive Rocketry Assoc.
CRS Canadian Rocket Society (Toronto)
MARS Monroe Astronautical Rocket Society (Rochester, NY)
MSC Mad Scientists Club
NOVAAR Northern Virginia Assoc. of Rocketry (Fairfax, VA)
SOAR South Ottawa Assoc. of Rocketry (Ottawa)

Max Yablonovitch preps his full-size "Jiskra" boost/glider which flew in the Sparrow B/G event. The Jiskra is a heavy model, but it showed excellent stability and a good glide during trimming tests. Unfortunately, the clip leads went up with the glider on the contest flight, putting it somewhat out of trim.



The winning Plastic Model was this MPC "Vostok" entered by William Bourne. The model was painted to the white and red colors used by the USSR for the Paris display version.

and the glider "Red Baroned" for a DQ. Another interesting glider was Max Yablanovitch's full size "Jiskra," a heavy glider, which looked like it could stand up to any engine power. However, we never got to see this one glide because it took the clip leads with it into the sky.

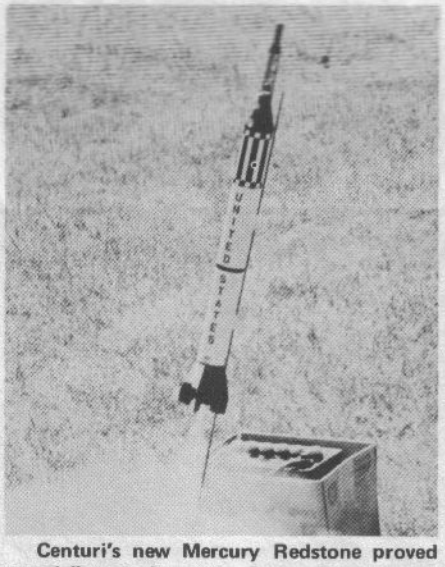
LeMans Start, an event developed by the Monroe Astronautical Rocket Society of Rochester, New York, was the most exciting contest of the day. Here the contestant preps his rocket in advance; then, at a signal from the timer, he races to the pad, hooks up the model, fires it, recovers it, and returns it to the timer. The winner is the contestant with the shortest overall duration. Ideally the model should have high drag on the way up (to slow it down quickly) and less drag on the way down (to let it fall quickly). This resulted in some unusual models being flown. Inverted paper cups (see **MRm** July 71, page 20) and other high drag devices were used. The winner, with a total time of only 20.5 seconds, was Ferenc Roka, who is from the MARS club which created this event.

The overall results don't prove much about the superiority of U.S. or Canadian rocketeers. About 35% of the competitors were from the U.S., and they took three of eight first places With the exception of Plastic Model, where there were no U.S. entries, the results were well divided between the two nations.

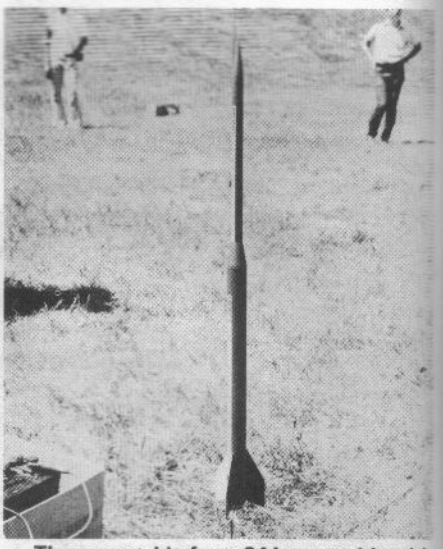
Following the contest George Flynn discussed the subject of "Technological Advances in Model Rocketry." The basic theme of the discussion was that most major advances to the model rocket state-of-the-art have been techniques used outside of model rocketry which were adapted for use in the hobby. Looking at engines, the original black powder motors were based on the technology developed in the fireworks field. The revolutionary Enerjets were an adaptation of sounding rocket motor technology. Our static stability criteria are basically those developed for mortar shells and small field weapons in the early part of this century. Boost glider design criteria are basically those known to model airplane builders since before World War II. Even experimental procedures such as the flow visualization technique (MRm June 1971) have long been used in other fields. Thus the rocketeer intent on advancing the state-of-the-art would do well to investigate prior research done in other fields to determine what of it is relevant and adaptable to model rocketry.

At 9:30 PM everyone gathered downstairs to prep their models for the night launch. The field was just outside the Convention center, but it was dark enough that the participants had trouble locating the launch system. Most of the models were standard designs with tracking beacons in the nose. The star of the show was "The Ruptured Duck," a boost/glider built by Ferenc Roka. This model used a model airplane box type fuselage to provide room for batteries and a light in the body. The light show was amazing as the glider lifted off, looped twice, then went into a glide and made a perfect landing – duration 9 seconds.

Sunday morning also began with a launch, this one a 1½ hour session for sport launching and manufacturer's demonstrations. Centuri Engineering took the opportunity to show off their Enerjet engines by putting an E-24 in the Saturn-V and flying it higher than most rocketeers have ever seen that rocket go. The Saturn-V used the new "slip-on" clear plastic fins, now standard in the Centuri kit, which allow the model to be built with exact scale balsa fins. Larry Brown followed this up with the flight of a Space Shuttle, the Centuri kit which boosts, then separates into two gliding portions just like NASA's pro-



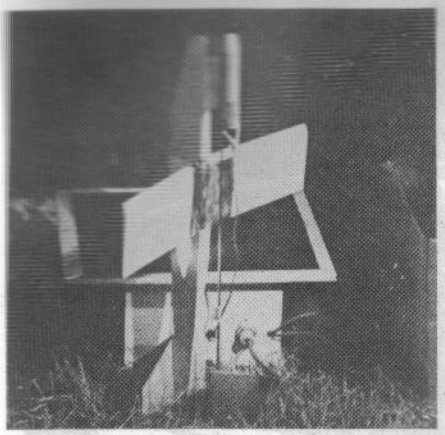
Centuri's new Mercury Redstone proved especially popular at the Convention as rocketeers noticed the highly detailed surface of the plastic Mercury capsule. After a long delay because of difficulties with production of the capsule, the Mercury-Redstone kit is now available from Centuri.



The newest kit from SAI, a sure hit with Canadian rocketeers, is this model of the Black Brant IV sounding rocket. The Black Brant IV is one of the Bristol family of Canadian research rockets. The SAI kit is available through their new Canadian distributor as well as in the U.S.

Next Month in Model Rocketry:

BRITISH COLUMBIA INVITATIONAL ROCKET MEET



The "Ruptured Duck," Ferenc Roka's unique night flying boost/glider sits on the pad prior to its flight at the Convention "night launch." A bulb inside the square fuselage emits light through the hole just behind the wing.

posed shuttle. The first flight was powered by a C6, and both sections glided around the field in circular patterns. Next came a D8 powered flight in an experiment to see if the Shuttle could withstand the power. It did, with a nice boost, a single loop to lose speed at apex, and a gliding recovery.

Space Age Industries, which recently announced the formation of a Canadian company to market their kits in Canada, was on the scene with their newest kit — the Black Brant IV sounding rocket. This model stands about 18" tall, and flys well with B or C engines. Availability will be announced shortly by SAI. Another SAI demo flight, the Mini Bat B/G, didn't go so well when failure to trim the bird for a turn caused it to glide out of site (and out of recovery range) after a 45 second duration on a B6-0.

Needless to say, the Klouser Team had rebuilt their Apparition B/G, which shattered numerous times on Saturday, and prepped it for another flight. Once again, to the amazement of no one, it shattered!

Following the launch, John Rabzel led a discussion on the possibilities of supersonic model rocket flight. He discussed the increase in drag which occurs at the transition to to supersonic flight, and the design compromises which must be made in order to build a model which will perform well in both the subsonic and supersonic ranges of velocity.

A home movie and slide session followed, with the prime attraction being a series of slides which the Melbourne, Australia rocket club had forwarded to the ARRA for use at the Convention. The models were basically similar to North American rockets, in fact they were mostly Centuri kits. One "Flying Jenny" B/G was also seen on the Australian pads. Canadian rocketeers got their first introduction to the swing-wing Ground Hog when they viewed Dave Klouser's slides of the PACT-I Convention. Every second photo seemed to be a Ground Hog, perhaps because Jon Robbins flew them so many times.

The final event on the Convention schedule was the Awards Banquet. Along with the normal presentations to the contest winners, the ARRA club presented a special award to Steve Kuthmeyk and Richard Carmel for their efforts in making the 1971 Canadian Convention a success.

New Product Notes

Model Products Corporation has announced the availability of several new engines in their Minijet line. Two booster engines — an A3-0m, and B3-0m — as well as long delay upper stage engines — ½A3-5m, A3-6m, and B3-7m — supplement the already announced ½A3-3m, A3-4m, and B3-5m. If MPC Minirocs and Minijets are unavailable at your dealer they can be ordered direct from MPC, Dept. Q, 126 Groesbeck Highway, Mt. Clemens, Mich. 48043. A complete Miniroc catalog is available for 15 cents from the same address.

Competition Model Rockets has introduced a new body tube for the Minijet and Minibrute engines. The tube, approximately 14 mm O.D., sells for 20¢ for a 12" length as part number RB-50. Parabolic plastic nose cones (NC-50) for the new tube sell for 50 cents for two. Both items are available by mail from CMR, Box 7022 MR, Alexandria, VA 22307.

Contest Products has introduced 12 new products to their line. They consist of 8 products which use aluminized-mylar and 4 new colors of Traking Powder. For those rocketeers who have experienced "shredded chutes" in egg lofting or anywhere where weight is massive, CP offers a line of strong ½ mil (.00050") aluminized mylar parachutes. They are available in three sizes: 14" ($.45), 18"($.60), and 24"($.80). For duration events (parachute and streamer), CP has a line of ultra thin and light-weight ¼ mil (.00025") aluminized-mylar products. For your PD birds, large parachutes are available in three sizes: 20"($.70), 30"($1.25), and 36"($1.50). A "Mylapak" is available for $1.50. This contains a large 36" x 56" sheet of this material for those rocketeers who wish to make different sizes than those offered. For the new NAR Streamer Duration event, CP sells a streamer kit made from ½ mil (.00050") aluminized-mylar. With this kit, you receive two 2" x 56" streamers with all the necessary items to produce them. It sells for $.30. CP's Traking Powder is available in 5 colors — Black, Red, Dark Blue, Green, Orange. All come in 1 ounce packets and sell for $.35. The above are available for immediate shipment from: Contest Products, Dept M, 15 Hunter Ave., Fanwood, N.J. 07023. (Include $.25 with all orders for shipping and handling.

FULL SIZE PLANS AVAILABLE

In response to numerous requests from readers, Model Rocketry is making available full size plans of several Boost/Gliders published in back issues of the magazine, many of which are now sold out. In future months we expect to announce the availability of scale plans from past issues, as well as reprints of the most popular articles.

Bumble Bee B/G - An elliptical wing Hornet B/G which has turned in contest performances of over two minutes. Full size plans 50 cents.

Wasp B/G - A lightweight Hornet or Sparrow B/G using a balsa boom. Popular contest performer. Full size plans 50 cents.

Dove III Flop-Wing B/G - Complete plans and instructions for the Dove III flop-wing Designed as a Sparrow, this rocket can be scaled up to higher power events. Full size plans and complete instructions $1.00.

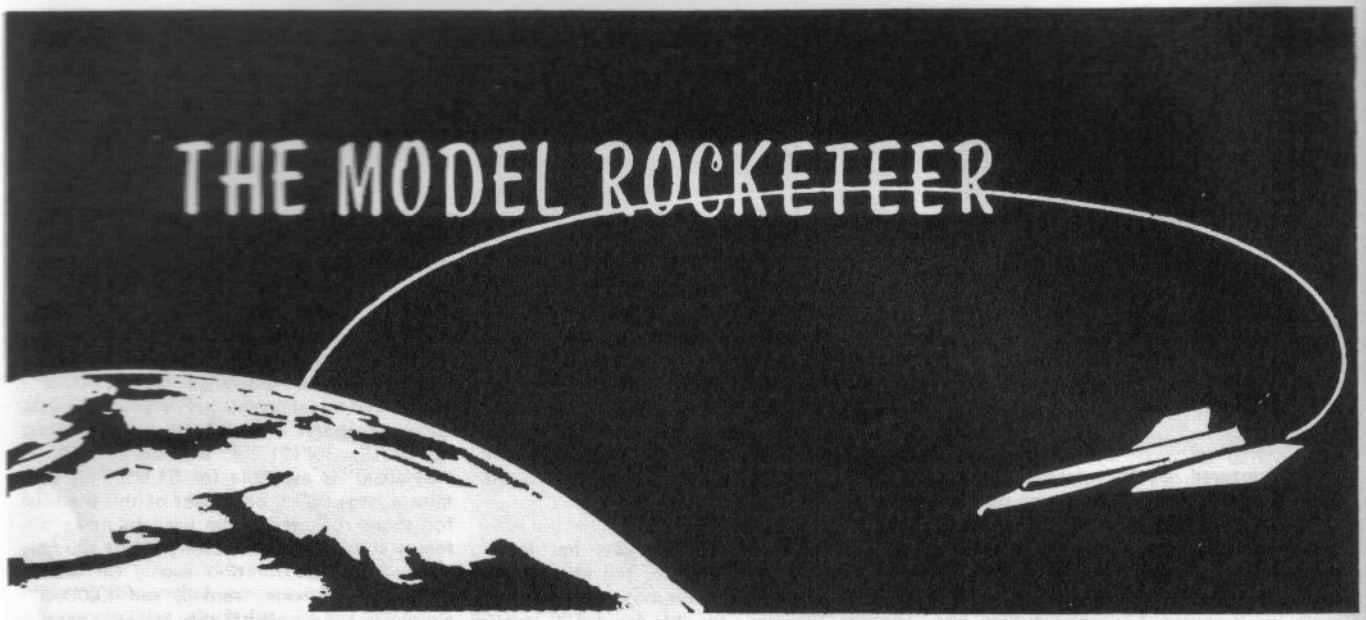
Thunder-Bird B/G - A popular and reliable fixed-pod contest bird for Hawk and Eagle B/G. Full size plans 50 cents.

Space Dart B/G - A small, high-performance glider for Hawk B/G. Sturdy enough to go for high altitudes, yet still light enough to glide well. Full size plans 50 cents.

Bat B/G - An attention-getting sport glider with unusual wings. For ½A through B engines. Full size plans 50 cents.

TAD Scale Plans - Plans for the Thrust Augmented Delta satellite launch vehicle (a Thor-Delta with three solid strap-ons), including details on dimensions, lettering, and coloring. Plans only 50 cents.

Order from: Model Rocketry, Box 214, Boston, MA 02123



NATIONAL ASSOCIATION OF ROCKETRY, Box 178, McLean, Virginia 22101

The Model Rocketeer is published monthly in **Model Rocketry** magazine by the National Association of Rocketry, Box 178, McLean, Virginia 22101. The National Association of Rocketry, a non-profit educational and charitable organization, is the nationally recognized association for model rocketry in the United States. **Model Rocketry** magazine is sent to all NAR members as part of their membership privileges. NAR officers and trustees may be written in care of NAR Headquarters. All material intended for publication in *The Model Rocketeer* may be sent directly to the editor.

1971-1972 LAC Elected

The results of the 1971-1972 Leader Administrative Council election were announced at NARAM-13 by Bob Mullane, election chairman. The following people were elected:

Charles Andres
Doug Ball
Trip Barber
Wanda Boggs
Charles Russell
Connie Stine
Alan Stolzenberg

At the first meeting of the 1971-1972 Leader Administrative Council elections for officers were held. Charles Russell was elected new LAC Chairman, and Alan Stolzenberg was elected Secretary. All LAC correspondence should be addressed to Leader Administrative Council, c/o Alan Stolzenberg, 5002 Somerville Street, Pittsburgh, PA 15201.

Worth Resigns as Treasurer

NAR President James Barrowman announced at the August 10, 1971 meeting of the Board of Trustees that John Worth had resigned as NAR Treasurer effective with that meeting. Worth cited the time needed to provide guidance from the Treasurer to better organize the HQ financial records and to provide assistance in bookkeeping and his own excessive workload as AMA Executive Director with the tremendous expansion of AMA activities is the reason for his resignation. Worth indicated his willingness to assist the new appointee, not yet designated, and indicated his desire to remain active on the Board of Trustees.

An emphasis on competition and research is becoming more and more prevalent in the NAR today. Such a trend, in itself, is not such a bad thing, but we wonder whether or not it has, in some cases, been carried too far. Is there still a place in our organization for the "just for fun" rocketeer, or for the person more interested in other activities (*e.g.*, editing the section newsletter, section organization, and administration)? So many newsletter editorials, convention speeches, etc. seem to suggest that NAR members who aren't either deeply involved in research or all-out competitors are a blot on the organization!

Compulsory training programs for new section members worry us too. Should a member who is not interested in competition be *forced* to bring himself "up to the level of some of the more experienced members"?* Certainly, such courses are a good idea for people who really like to get out and compete, but they should be *voluntary*. If a person's interests lie in this area, he would be foolish not to take advantage of such worthwhile programs. It can be argued, of course, that mandatory programs are necessary because they teach people how to build safe, stable rockets. Yes, NAR members should know how to build safe, stable rockets, but they can be taught in other ways. An unsafe rocket should not be allowed to be flown on any well-operated range, so the new rocketeer whose rocket is rejected by the range safety officer knows something is wrong. Older members should take it upon themselves to help the newcomer in a friendly way, without force-feeding the poor kid.

Might not mandatory programs or other undue emphasis on competition drive away noncompetitive people who could become great assets to any section interested in more than just amassing the largest possible number of contest points? Does a good newsletter editor necessarily have to be a good modeler? How about a top-notch section president (or any other officer)? The world's greatest tracker? We don't mean to imply that competition and other interests are mutually exclusive, but we do want to point out that they need not occur together. Not only would adding such people to the section roster profit the section; the individual in question would benefit from the relationship too, possibly by gaining a sense of worth he might not otherwise have.

Competition is, of course, necessary in order for model rocketry to prosper and grow. It provides an impetus for development of new ideas and helps to keep the hobby from stagnating. *But,* too much emphasis on competition, in addition to driving away potentially beneficial members, can result in cheating, bitterness, and poor sportsmanship in general, all of which, unfortunately, we have seen far too often on the range at major contests.

The emphasis on research is likewise two-faceted in its in its effects. On the plus side, naturally, it keeps the hobby moving ahead, and, again, fends off stagnation. Could it also, however, frighten off youngsters who don't have technical know-how? Might such people go off and, in the course of less scientific "experiment," blow off a head, or a hand, or maybe just put out an eye or two? Can't we try to find a place for these people too — in the interest of safety?

The NAR must realize that room must be left in our organization for people without competitive or technical interests. Not to do so would be to narrow the range of our membership, resulting in a dull, stultifying atmosphere where competition turns into throatcutting, and research project presentations, while perhaps technically useful become dry and boring. Model rocketry is a hobby. It should be fun, exciting, and worthwhile for all people who wish to participate in it. Let's stop taking it so seriously. In our quest for excellence, are we perhaps driving away people that we could be helping, or even people who could be helping us?

(* Note: See the "Sections Hold Training Programs" part of this month's *Section News* column.)

* * * * *

The *Model Rocketeer* would welcome any comments on the above editorial or on any other subjects for "Loudly from a Broken Soapbox." The opinions put forth in the above article are those of the author alone.

Elaine Sadowski

By Charles Gordon

A History of the Steel City Section

By Elaine Sadowski

The Steel City Section was founded in 1964 by Jay Apt. Of the twenty-five people attending the first meeting, twenty-two became members of the section. SCS's first contest, SCRAM-1 (The name was first proposed as a joke, but the section's Contest and Records Committee couldn't come up with another one, so we've had SCRAM's, or Steel City Rocket Aerial Meets, ever since.) was originally scheduled for December 27, 1964. A special pre-contest launch was held for the press, as an article had been promised, but the results were rather disasterous. Most of the rockets never got off the launch rack, and many of those that did exploded or crashed, causing one reporter to call the event "a real Blast," "a smashing success" and "Black Sunday." After being postponed once for foul weather, the contest was finally held on January 3, 1965. In those days, we launched in all kinds of weather, rarely postponing for cold, and quite often scorching gloves, coats, etc. on little propane gas heaters scattered around the launch area.

Perhaps the activity that the Steel City Section is best known for is the sponsoring of conventions. The first model rocketry convention was held in the spring of 1966, with Jay Apt acting as chairman. Pittsburgh Spring Conventions have been held every year since then, and attendance has steadily grown.

Section members have their marks on the NAR, taking awards in competition and serving on the Leader Administrative Council and the Board of Trustees. Jay Apt and Elaine Sadowski were among the original seven LAC members, and both of them have served as both secretary and chairman of that group. Arnie Pittler, a former Convention Chairman, was elected to the 1970-1971 LAC. Jay is now on the Board of Trustees, and he is serving the NAR as Secretary. Richard Fox, notorious for his "Foxmitter," has just completed a term as section president.

The first indoor model rocket launching was conducted by the Steel City Section in the fall of 1967. This took place at an air show held at the South Hills Village Shopping Mall in which the section participated along with groups from the Civil Air Patrol, the Academy of Model Aeronautics, airlines, aircraft manufacturers, and related groups. The launchings, which took place every half-hour, were accompanied by a display of models and trophies. The apparatus for the launch was quite difficult to set up. Because we were in a shopping mall, which was, of course, filled with people, the rocket had to be restrained. Guide wires were attached to a balcony above the exhibit. The rocket, a very heavy one specially designed and built by Arnold Pittler, rose to a height of approximately 30 feet on the wires. The parachute then ejected, but the descent was not very gentle — the fins of the rocket cracked after five firings.

Section members have also used their model rocket knowledge in teaching classes for such organizations as the Office of Economic Opportunity and the School for the Blind.

Vikings in Richmond

Monthly model rocket launches are held by the Viking Rocket Society (Section 203) in Richmond, Virginia. The launches take place at the Virginia State Fair Grounds in Richmond. Each month two events are flown (non-sanctioned) according to NAR rules for practice and for fun. Interested rocketeers can call 703-266-8064 for more information on this activity.

Air Show Launch

On June 27, members of Stamford Connecticut's Fairchester Section (section 115) put on a model rocket demonstration at the Bridgeport Airport as a part of the annual Barnum Air Show. Section members Jim Bosse, Rich Sternbach, Jim Waurishuk, Jim Reekie, Greg Scinto, and Al Malizia launched before an estimated 4000 enthusiastic spectators. Congratulations to the Fairchester Section for a job well done.

Sections Hold Training Programs

BCMRA: May 18 marked the beginning of the Broward County Model Rocket Society's (section 217, in Fort Lauderdale, Florida) Trainee Program for new club members who lack the experience of older members. The main objective of the program is to bring the new and younger members of the club up to the competition level of some of the more experienced members. The basic tools of the Trainee Program are the Centuri "Design Handbook" and the Estes "Yellow Pages Handbook." Trainees learn to build a basic model rocket and profit from the passing along of some of the personal experiences of the other members of the section. Each trainee in this program is quickly exposed to the basic philosophy of the hobby . . . "Safety First!"

In other training program news we reprint the following article, entitled "Graduation," from Vol. 2, No. 5, of *Emanon*, the official newsletter of the YMCA Space Pioneers (New Canaan, Connecticut):

"On that long awaited date, June 7, the trainees graduated. After an intensive nine month training session they finally became full-fledged members. Seventy-seven people have gone through the course and graduated during its six years of existence. Those who received their certificates were Mrs. Barbara Kennedy, John Kennedy, Hank Ober, Mike Scarborough, Stephen Sweet, Chris Wurster, and Mr. Gene Wurster.

"The David Vesley Memorial Trophy, awarded each year to the Space Pioneer, who, in the eyes of the members, has most improved, was given to Michael Scarborough.

"There were three other special awards. The first went to Mr. Tom Walker of the YMCA as an honorary member of the Recovery Crew. The next went to Mrs. Kennedy as the Kitchen Rocketeer of the year. The third special award went to Connie and Ellie Stine as the first members of the club to break a thousand points.

"After the presentations members and their families were treated to punch and goodies."

A third section which has a training program is the West Covina Model Rocket Society in West Covina, California. Their members must go through "Mercury," "Gemini," and "Apollo" programs in order to become full-fledged section members.

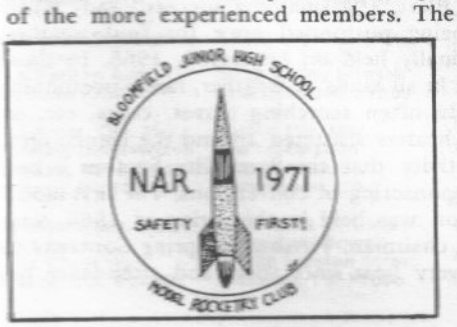
Section Flags

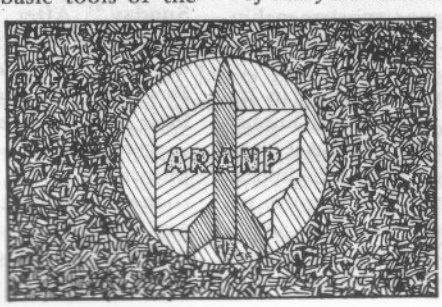
This month we are presenting the flags of the Bloomfield Jr. High School Model Rocketry Club (yellow rocket body with red and blue fins; blue lettering on white background) of Bloomfield, Connecticut, the Aerospace Research Association of Northwestern Pennsylvania, located in Meadville, Pa. (dark blue rocket, light blue map in medium blue circle, gold letters and flame, deep red background), and the Technical Institute for Rocket Observation and Study, of Crystal Lake, Illinois (green and blue Earth, gold trajectories, black and white moons, on a dark blue background).

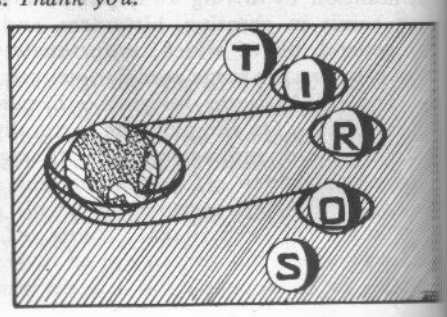
All correspondents with NAR Section News please note that the correct address for NAR Section News is:

NAR Section News
Charles Gordon, Editor
192 Charlotte Drive
Laurel, Maryland 20810

Please disregard the previous notice of the University of Maryland address. Thank you.







FROM THE BOARD OF TRUSTEES

Dr. Ellsworth Beetch, former NAR President, has resigned from the Board of Trustees. Manning Butterworth, currently the Mid-America Regional Manager and Chairman of the By-Laws Revision Committee, has been appointed by Jim Barrowman to fill the vacancy. The appointment is subject to the approval of the Board.

Notes on NETS-2

by Lindsay Audin

(Lindsay is an NAR trustee, the LAC advisor, chairman of the Publications Committee, and a former editor of the Model Rocketeer.*)*

Numerous conventions have been held in the past few years, most involving more than 100 people and several thousand dollars. Most sections, however, are not willing to jump into such a commitment without some prior experience at non-flight rocketry.

On the other hand, communication by small groups (at contests, club meetings, etc.) often leaves something to be desired – usually sufficient time, planning and preparation to handle a topic in depth.

Pascack Valley, known as an innovator in organization, saw that a need existed for an interim type of meeting. After some brief discussion, it was decided to hold a one day affair on Scale and R&D Techniques and to invite rocketeers in the N.Y. – N.J. – Conn. metropolitan area. It was dubbed N.E.T.S., for *N*orth*E*ast *T*echnical *S*ymposium. The basic notion was as follows:

* By holding it on one day, the burden of housing was eliminated.

* By limiting the scope of the discussions, one or two topics could be handled fully with maximum audience participation.

* By setting the hours between 11 AM and 5 PM, only one meal need be provided (lunch) and that could be done easily in the meeting room.

* By utilizing a school, meeting room costs were effectively eliminated.

All of the above matters worked out successfully.

Chronologically, the planning opened up something like this:

Content

1. Select the attitude of the meeting (technical, competitive, organizational).
2. Limit the scope of topics (We chose scale and R&D.).
3. Develop presentations (slides, blackboards, etc.).

Size

1. Limit the number of participants loosely (We set a ceiling of 75.); also determine a minimum to break even (We set 20.).
2. Based on that limit, determine needed resources (food, note paper, chairs, etc.) and total costs.
3. Choose a reliable, easy-to-find meeting place and get a commitment on it as early as possible.
4. Publicize the meeting at an individual cost at least 25% over planned expenses to allow a safe buffer.
5. As responses come in, tailor the meeting to the participants' number and interests.

To accomplish the above, a reliable staff should be established. At NETS most of the work was borne by Bob Mullane and myself, which was not a very intelligent maneuver. I would suggest a nucleus of workers consisting of:

–Chairman; keeps plans on schedule, obtains meeting place

–Secretary; handles paper work (including recording of proceedings), obtains speakers

–Chief Coolie; obtains materials, plans lunch

–Second Coolie; sets up demonstration (if wanted), helps Chief Coolie

With four workers a tightly knit group is possible; it also reduces travel and phone expenses.

Our NETS had a demo (run by PV member Gary Bossong), but it was our conclusion that one is not necessary unless closely tied to the discussions (such as aerial photography techniques). Otherwise, though, the above staffing is the minimum needed to avoid overburdening any individual.

NETS-1 had four lecture-discussions:

1. Problems in R&D (L. Audin)
2. Drawing Scale Plans (B. Thayer)
3. New Ideas in R&D (J. Persio)
4. Obtaining and Presenting Scale and R&D Data (B. Mullane)

I might add here that selection of your speakers is critical; they will make or break your meeting. The above were well versed and quite capable and made up for any organizational inadequacies present that day.

It was intended that the subjects overlap but it was also intended for the participants to participate. This was, perhaps, NETS major failing. It was hoped that the breaks between talks would yield constructive dialogs among those present. According to collected comments, this did occur to a certain extent, but I personally was disappointed. For the future, I'd like to suggest some alternate means of pursuit, the object being learning by *doing*, as well as listening.

1. For R&D topics (or similarly structured material), adopt a problem (such as an idealized spot lander) and have the group solve it through discussion. This might best be handled in a small separate group (less than 10) all of whose members are interested in that particular project. The leader would apply the principles that normally would be given in a lecture format.

2. Scale plan drawing could be covered by setting up a "teaching machine" system. *e.g.*, slides (or printed sheets) with drawings that contain errors which the participants must find. All basic details of drawing could be brought out while trying to find the errors.

3. Sets of data (scale or R&D) could be presented (also with errors or excess material) and each group member would put the data in a presentable format. The group would then discuss each member's method. Such a format might also be an excellent way to train judges.

Other means come to mind but they are up to the symposium committee. One point that should be kept in mind is the type of meeting you really wish to hold – some of the above methods might better be termed "workshop." This is important because your participants may not be tuned to such involvement. Clear, concise publicity of content can avoid confusion and disappointments in this

area.

A few practical notes:

1. Plan ahead at face-to-face meetings; avoid long distance phone calls. Much NETS expense went to calls between Bergen County, N.J. and Westchester County, N.Y.

2. Select your committee carefully and be ready to shift jobs. NETS also suffered in planning due to a personal problem on my part: I got transferred to the night shift where I work. Be ready to take over and change responsibilities.

3. For lunch we had sandwiches made early that morning at a local delicatessen (which had been warned a week earlier) and kept in a refrigerator near the school. Average cost was about $.75 and we bought 40. Deli sandwiches are well-stuffed and these were no exception. We had two basic types, roast beef and ham (some with mustard, some with mayonaisse). Most tastes appeared to be satisfied. Two cases of good soda pop (two flavors) came to about $5, freshly picked apples (40) cost about $2. Thus, for each of the 30 participants, food costs about $1.20 to $1.40 when extras (napkins, etc.) are included.

Everyone seemed happy and the types of foods allowed people to move freely from group to group. Total expenditures for food: less than $40.

Accessories: each participant was provided with pencil and sheets of blank paper for notes, doodles, questions, etc. A pencil is also a good thing for a nervous youngster to have in his hand when he tries to talk in a group. This also made it very easy for us to collect written comments at the end of the day.

5. We collected quite a mass of scale and R&D material for examination. Via slides, Bob Thayer had about half a dozen plans, and on paper there were another half dozen. Also available were fifteen R&D papers from past NARAM's many of them winners. They were utilized as examples in the lectures as well. A similar collection in other meetings would yield many topics for discussion, I'm sure.

6. Our meeting room was a science classroom with ample table space and large blackboards. Choose the room well, it should not cause cramping or become stuffy easily. The less it looks like a schoolroom, the better.

7. To collect comments simply, I ashed for only what was liked most and least. Those who wanted to write more did so. Being lazy, we didn't feel a detailed questionnaire would be really helpful. I personally felt that the time to fill one out would be better spent in discussions.

8. Perhaps the main place we fell down was in publicity. I think we should have contacted *all* local sections individually to maximize response. Alas, I bear guilt for that one. Beware, however, of excess paperwork. We had the minimum, and it included two mailings: application and cover letter, and map and directions. That's four printed sheets, one a hand-drawn map – they take time. I cheated, though. I found a road map that covered the general area and the Bergen County area was about 8" x 11". I darkened the major roads and then traced them onto an 8½" by 11" sheet. Thus, a scale map emerged, courtesy Esso.

Well, these notes have driveled on long enough. Hold your own NETS and do a better job. Be careful of overhead costs (gas, phone, film, etc.) and you'll even make some $ for your club. And tell the rest of us about it. Maybe we can work up a NETSwork (pun, pun) of symposia so everybody gets into the act. In the meantime, good luck.

(Editor's Note: The above article is an excerpt from NETS ONE, a booklet covering the four lecture demonstrations and also including a summary of participant views. Copies of this highly informative booklet may be obtained by sending 50 ¢ to Brian Skelding, Pascack Valley NAR Section, 9 Appleton Road, Glen Ridge, N.J. 07028.)

NAR Contest Board is reorganized

by Dick Sipes

As of September 15, 1971, the NAR Contest Board was reorganized into six Regional Contest Boards. The Regions are the same as the ones used by Section Activities. It is hoped that this reorganization will provide sections with a faster turn-around time on sanction requests and a better rapport with their Contest Boards. It will also cut the work of each board by one-sixth and give the chairman time to serve each section on a more personal basis. The Contest Board that will fill a sanction request is determined by the home state of the section sponsoring the contest. A list of the Boards follows; please note the chairman of your board and the states that he serves.

Northeast Contest Board
A.L. Lindgren, Chairman
15 Hunter Avenue
Fanwood, New Jersey 07023

Serving sections in the following states: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, and New Jersey.

Southland Contest Board
Dottie Galloway, Chairwoman
428 Ben Oaks Drive, West
Severna Park, Maryland 21146

Serving sections in the following states and territories: Maryland, Delaware, West Virginia, Virginia, North Carolina, South Carolina, Kentucky, Tennessee, Georgia, Alabama, Mississippi, Arkansas, Louisiana, Florida, Washington D.C., Puerto Rico, and the Virgin Islands.

Midwest Contest Board
Jon H. Randolph, Chairman
10301 Lake Avenue
Apt 520
Cleveland, Ohio 44102

Serving sections in the following states: Ohio, Indiana, Illinois, Missouri, Kansas, Iowa, Wisconsin, Michigan, Minnesota, Nebraska, North Dakota, and South Dakota.

Southwest Contest Board
Bernard S. Russell, Chairman
14155 Labrador
Houston, Texas 77047

Serving sections in the following states: Texas, Oklahoma, New Mexico, and Arizona.

Mountain Contest Board
William S. Roe, Chairman
Box 1052
Colorado Springs, Colorado 80901

Serving sections in the following states: Colorado, Utah, Nevada, Wyoming, Idaho, and Montana.

Pacific Contest Board
Donald C. Valkema, Chairman
13737 Somerset Road
Poway, California 92064

Serving sections in the following states: California, Oregon, Washington, Alaska, and Hawaii.

AN ANALYTIC REPRESENTATION OF MODEL ROCKET THRUST-TIME CURVES

Manning Butterworth NAR 213

(Manning is a long-time NAR member from Eagle Lake, Minnesota.)

Since the initial paper of this title (hereafter referred to as Paper I) was published in the **R&D Methods Guide** [Ed. note: It also appeared in the March *Model Rocketeer.*] the engines which it discussed were extensively redesigned. Therefore a program was conducted to bring the formulae of Paper I up to date. The formulae presented here apply to A8-, B4-, B6-, and C6- type engines.

The reader will recall that the thrust was represented by the function $F(t) = f1(t) + f2(t)$, where $f2(t)$ described the thrust peak and $f1(t)$ the constant sustaining thrust. The much higher peak thrust of the new engines necessitated basic changes in f1, but only changes in values of the constants for f2. The data used in this program were taken from the Estes Industries' *Technical Note TN-1* and appear below in Table I.

It is found that the thrust-time curves shown in *TN-1* can be adequately reproduced by a function of the form:

$$(1)\qquad F(t) = \frac{at^2}{1 + b(t-\epsilon)^2} + \frac{ct}{1 + h(t-\delta)^4}$$

The first term, f1, simulates the sustaining thrust and the second, f2, the peak. For A8- and B4- type engines the constants have the following values: $a = 840$, $b = 70$, $c = .185$, $h = 2 \times 10^4$, $\epsilon = .006$, and $\delta = .18$. For B6- and C6- type engines the values are $a = 1520$, $b = 75$, $c = 140$, $h = 10^4$, $\epsilon = .006$, and $\delta = .18$.

The total impulse can be found by integrating $F(t)$. The integration is straightforward but lengthy, so we simply state the result. Let $I_T = \int_0^{t_1} F(t)dt$, where t_1 is the duration of the engine, and define

$I_{T_1} = \int_0^{t_1} f1(t)dt$ and

$I_{T_2} = \int_0^{t_1} f2(t)dt$. Then for $F(t)$ from Eqn (1) we have

$$(2)\quad I_{T_1} = \frac{at_1}{b} - \frac{a}{b^{3/2}}\left(\frac{1}{b} - \epsilon^2\right)\left[\tan^{-1}(b^{1/2}(t_1 - \epsilon)) + \tan^{-1}(b^{1/2}\epsilon)\right] + \frac{ae}{b}\ln\left[\frac{1 + b(t_1 - \epsilon)^2}{1 + b\epsilon^2}\right]$$

and

$$(3)\quad I_{T_2} = \frac{c}{2h^{1/2}}\left\{\tan^{-1}[h^{1/2}(t_1 - \delta)^2] - \tan^{-1}(h^{1/2}\delta^2)\right\} + \frac{c\delta\sqrt{2}}{4h^{1/4}}\left\{\tfrac{1}{2}\ln\left[\frac{h^{1/2}(t_1 - \delta)^2 + \sqrt{2}h^{1/4}(t_1 - \delta) + 1}{h^{1/2}(t_1 - \delta)^2 - \sqrt{2}h^{1/4}(t_1 - \delta) + 1}\right] + \tan^{-1}[\sqrt{2}h^{1/4}(t_1 - \delta) + 1] + \tan^{-1}[\sqrt{2}h^{1/4}\delta + 1] + \tan^{-1}[\sqrt{2}h^{1/4}(t_1 - \delta) - 1] + \tan^{-1}[\sqrt{2}h^{1/4}\delta - 1]\right\}$$

For the expression for f1(t) given in Paper I, viz. $f1(t) = \frac{at}{1 + bt}$, I_{T_1} is considerably simplified. It is

$$I_{T_1} = \frac{at_1}{b} - \frac{a}{b^2}\ln(1 + bt_1)\ ,\ \text{(Paper I)}.$$

Total impulses calculated with equations (2) and (3) are given in Table I. The largest deviation from the manufacturer's published values, -.06 lb-sec for the B4- engine amounts to an error of about 5 per cent. A comparison of the computed and manufacturer values for the total impulse together with a comparison of the graphs shown in *TN-1* and those constructed from equation (1) illustrates an interesting point that has received little notice so far. That is, the A8-, B4-, B6-, and C6- type engines are listed in the catalog as producing the maximum possible total impulse for their class — 2.5, 5.0, 5.0, and 10.0 nt-sec respectively. However, a characteristic of any manufactured product is that it will have a certain distribution around some mean value. If the engines in question were designed to operate at the stated limits with, say, 10 per cent tolerance, then half of the engines would produce too great a total impulse, making NAR certification very difficult. Thus, it is a practical necessity to design the engines to operate somewhat below the published values which are really upper limits. This explains why the graph of equation (1) has a wider peak than that in *TN-1* yet gives a total impulse of 2.5 nt-sec for the A8- engine. Equation (1) does reproduce the plateau of *TN-1* for the B4- engine and, as we see from Table I, the resulting total impulse is too low. Exactly the same thing holds for the B6- and C6- graph — the peak is too wide and the plateau is fitted well — except that in this case the B6- total impulse is too high and that for the C6- is just right.

A word of caution about adjusting F(t) to correct these errors: altering the duration produces a predictable change while changing the sustaining thrust does not, as the latter alters the shape of the entire curve including the peak.

Again, to convert to the metric system multiply F(t) by .278 newtons/ounce.

Table I

Engine Type	I_T (Mfr. Value) (lb.–sec.)	Computed I_T (lb.–sec.)	Duration (sec.)	Peak Thrust (oz.)	Time to Peak (sec.)	Plateau Thrust (oz.)	Time to Plateau (sec.)
A8-	.56	.56	.395	47.6	.22	11.6	.37
B4-	1.12	1.06	1.15	47.6	.22	11.6	.37
B6-	1.12	1.17	.785	47.0	.24	20.2	.42
C6-	2.25	2.25	1.66	47.0	.24	20.2	.42

DEALER DIRECTORY

Hobby shops desiring a listing in the Model Rocketry Dealer Directory should direct their inquiries to Dealer Directory, Model Rocketry magazine, Box 214, Boston, MA 02123. Space is available only on a six month contract for $18.00, or a twelve month contract for $35.00, payable in advance.

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(Continued from pg. 48)

on October 24, 1971, will be held at Hannover Air Park. Events include Class 1 PD, Class 2 SD, Pigeon Eggloft, Hornet B/G, Sparrow B/G, Swift B/G, Sparrow R/G, and Parachute Spot Landing. Interested rocketeers should contact Tom Hench, 4802 Kengsington Ave., Richmond, VA 23226.

The Glen Ellyn Rocket Society (Glen Ellyn, Illinois) was active this past summer promoting rocketry in its area. The first of three public demonstrations was a display at the Jaycees Village Fair, May 26-31, 1971. The club used fifteen posters showing various aspects of model rocketry. Literature from the major model rocket manufacturers was passed out, and free rocket kits were given away each night. The club's activity was covered in the Glen Ellyn *News,* and club member Andy Pozdol was interviewed on radio station WGHS-FM which broadcast from the fair.

The club's second demonstration launch was held on the 4th of July. The biggest launch of the year, the Glen Ellyn Rocket Society's annual "Labor Day Launch," is expected to attract several hundred spectators. Each year club members launch over 100 rockets in this event.

The Town of Highland (New York) Model Rocket Club has held four meetings and several launches since April 1971. At the first meeting Bob Smith was elected president; Peter Volli, vice-president; Joe Yagel, secretary-treasurer; and Bryan Weyant, publicity director. The club has scheduled a contest with the Newburgh Rocket Club (Newburgh, NY), and is looking for other clubs in the area to compete with. Rocketeers and clubs can contact the Highland club through Bob Smith, 27 Klietz Ave., Highland Falls, NY 10428.

The Society of Lodi Area Rocketeers (SOLAR) was recently organized as an NAR Section in Lodi, California. The club now has 15 members, and the president has constructed a 10 foot tall model which he hopes to fly soon. Interested rocketeers should contact Dennis Holck, 18547 N. Jackton Rd., Lodi, CA 95240.

A "Beginner's Course in Model Rocketry," sponsored by the Central YMCA in Springfield, Ohio was held during the summer months. The five-week course, open to boys between the ages of 9 and 15, included sessions on model rocket safety, flight, tracking, and recovery.

On June 26 and 27, 1971 the 4th Hawaii Statewide Model Rocket Meet, sponsored by Cyril's Hobby Shop, was held. The contest was flown from Kapiolani Park, adjacent to Diamond Head Crater and the Honolulu Zoo. The first event flown was Eggloft, which only had one entry, won by Alfred Seita with a 295 foot flight on his Estes Scrambler. Alfred Seita also took first place in the Pee Wee Payload event flying a modified Sprint. In the Scale Altitude event, limited to V-2 models, Nelson Ho took first with an Estes V-2. Dennis Gorong placed second in the Scale Altitude flying a Centuri V-2. The fourth event was Class 0 Altitude which was won

by Gerald Kawecka, who served as Range Safety Officer, with a flight to 204 meters.

Sunday's events included Open Spot Landing, which went to Roberta Corla who made to 57 feet from the target in a 10 mph wind. Sparrow B/G, won by Nelson Ho with with 97 seconds on an Estes Falcon, had several good flights. The final event was for "Funny Birds" — the object being to build a stable, un-rocket-like object. Roy Ho took first place with his flying light bulb, while Nelson Ho took second with a flying baseball bat.

Hawaiian rocketeers can contact this club through Nelson Ho, 1641-A-Kaikuahine St., Honolulu, Hawaii 96817.

Model rocketeers in the Culver City, California area have formed the Southland Association of Rocketry, an NAR chartered Section. The club, which launches at the Marine emergency landing field in Fountain Valley, is looking for new members of junior high school age as well as an adult supervisor. Interested rocketeers can contact the club through Rich Groseberg at 553-9709.

The *Worchester Sunday Telegram* featured a story on model rockets, complete with a front page color photograph, in their "Feature Parade" section on July 11, 1971. The article reported on the activities of the 80 member club at the Shrewsbury High School near Worchester, Massachusetts. The club has a launching session every two weeks, and held a special demonstration launching for *Telegram* reporter Michael Pollack.

Gerry Fornes and David Fornes are forming a model rocket club in Columbus, Ohio. Interested rocketeers should contact Gerry Fornes, 1405 Kelton Ave., Columbus, Ohio 43206.

Send your club or section newsletters, contest announcements and results, and other news for this column to:

Club News Editor
Model Rocketry Magazine
P.O. Box 214
Astor St. Station
Boston, Mass. 02123

(NARAM-13 R&D Summaries, cont.)

Flashbulb Cluster Ignition BY JOHN LANGFORD
To increase the reliability of cluster ignition, AG-1 flashbulbs were used to ignite a Centuri Sure-Shot wick in each engine of the cluster. The Sure-Shot wick is inserted into each engine, an AG-1 flashbulb or an AG-1B bulb is pushed into the nozzle, and both are taped in place. All flashbulb leads are hooked up in parallel, and a pulse of current is applied to ignite the entire assembly. On clusters of 1 to 6 engines, six volts is sufficient for ignition, while twelve volts should be used for larger clusters. During the test period 63 engines were ignited in clusters, including one 15 engine cluster, with no failures.

The Open Door Ejection System BY HAROLD MAYES
The Open Door Ejection System uses a trap door in the side of the rocket through which the parachute is ejected. Using this deployment system the rocket remains in one piece, and the shock cord can be attached to lower it tail first thus preventing damage to fragile payloads.

Internal Ballistic Parameters of C6 Series Engine BY TRIP BARBER
Measurement of the exhaust temperature of a C6 engine (using a platinum-rhodium thermocouple), combined with accepted processes for the combustion, and manufacturer's published specification on the engine characteristics allowed direct calculation of the engine internal parameters. These calculations result in the following values during sustaining thrust: Effective Exhaust Velocity = 2830 ft/sec, Burning Rate = 0.98 in/sec, Exit Temperature = 2760 °R, Chamber Pressure = 136 psia.

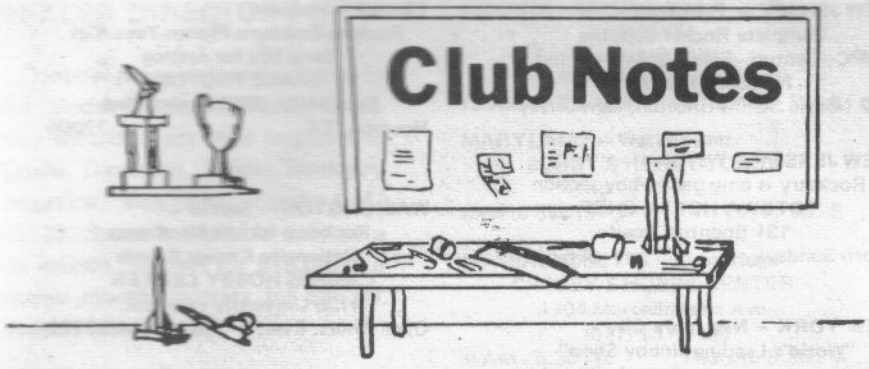
Model Rocket Flight Simulation BY BRIAN BEARD
An analog computer program was developed to allow flight simulation of model rocket performance including time variations of thrust and mass. The flight of an Estes Alpha III weighing 50 grams and powered by an A8 engine was analyzed with the following results:

Maximum Acceleration	= 35.5 g's
Maximum Velocity	= 63 m/sec
Altitude	= 125 meters

The effect of engine variations (due to manufacturing tolerances) was also studied with the conclusion that "altitude prediction as a competition event, as well as all altitude events, is pretty much luck in getting the right engine."

A Multiplexed Transmitter for a Model Rocket BY CHRISTOPHER WILLIAMS
A three channel multiplexed transmitter, accepting variable resistance sensors having resistances between 0 and 10K ohms, with a range of ¾ mile on Citizens Band was developed. The transmitter uses two integrated circuits and two transistors. The integrated circuits (a Motorola MC789P hex inverter and a HEP 580 dual two input gate) form the multiplexer-modulator. Three voltage controlled oscillators (VCO), with base frequencies of 15 Hz, 400 Hz, and 1500 Hz, are modulated by the sensor outputs. The multiplexer switches from one VCO to another at a rate controlled by the low frequency VCO. This signal is fed to the CB transmitter.

Thrust Augmentation by Freon Injection BY CARL GUERNSEY
A spent engine casing, epoxied to the live casing, was used as an injection chamber to add liquid Freon to the exhaust. By injection of liquid Freon, the performance (total impulse) of a C-engine was increased by 50 to 130%. It was also indicated that there is an optimal Freon flow rate for maximum thrust increase.



The Second Annual Ocean Shores Invitational attracted participation from four clubs in the Northwest — the South Seattle Rocket Society (Seattle, Washington), Kent Kondors (Kent, Washington), Columbia Model Rocket Club (Vancouver, Washington), and Burnaby Model Rocket Club (Burnaby, Canada). The opening event, flown on July 31, was Robin Eggloft. With a fantastic track closing rate of 37 out of 38 models flown, Don Beadle captured first place with 187 meters. Don flew a streamlined model from a closed breech launcher to a 22 meter victory over Ed Melvin who was tracked to 165 meters. In Class II Streamer Duration Terry Medina edged out Steve Bainbridge with a 54.4 second duration.

Sunday's flying opened with the Class I Parachute Duration contest, an event won by Rick Meikle with an impressive 430.5 second flight. In Sparrow B/G, the only event won by the Seniors, Don Resor topped the field with a 163.2 second duration. The final event, Spot Landing, went to Keith Beedle, with a 22' 4" distance from the mark. Overall Don Beadle of SSRS took first in Junior, Steve Bainbridge also of SSRS finished first in Senior, and to make it a clean sweep the South Seattle Rocket Society won the club championship at the meet.

(From *The Modroc Flyer*, SSRS Newsletter)

On May 8-9, 1971, the two Pittsburgh NAR Sections — Three Rivers and Steel City — jointly sponsored a regional contest, PghRANG-71, which attracted 37 contestants from New York, New Jersey, Ohio, and Kentucky. The contest opened on a cold, windy Saturday morning, with Open Spot Landing the first event on the schedule. Mike Thomas captured first place with 21' 2" while Mike Thomas was second with 27' 8". Next was Robin Eggloft with some noteworthy prangs including one by Jon Randolph which impacted right in front of the flight card table — and several good flights. The Fox Team topped the field with a 448' flight. Design Efficiency, won by Jon Randolph with 73.8 m/nt.-sec., and Drag Efficiency, which Jon also won with 621.6', were also flown on Saturday. Eagle B/G, scheduled for Saturday, was postponed until Sunday because of the high winds.

Sunday's weather was more promising, and Eagle B/G was the first event flown. Though many of the flights left something (performance?) to be desired, Tom Waellett turned in a 4:41 flight with a typical parasite. In the Class 0 PD there was only one outstanding performance — a 1:47.8 duration by Fred Long. The Sparrow R/G event, which saw quite a few variable geometry and CG shift attempts, was won by Jon Robbins flying a Ground Hog to an 87 second duration. In Scale and Super Scale it was a Cleveland triumph, with Brian Dolezal and Jon Randolph capturing first place, in Junior and Senior respectively, in both events.

(From *Contrails,* Three Rivers newsletter.)

The latest issue of Modroc, newsletter of the St. Francis (Wisconsin) Jaycees Junior Rocket Program reports the results of the club's experimental *Cineroc* project. The first flight, on June 10th, carried the club *Cineroc* to 465 feet on a single-stage, D13-5 powered Omega, the booster was recovered effortlessly, but club members had to chase the *Cineroc* three blocks from their Greene Park launch site to recover it. The second flight, to 895 feet, was a two-stage, D13-0, D13-5 powered Omega. The Cineroc was recovered a half mile from its Warnimont Park launch site. Both *Cineroc* films were shown to club members at a regular meeting.

The Wilmington Rocket Society, organized ten years ago in 1961, plans to charter as an NAR section this year. The club has held three demonstration launches during the summer, and plans are underway for the Cape Fear Area Meet, scheduled for 1972. Interested rocketeers should contact Giles Almond, 7 Holland Drive, Castle Hayne, North Carolina, 28429.

A new model rocket club is being organized in Tulsa, Oklahoma. Interested rocketeers should contact Allen Monchil, 6019 E. 57th St., Tulsa, Oklahoma 74135.

Results of SPAM-4, an area meet hosted by the New Canaan (Conn.) YMCA Space Pioneers, are reported in the latest issue of *Emanon.* Overall Scale winner was John Drake, who received 885 scale points for his Astrobee D model. In Pee Wee Payload John Drake again placed first with 220 meters. The Englund Team topped the Robin Eggloft field with a flight to 169 meters. In Predicted Altitude Arnold Jacobsen took first with an error of only 1.6%. Eagle Boost Glide, a new event for the Space Pioneers, was won by Greg Scinto with a duration of 89 seconds. The final event, Sparrow Rocket/Glider, was won by the Englund Team with a 114 second duration.

A new club is being formed in Irving, Texas. Interested rocketeers should contact Mike Bailey, 1413 Fulton Drive, Irving, TX 75060.

The North Arlington Association of Rocketry in Arlington, Virginia is looking for new members. The club holds weekly meetings and biweekly launches. Presently the club has 10 members, and plans a competition launch. Interested rocketeers should contact Frederick Lawler, 703 North Jackson St., Arlington, VA 22201.

A new NAR Chartered Section has been formed in the Oklahoma City area. The name of the section is the Oklahoma Model Rocket Society. Interested people please contact Mike Clay, 4609 N.W. 35th, Oklahoma City, OK 73122.

Rocketeers in the Southeast Missouri area interested in forming an NAR section, should contact Jeffery Estes, Route 1 Box 40, Marble Hill, MO 63764.

Bob Ziegler is attempting to organize a model rocket club in the Northern Cambell County Kentucky area. Interested rocketeers can contact him by writing to 29 Woodlawn Terrace, Woodlawn, KN 41071.

Frank Petronio is attempting to form an NAR section in Orleans County, New York. Interested rocketeers are invited to contact him at: 13043 Presbyterian Rd. (RD No. 4), Albion, NY 14411.

Members of the Broward County Model Rocket Association of Fort Lauderdale, Florida journeyed to Titusville to witness the liftoff of Apollo 15. The group established a campsite about 12 miles from the Complex 39 launch site. Located in a campsite with many non-rocketeers, the BCMRA members used the opportunity to hold a model rocket demonstration including the launching of another of Jim Bunce's underwater models.

A model rocket club is being formed in Rancocas Woods, New Jersey. Any rocketeers in Burlington County interested in more information should write Jerry Cannata, 8 Evergreen Rd., Rancocas Woods, Mt. Holly, New Jersey 08060.

The Winter Park Aeronautics and Space Society has scheduled the Central Florida Area Meet, open to all rocketeers in the state of Florida, for October 30, 1971. Events to be flown are Pigeon Eggloft, Sparrow B/G, Open Spot Landing, and Class 1 Streamer Duration. Interested rocketeers should contact Harold Downing, 2840 Cady Way, Winter Park, Fla. 32789 for more details.

The Salem, Massachusetts Squadron of the Civil Air Patrol invites any Greater Lynn Area rocketeers to join the CAP Model Rocket Squadron. Contact MSGT Kendall Johnson, CAP Salem Squadron, USNRTC, Derby St., Salem, Mass. 01970.

The Vikings Rocket Society of Richmond, Virginia has announced their Central Area Rocketry Meet, open to all NAR members in the state of Virginia. The meet, to be held

(Continued on pg 46)

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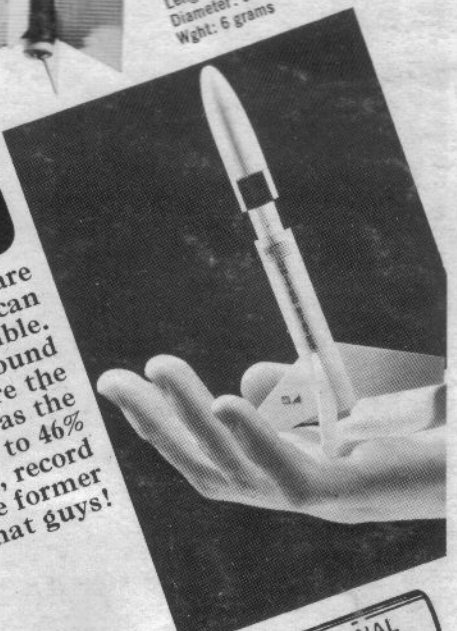

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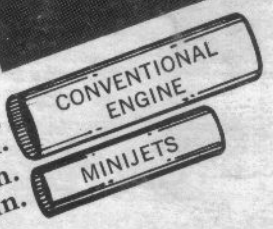

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