MODEL ROCKET NEWS

Vol. 11, No. 2
JUNE 1971

THE MINI-BRUTES ARE HERE !

Read all about the "Little Birds with the big POWER" on page 12.

NOTES FROM THE BOSS

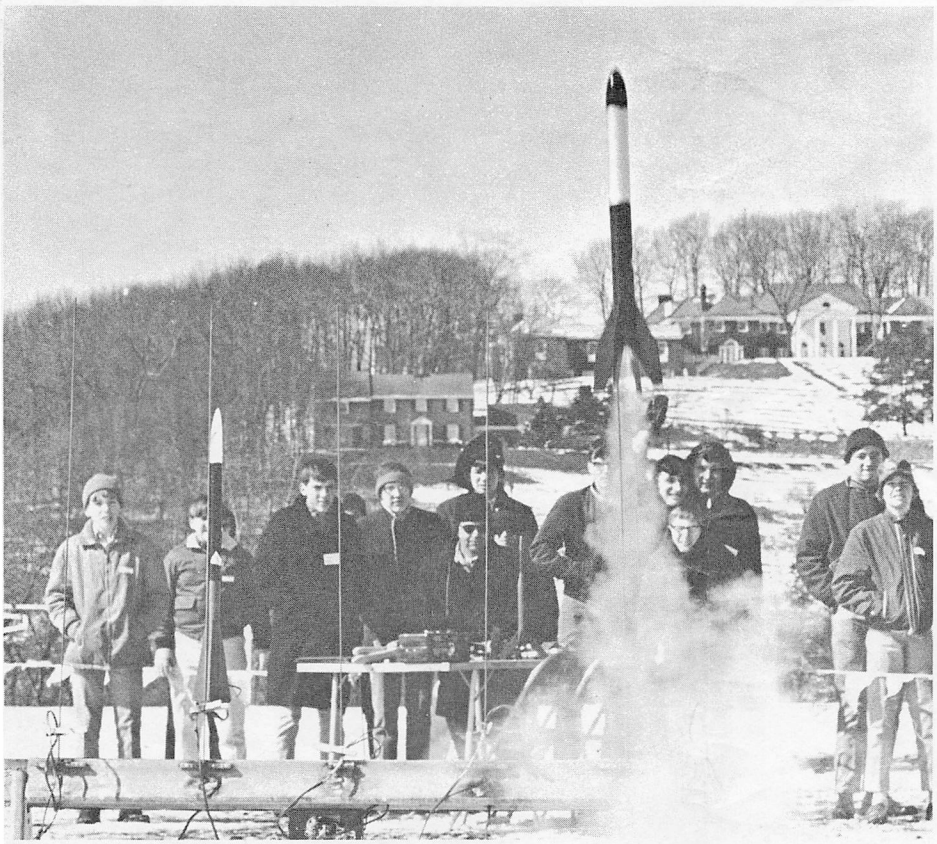
What's so great about a mosquito? Well, if you're talking about one of those tiny insects with the big bite that insist on trying to eat you up while you're out at the launch pad, there is nothing great about them (except their quantity).

However, if you're talking about the new MINI-BRUTE rocket named the *Mosquito,* it's the greatest thing since peanut butter. It's the tiny bird on the cover of this MRN, and it's the smallest rocket in the brand new MINI-BRUTE line we are introducing this month. (Read all about this great new line on the back page.) Just under 4 inches long, this little guy can almost fit in your shirt pocket - although we don't advise carrying rockets that way. We think that you will have lots of fun flying the *Mosquito* and the other two MINI-BRUTES, the *Screamer* and the *Mini Bertha,* with the new ESTES "T" Series engines that give you BIG power for their size. And I bet your friends' eyes will nearly pop out when your Altiscope shows those far out altitudes.

With the new MINI-BRUTE line, ESTES Industries now has over sixty model rockets to offer, plus all the supplies you need to fully enjoy your favorite hobby with your family or your friends. That's quite a jump from the first ESTES rocket, the *Scout,* which we designed back in 1960. As you know, the Scout is still around and still a very popular rocket. But in the past eleven years our Research and Development team -- helped by your suggestions and comments -- has worked hard to create for you a wide choice of birds and accessories that would answer your favorite question, "What's new in model rocketry?" The *Mars Lander,* the *Orbital Transport,* the *Sprint,* the *Falcon,* the *Cherokee-D,* the *Omega,* the *Interceptor,* the *Camroc,* the *CINEROC,* and the *TRANSROC* - all these are examples of the fascinating possibilities in model rocketry. You can be sure that we have many more exciting designs on the drawing board!

Speaking of all the things that have happened here at ESTES in the past, I just realized that we have been in Penrose, the *"Model Rocket Capital of the World,"* since August 1961. Ten years! I can hardly believe it! It seems it was only yesterday that my wife, Gleda, and I moved from Denver and started our operation in a tiny frame building with just two people to help us. Along the years, the support of our customers, their confidence in our products, and their loyalty have helped us grow not only in size but also in the ability to serve all of you model rocketeers better. I am really looking forward to the next ten years - and I hope it is just as much fun!

Vern



Active participation in model rocket meets such as the one shown in this photograph (taken at Pittsburgh) is one of the advantages of belonging to a club. And there is much more, as Dane Boles tells you on Pages 8 and 9.

D.O.M. WINNERS

First place winners in the Estes Design of the Month contest are:

In September (two winners), Jim Matheny, Minneapolis, Minnesota (Jules Verne's 1865 Moon Express); and Richard J. Rynearson, College Station, Texas ("Effort III" design efficiency model).

In October, H.L. Stephens, Philadelphia, Pennsylvania (Installing engine mounts in odd size tubes).

In November, Michael H. Okuda, Honolulu, Hawaii (Apollo launch escape system model).

Each first place winner is entitled to a $50.00 Estes award.

MODEL ROCKET NEWS

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The MODEL ROCKET NEWS is published by Estes Industries, Inc., Penrose, Colorado. This publication is written for America's model rocketeers to promote safe youth rocketry, distribute current technical information, and make model rocketry more enjoyable and educational. Current issues of the MRN are distributed free of charge to all active Estes customers.

Vernon Estes----------Publisher
Frank Genty----------Editor

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PRECISION BUILDING TIPS

by Larry Renger,
Estes Project Engineer

This article is designed to help the rocketeer who is ready to do some serious building. He has put together and flown a few kits. Now he wants to precision-build and super-finish to get top performance and looks.

Attitude is the main thing--you can build as well as your patience will allow. Taking a little extra time and effort will result in a well-constructed model that will last longer.

One good way to gain patience, I have found, is to construct two or more models at once. There is always something to work on while parts dry.

Materials come next. Basics in model rocketry are: paper or mylar tubes, balsa wood, cardboard, plastic, glue, and paint.

Paper and mylar tubes require little comment, except that a gummed paper is needed to glue anything to mylar. (See Page 64 of 1971 Estes catalog.)

Being a natural rather than man-made product, balsa wood varies a lot in its properties such as hardness, weight, and cut. Test hardness by nicking the wood with your thumbnail. To check weight accurately, weigh each block or sheet and calculate the volume:

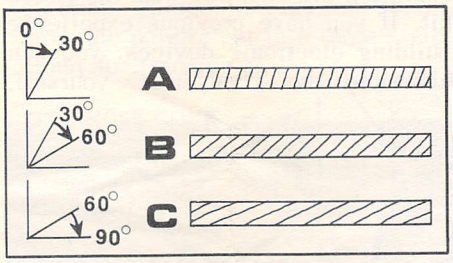
$$Density = \frac{weight \text{ (in oz.)}}{length \times width \times height \text{ (in in.}^3\text{)}}$$

Balsa density ranges are as follows: light--0.028 oz./cu. in. to 0.056 oz./cu. in.; medium--0.056 oz./cu. in. to 0.093 oz./cu. in.; heavy--0.093 oz./cu. in. to 0.140 oz./cu. in. Heavier wood is usually stronger and harder.

Heavy wood can be vital for use in nose cones where stability is critical, and light wood is ideal for thick cross-section wings and fins. Medium balsa is easily worked for close tolerance and general use.

The cut of wood refers to the direction in which the sheet of wood was cut from the tree. Make a clean cut into the end of a sheet with a sharp knife. Look at the grain on the end. There are many small parallel lines.

The following drawing illustrates classification of balsa by grain direction.



In use, A grain is for blocks, strips, and in sheets where the wood is to be bent, or for bulkheads, spars, and the like. B grain is good for general use, such as fins or spars. C grain has the greatest resistance to both bending across the sheet and warping. It's almost a must for boost glider wings and great for fins on altitude models.

Glue types are: white, acetate or "model airplane" cement, and styrene or "plastic" cement. White glue is superb for basic construction on porous materials like balsa, paper, and cardboard. Acetate cement sets fast for field repairs and detail parts on scale models. You need styrene cement for plastic joints and for joining plastic to wood or paper.

On porous surfaces always rub a coat of glue onto the surface and let it dry. Then apply a second coat and join the parts. Do not pre-coat the plastic surface when joining wood and plastic.

Styrene and plastic cements are of two basic types. One, usually sold in tubes, is styrene plastic dissolved in a solvent. This is necessary for wood-plastic joints where the glue must penetrate the porous material. The other type, usually bottled, is strictly a solvent. It joins two plastic surfaces by causing them to melt and then re-harden together. When used sparingly, it makes clean joints.

Enamel, lacquer (butyrate dope), and epoxy are the three basic paints. To be safe, never coat one type of paint over another--except that filler coat is a lacquer and may be used under (and only under) any of the three paints. Give the paint 24 hours to dry or set between coats unless the instructions state otherwise. The time for paint to be "touch dry" is much less than the actual time to set.

Last, but not least, are the tools. Let me say that whenever I ran into a difficult job, it was usually due to the lack of proper tools. For model rockets, you need fewer basic tools than for many other hobbies. A good sharp knife, such as the X-acto #1 handle with #11 blade, a sanding block, several grades of sandpaper, and a paint brush are real basics.

Actually, almost anything can be useful--your budget is the limit. Try to buy tools on a use-priority basis, that is, the most used tools first, then work toward the less used. You can build great models with the simplest tools. More tools just make it easier.

Patience, close attention to details, and the use of proper tools will help you build a model rocket that will perform beautifully and last much longer than a model that is just slapped together as you hurry along and is sloppily finished.

TRANSROC

Estes opens a whole new world in model rocketry

"Hey, this is GREAT!" Can't you just hear your friends when you fly your model rocket with the Estes TRANSROC--the latest in miniature Space Age electronics? You'll have lots of fun, too, becoming an expert with this multi-purpose transmitter that will literally transform your model into a "talking bird."

You can start by using the TRANSROC as a rocket finder--its most basic mode--to retrieve lost birds using your walkie-talkie. Then as the TRANSROC bug bites you, you can add sophisticated Estes TRANSROC accessories that will bring you even closer to being a real space scientist.

The TRANSROC is just over four inches long and fits neatly in a BT-50 paper body tube (or PST-50 FJ clear plastic body tube), and can easily be adapted to larger rockets. It is powered by a 15-volt battery with a life of up to 24 hours and transmits on any of the 23 channels in the 27 Megahertz (megacycle) Citizens Band which you specify. Normally, the crystal supplied will be Channel 11 or Channel 14 to match the walkie-talkie units available from Estes. No FCC license is required to operate the TRANSROC.

Detailed and thoroughly illustrated instructions on assembly, theory, and operation are supplied with the Estes kit. If you have previous experience building electronic devices, you can assemble the TRANSROC yourself. If not, you may prefer to purchase a pre-built TRANSROC.

In its basic rocket-finder mode, the TRANSROC emits a "beep" which, depending upon the level of interference present and the sensitivity of the receiver used, can be picked up at distances of up to five miles or more during flight and up to a few hundred yards after landing.

Once you have mastered the operation of the basic TRANSROC transmitter, you are ready to add any of the accessories that will give you many hours of educational enjoyment. You become highly involved in the flight as you listen to your rocket send data back to its own "Mission Control" on the ground.

Using the transmitter's printed circuit board, you can, for instance, add a miniature microphone and record in sequence from your receiver the sounds from on board the rocket: countdown, lift-off, coasting, parachute ejection, descent, and landing. Playing the recording back at your next club meeting will make a hit.

Another accessory for the TRANSROC is a spin-rate sensor that tells you how fast your rocket is spinning as it streaks upward. There is also a temperature telemetering kit.

The TRANSROC possibilities are not limited, however, to the Estes accessories. Let your imagination run free! Designing and building your own telemetering components for use with the TRANSROC can give you an even greater feeling of achievement in the ever expanding field of model rocketry.

(Write for your free Estes Rocketronics Catalog.)

Jo Angel, a member of the Estes Rocketeer Communications Department staff, is shown placing a TRANSROC (in the microphone mode) in the payload compartment of a rocket. Hole in payload section is for tuning antenna-matching coil.

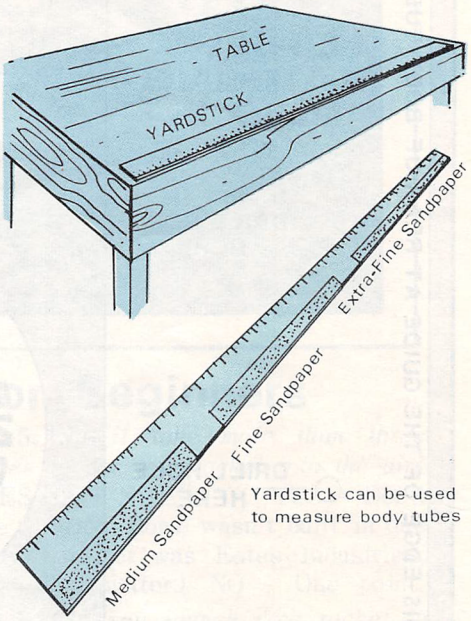
CONTRIBUTORS WANTED

Win an Estes merchandise certificate! Send articles (or article outlines) and/or photographs to Model Rocket News for possible publication. Address the material to: Editor, MRN, Estes Industries, P.O. Box 227, Penrose, Colorado 81240.

THE IDEA BOX

HINTS FOR YOUR WORK TABLE

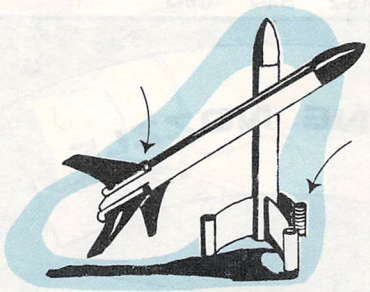
Wyatt Stahl of Flandreau, S.D., deserves a hand for this helpful bit of information. Fasten a yardstick to your rocket-building work table. Glue pieces of sandpaper to the yard stick. You now have a multi-purpose tool to assist you with your hobby, a straight edge for measuring and a sanding area for sanding root area of fins flat and other uses.



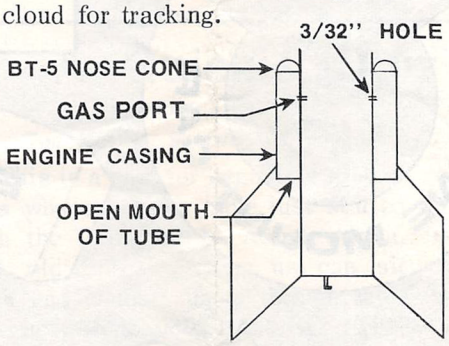
CUSTOMIZING YOUR ROCKET

This helpful hint comes from Frank Bennett of Panarama Ct., McLean, Va.

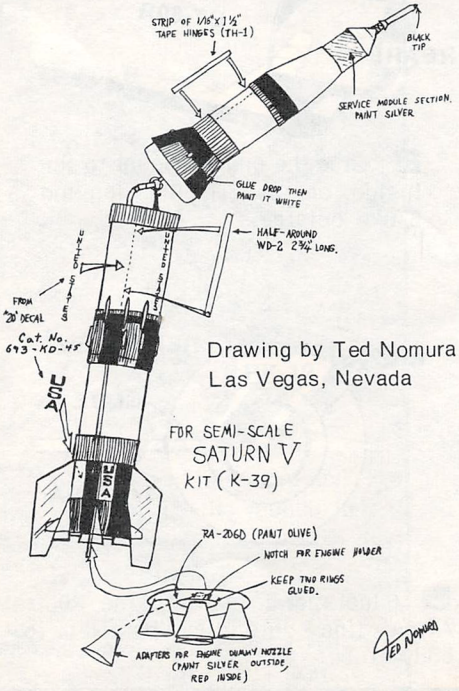
Frank suggests that you use your old rocket engines to customize your rockets. They really make great Jet Pods.



If you really want to add realism to your models, use the pods as tracking devices. Wrap a small amount of talcum powder in a Kleenex and place in the empty engine casing. When the ejection charge is ignited it will blow the powder out in a large visible cloud for tracking.



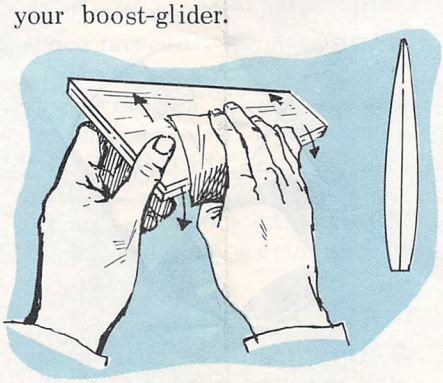
SUPER DETAIL



Drawing by Ted Nomura
Las Vegas, Nevada

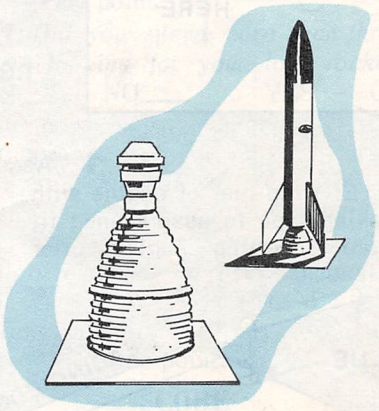
SANDING TIPS

When sanding fins on rockets that have an airfoil, its easier to hold the two wings together back to back, sanding the two wings at the same time. This gives you a complete airfoil, and your parts will be more uniform, thus improving stability in your boost-glider.



This hint was given to us by Carl Van Camp of Lansing, Mich.

DISPLAY STAND



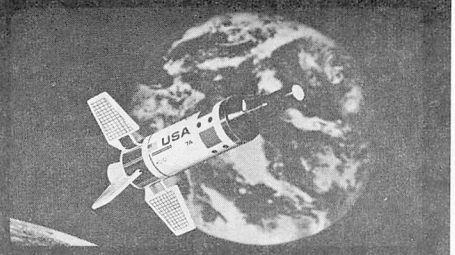
With little effort, you can have an attractive and inexpensive display stand, says John A. Wilkins of Chinchilla, Penn. Glue the nozzle from 1/100 scale Saturn V to a 2''x2'' square piece of cardboard and insert in the engine tube of your rocket. (Catalog number S0-1, $.90 each)

Estes Industries Rocket Plan No. 73

ORBITAL TRANSPORT LABORATORY OTL-7A

by Ted Nomura Las Vegas, Nevada

JUNE 1971 DESIGN OF THE MONTH WINNER



PLACE THIS EDGE OF THE GUIDE AT REAR OF BODY TUBE

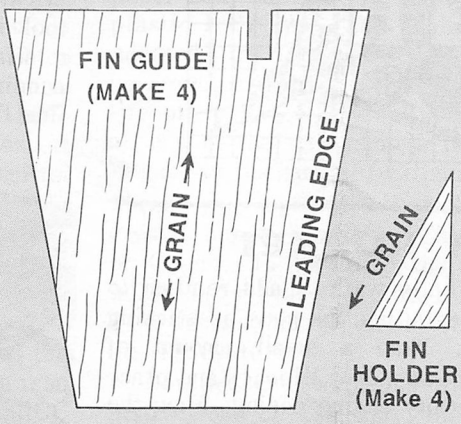
DRILL HOLE HERE

DRILL MARKING GUIDE

DRILL HOLE HERE

DRILL HOLE HERE

DRILL HOLE HERE



FIN HOLDER (Make 4)

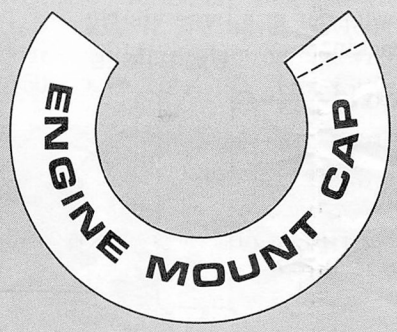
PARTS LIST

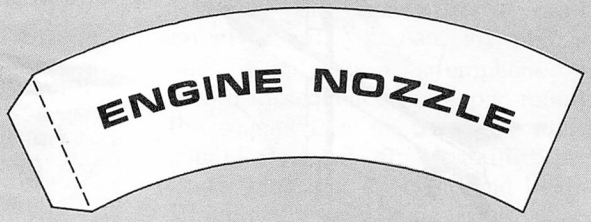
1	NOSE CONE	BNC-60AB
1	BODY TUBE 2.75''	BT-20J
1	BODY TUBE 5''	BT-60R
1	ENGINE BLOCK	EB-20A
3	CENTERING RINGS	RA-2060
1	CENTERING RING	AR-2050
1	BALSA SHEET	BFS-40
1	LAUNCH LUG	LL-2B
1	DOWEL 1/8''	WD-1
1	PARACHUTE KIT	PK-12
1	SCREW EYE	SE-1
1	SHOCK CORD	SC-1
1	NOSE CONE WEIGHT	NCW-1

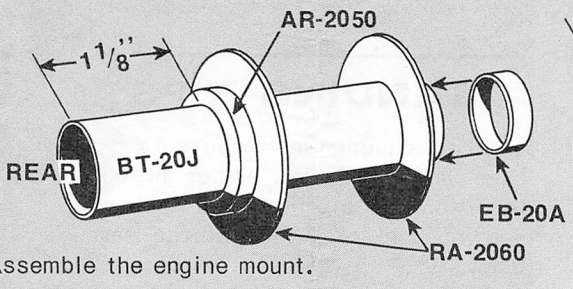
In addition to the parts listed above, you will also need a modeling knife, white glue, sandpaper, a brush and paints, sanding sealer, and a postcard.

RECOMMENDED ENGINES

A5-2 B4-2 C6-3

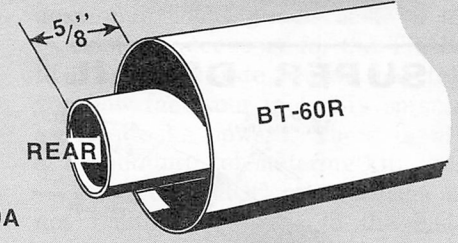




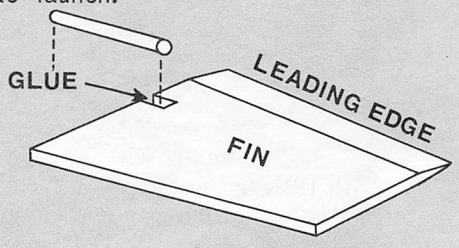


1 Assemble the engine mount.

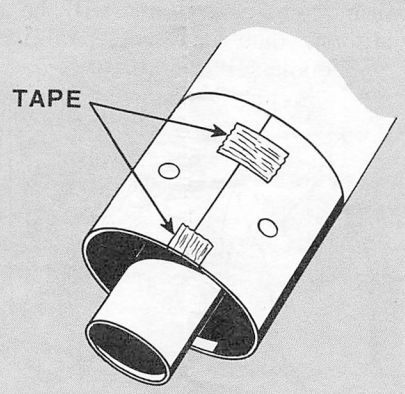
NOTE: Wrap rear of engine with masking tape to assure snug fit before inserting engine prior to launch.



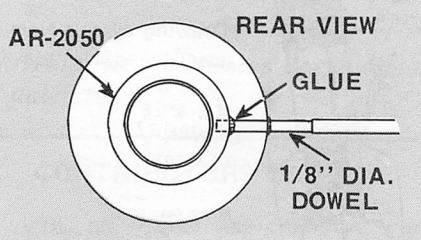
2 Glue the engine mount to the inside of the BT-60R, leaving 5/8'' outside.



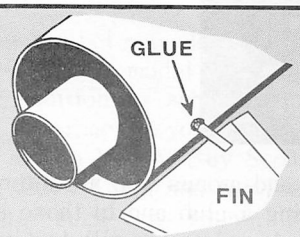
3 Cut four 1'' long dowels from WD-1 and glue to the fins. Sand the fins to the shape as shown.



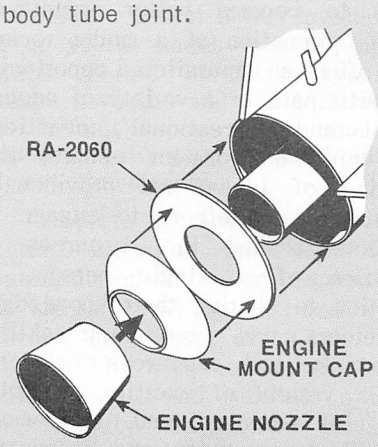
4 Drill four 1/8'' dia. holes into body tube and AR-2050 ring by using the guide.



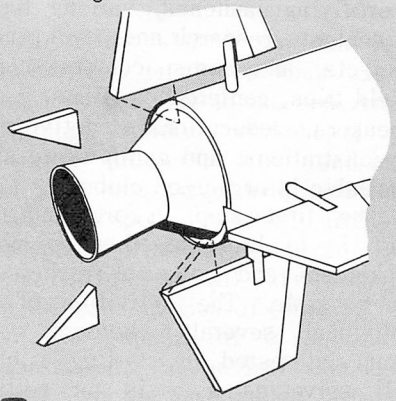
5 Glue the dowel into the 2050. Align fins carefully, parallel to body tube.



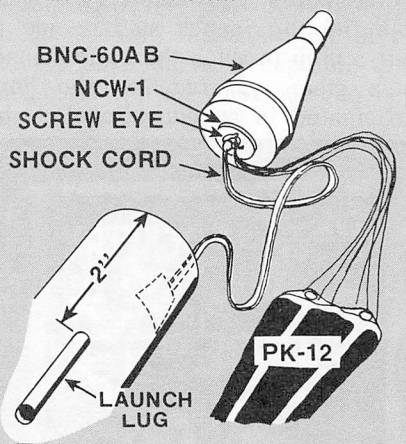
6 Apply glue fillet to dowel-body tube joint.



7 Assemble and glue the rear engine mount as shown.



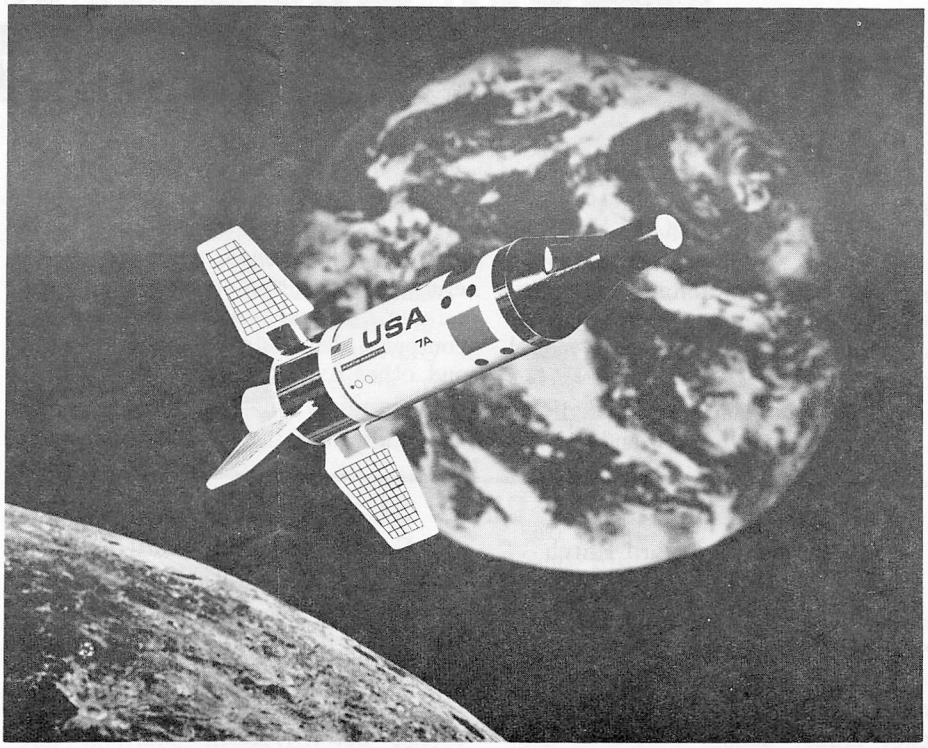
8 Glue the four small fin holders as shown.



9 Assemble the recovery system and glue the launch lug.

PAINTING

BODY .....WHITE OR SILVER
NOSE CONE ..... RED OR SILVER
FINS.....BLUE WITH THIN SILVER LINES



A Quickie Quiz for Beginners

by

Ted Kelley, Sherwood, Oregon

This is a quiz for beginning rocketeers whose careers have just started with the flying of the Astron Alpha. The old "pros" among us can sit back and chuckle about this in their old age. POSSIBLE SCORE: TEN POINTS.

1. *Did you try to explain model rocketry to your sister?* YES___ NO___ YES - If you were successful, score one point. NO - Congratulations. Two points.

2. *When painting your rocket, did you apply any dope to your beautiful enamel finish, causing the paint to smear all over?* YES___ NO___ YES - Don't worry. You're still in the space race. NO - Score one point.

3. *Did you prepare your rocket in advance or did you put in the engine, 'chute, and wadding at the launch pad?* PRELOADED___ LOADED AT PAD___ PRELOADED - You did a good thing. Two points. LOADED AT PAD - Did your spectators have a nice wait?

4. *Did your first ignition wire merely fizz?* YES___ NO___ YES - Don't get shook. Just follow directions more closely. NO - One point.

5. *Did it take more than three tries to get your rocket into the air?* YES___ NO___ . YES - Don't be alarmed--Rome wasn't built in one day. (Neither was Estes Industries, for that matter.) NO - One point.

6. *Did you launch your rocket in high wind, despite all warnings?* YES___ NO___ . YES - Don't sweat about it. All beginners do it. NO - One point.

7. *Did you spend more than three hours looking for your lost rocket?* YES___ NO___ . YES - Oh, come now! Nobody does that! NO - One point.

8. *Did you get so excited on the first flight that you forgot to pull the key out of your launcher, causing the batteries to wear down?* YES___ NO___ . YES - You'd better watch out--this is only excusable once. NO - One point.

SCORE

9 to 10. You cheated. Start all over and tell the truth.

6 to 8. You have great foresight and a great future.

3 to 5. Watch it! Your future is in danger.

0 to 2. Read the Technical Section of your Estes catalog and start all over.

"CLUB COUNTDOWN"

by Dane Boles, Estes Director of Rocketeer Communications

WHY FORM A CLUB?

Model rocketry is the world's fastest growing hobby. Its popularity has created a tremendous interest in organized model rocketry. Thousands of rocketeers across the nation have joined together to form neighborhood clubs and community model rocket programs.

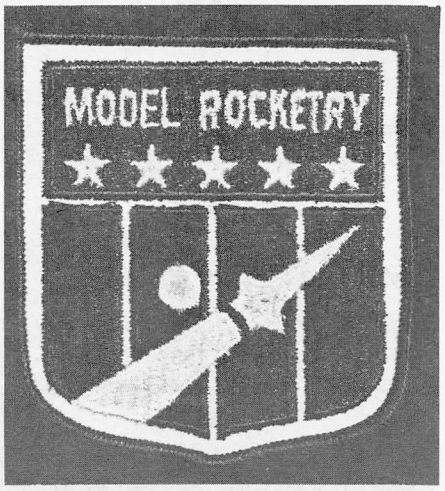
This new column will be dedicated to those individuals and groups who are already taking part or who wish to become involved in the development of a model rocket club. In the coming months "Club Countdown" will discuss such topics as club organization, sponsorship, fundraising, launch sites, workshops, contests, demonstrations, field trips, and other exciting activities.

This first installment of "Club Countdown" is directed to those individuals and groups who are interested in starting a club and to those struggling clubs who are still looking for ways to become better organized.

The formation of a model rocket club offers an unparalleled opportunity to participate in a variety of educational and recreational activities. The club environment permits the sharing of ideas and provides a chance for rocketeers to engage in projects beyond the resources or abilities of a single person. In addition to sharing their knowledge, rocketeers can pool their skills, expertise, and resources to carry out a variety of exciting projects. The club situation tends to promote individual creativity and teamwork.

Potential club activities include sport-flying launches, various types of contests, research and development projects, and aerospace workshops. Field trips, conferences, films, guest speakers, educational activities, demonstrations, and exhibits are also available to organized clubs.

The first step in organizing a club is to bring together as many rocketeers and potential rocketeers as possible. The activities of an individual, several rocketeers, or a group interested in starting a club will serve as a basis for getting people involved in model rocketry. In other words, two rocketeers meeting in a field to launch may decide to start a club in much the same manner as a group of students who have participated in an educational model



Model Rocketry Award Patch

EXCITING CLUB SUPPLIES

Model Rocketry Award Patch

Designed exclusively as a special award patch for outstanding achievement in model rocketry. Done in red, white, and blue with stars and stripes. Excellent for use by model rocket clubs, school programs, Boy Scouts, 4-H, YMCA, CAP, Boys Clubs, and other youth groups and service organizations. It is available for sale only to club advisors, teachers, and youth leaders as a special rocketeer award patch. Price $2.00 (Catalog number AD-3)

Model Rocketry Study Guide, TR-8 (Newly Revised)

This new booklet presents an excellent achievement guide for all model rocketeers. Terrific for clubs who wish to challenge their members with an exciting assignment of model rocket activities. *TR-8* is especially suitable for clubs featuring membership divisions based on model rocket experience. The guide features three sections dealing with such timely topics as basic model rocketry, multi-staging, clustering, engine performance, payload vehicles, scaling, boost gliders, competition, aerial photography, and research and development projects. A project flight record, section tests, and final exam are included to record a rocketeer's achievements and measure his knowledge of model rocketry. An official Expert Rocketeer Award Certificate is available to all rocketeers as they complete the *Model Rocket Study Guide*. *TR-8* provides a complete program for development towards excellence in model rocketry. Price $.75 (Catalog number TR-8)

Guide For Aerospace Clubs (Newly Revised Club Guide)

This new publication is essential for existing model rocket clubs wishing to become better organized and more actively involved in model rocket activities. In addition, this booklet sets forth general guidelines and organizational procedures for the development of a model rocket club and the running of its activities. The guide covers such topics as launch site operations, workshop activities, club funding, special equipment, aerospace presentations, competition, demonstrations, exhibits, field trips, research and development projects, sponsorship, and club advisors. For the best in club organization and the most exciting model rocket activities, follow the *Estes Guide for Aerospace Clubs*. Price $.50 (Catalog number BK-19)

New Multi-Pad Launch System

This is an ideal launch system for schools and clubs. The Multi-Pad features a built in public address system with push-to-talk microphone and powerful outdoor speaker. It is capable of sequentially launching one to six model rockets, and will handle an additional launch rack to increase its capacity to 12 pads. Each launch rack features heavy duty, 360 degree swivel pivots. Control panel includes safety key, pad selector switch, launch button, and continuity and power supply panel lights. This system will operate on any 12-volt car battery. The Multi-Pad is a must for active model rocket clubs, large school programs, and model rocket competition. Price $150.00 (Catalog number MFS-1)

rocket project may decide to start an after-school model rocket club.

In addition to schools and recreation departments, youth organizations such as the YMCA, Boy Scouts, 4-H, CAP, Boys Club, and service organizations such as Lions, Kiwanis, Rotary, and Optimists can be extremely successful in the development of a youth model rocket program. Clubs started by these types of groups have the additional advantage of instant sponsorship and the opportunity to gain an adult advisor almost immediately.

Complete details for club organization including guidelines for a public demonstration and organizational meeting will be featured in the second installment of "Club Countdown". For complete information on how to start and maintain a model rocket club, write to the Rocketeer Communications Department of Estes Industries and request a copy of our new *Guide for Aerospace Clubs*.

All clubs should have at least one advisor. A club advisor can be extremely valuable in the supervision of range safety, workshops, and research projects. His leadership can lend assistance with community relations, special events, arranging aerospace presentations, and field trips. His interest will aid in stimulating the participation of other parents and the support of a sponsoring organization. An advisor can be a parent, recreation leader, teacher, coach, scientist, Scout leader, merchant, or any adult who is willing to assume the responsibility of club advisor and who is acceptable to the members. He does not need to be an expert on rocketry.*

A sponsoring organization for a model rocket club can be of assistance in areas where special resources or supplementary funds are needed and in situations where increased community support or additional manpower is necessary. With the leadership of an adult advisor and the recognition of a sponsoring organization, a model rocket club will quickly receive its community's approval and support. This is especially valuable when publicity is needed for a special event or where model rocketry is still new to the greater part of the community. The following is a brief list of potential sponsors:

CIVIC ORGANIZATIONS

Recreation Department
School
College
University
Chamber of Commerce
Jr. Chamber of Commerce
Fire Department
Police Department
P.T.A.
Social Service
Forestry Department

SERVICE CLUBS

Lions
Optimists
Rotary
Kiwanis
Elks
V.F.W.
Masons
Eagles
Order of the Moose
American Legion
Salvation Army
Sertoma

YOUTH GROUPS

Explorer Scouts
Boy Scouts
Cub Scouts
Big Brothers
Boys Clubs
4-H
Y.M.C.A.
Indian Guides
Church Groups
Girl Scouts
Camp Fire Girls
Boy Scouts of Canada

COMMERCIAL FIRMS

Hobby Shops
Merchants
Aerospace Companies
Corporations

MILITARY AFFILIATIONS

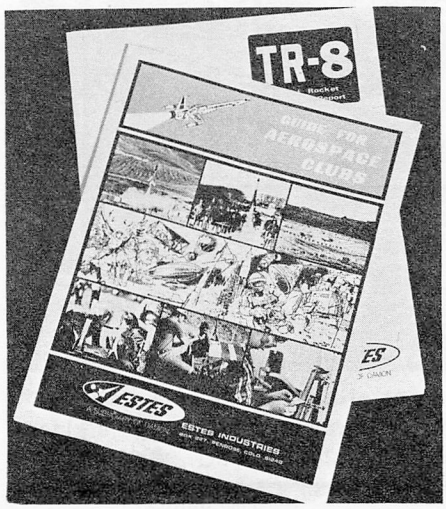
Civil Air Patrol
Special Services
Royal Canadian Air Cadets

If your teacher will write to the Education Department of Estes Industries, we will be happy to send free information about interesting ways to use model rocketry in the classroom.

With the strong interest of its members, with the leadership of an adult advisor, and with the enthusiastic support of a sponsor, a model rocket club will be ready to embark on a variety of exciting activities.

Future club activities to be discussed in "Club Countdown" include the development of range teams and specialty certification programs, aerospace workshops, club newsletters, special R&D projects, challenging contests, and exciting field trips. A good deal of information on various types of model rocket competition will also be featured. Drag Race Elimination, the Boost-Glider Meet, the Quadrathon, the Identical Kit Meet, the Backwards Launch, the Original Design Meet, the All-Comers Competition Launch, and the Funny Meet are just a few. "Club Countdown" will feature activities for both beginning and advanced model rocket clubs.

A model rocket club is where the action is! An organized model rocketry program will involve you and your friends in exciting Space Age experiences. Start a model rocket club today for your neighborhood or community.



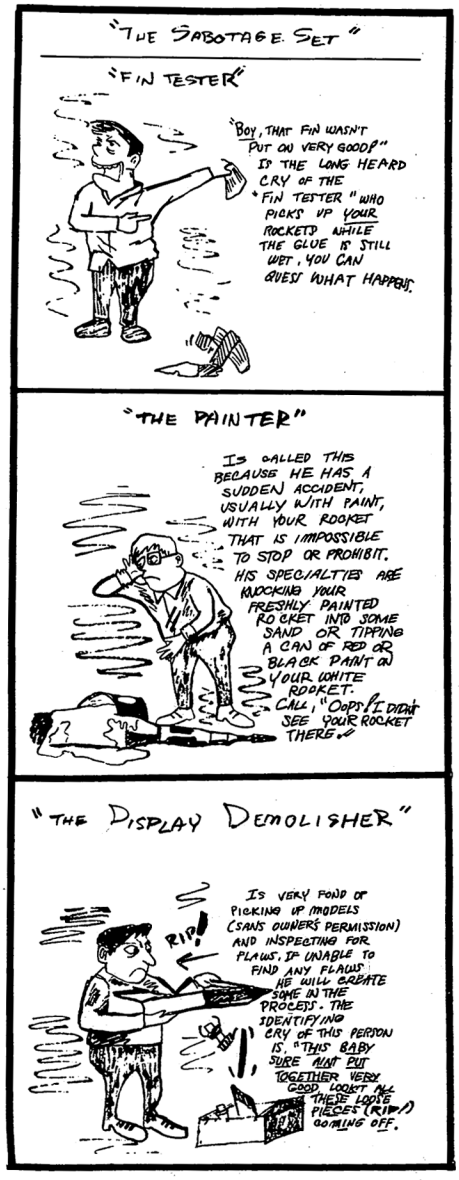
Newly revised TR-8 and Club Guide

Multi-Pad Launch System

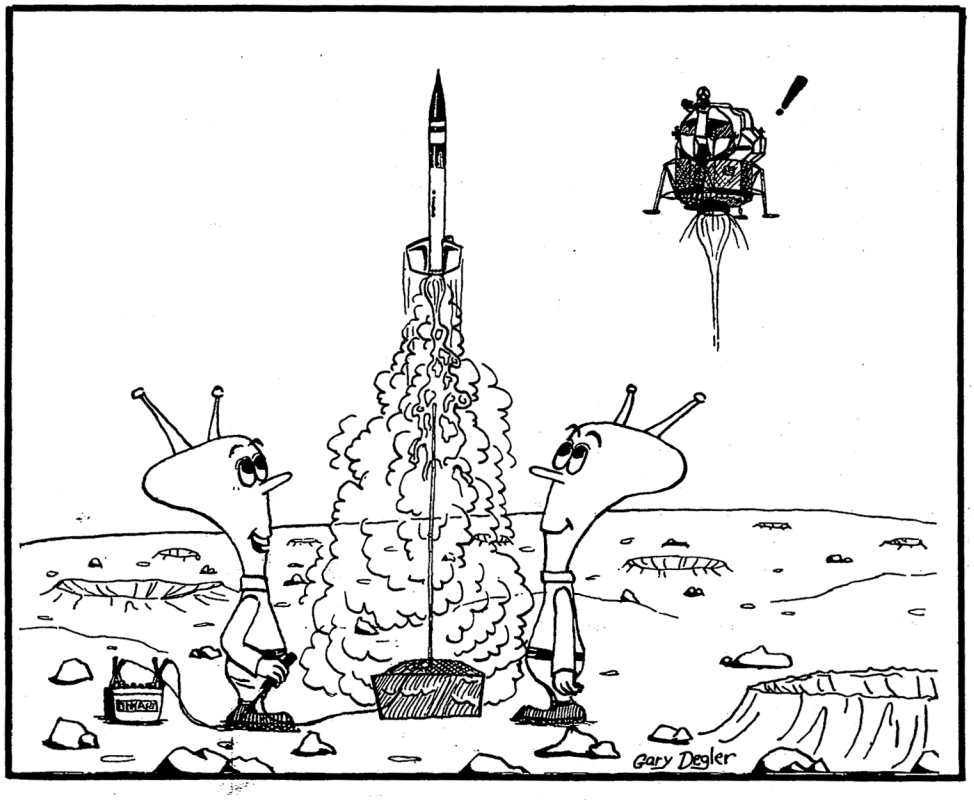
Vol. 11, No. 2

ROCKETOONS

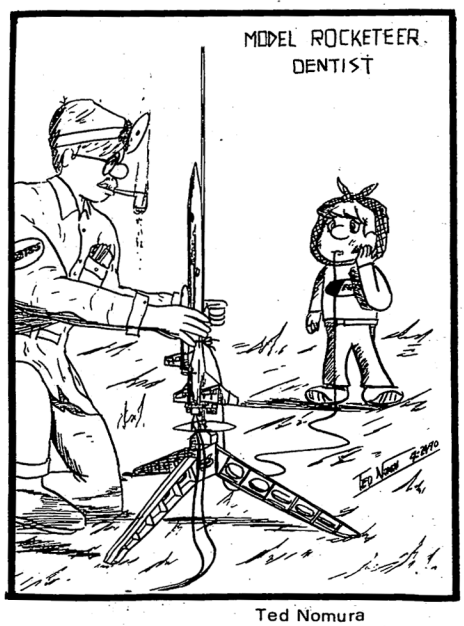
A selection of humorous drawings from MRN readers



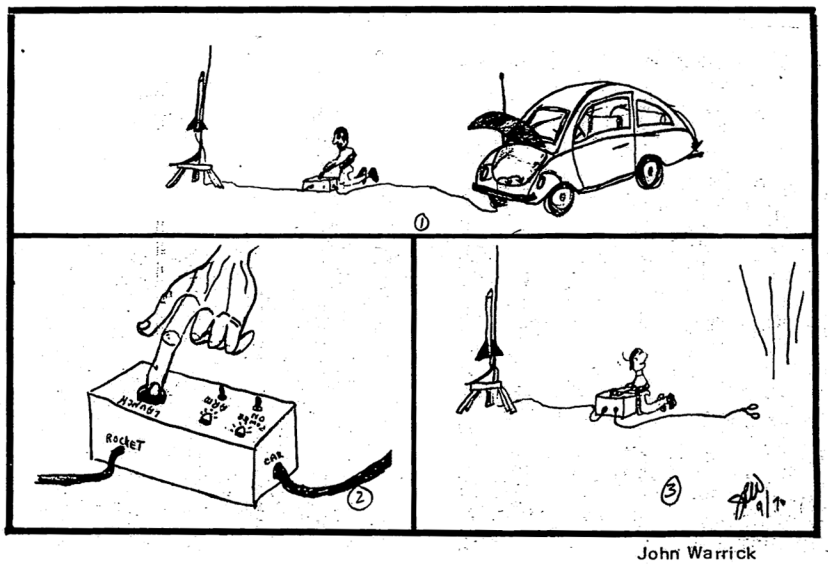
John Hinderliter
Canton, Pa.



Gary Degler
Indianapolis, Ind.



Ted Nomura
Las Vegas, Nev.



John Warrick
Brown Mills, N.J.

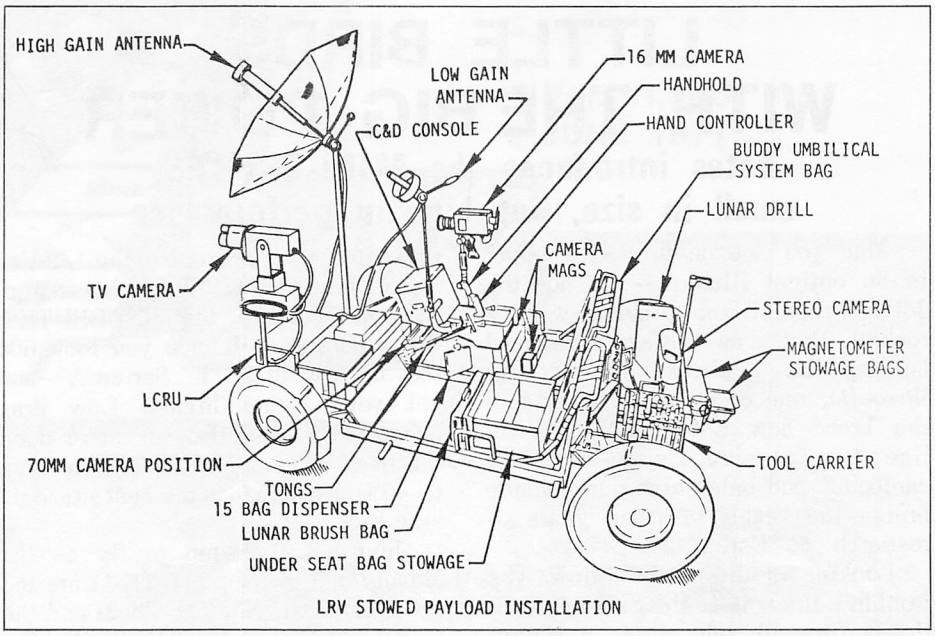
MOON BUGGY

Apollo 15 astronauts will drive their LRV on the lunar surface.

Maybe you have heard a recent radio commercial during which an astronaut reports his progress to Mission Control as he drives his Volkswagen over the lunar surface. Well, truth is closer to fiction than you think. Late in July of this year, two of the Apollo 15 astronauts will be driving on the Moon--although not aboard a VW.

While Command Module Pilot Alfred M. Worden orbits the Moon, Mission Commander David R. Scott and Lunar Module Pilot James B. Irwin will be exploring the Hadley-Apennine lunar plain with their lunar roving vehicle (LRV), a moon buggy that looks pretty much like a king-size electric golf cart and operates on the same principle.

The four-wheel LRV will provide transportation for the two astronauts and their tools, scientific equipment, and lunar samples collected on the Moon. It will be manually operated by one of the astronauts, and the driver will steer the vehicle much as he would on Earth using a hand grip (joy stick) to guide the LRV at variable speeds, forward and reverse.



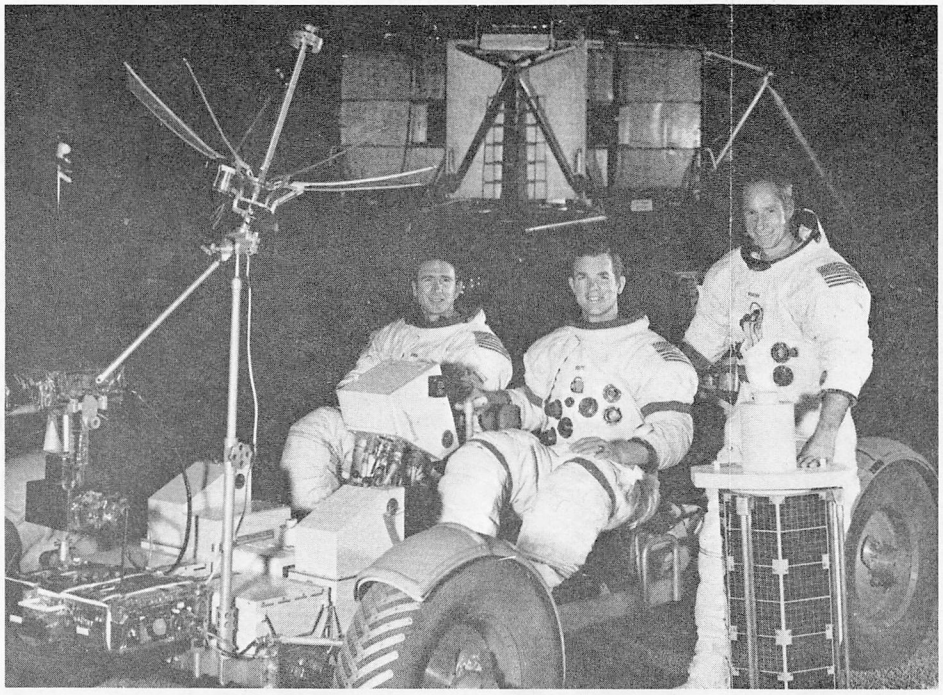
LRV STOWED PAYLOAD INSTALLATION

A color TV mounted on the LRV will give live coverage of the astronauts exploring the lunar surface.

Each of the LRV'S four wheels will be individually powered by an electric motor, and the vehicle's top speed will be about 8 miles an hour on a relatively smooth surface. The LRV's power source will be two non-rechargeable batteries. For safety's sake, there are two complete battery systems, each of which can power the vehicle. Although the LRV is normally steered by both the front and rear wheels, either one of the mechanisms can be disconnected in case of failure, and the vehicle can complete its mission with the remaining system.

The wheels are woven of zinc-coated piano wire with a spun aluminum hub and titanium bump stop. Treads of titanium are riveted to the wire mesh around each wheel's outer circumference.

During their stay on the Moon, David Scott and James Irwin will be able to make several sorties up to a cumulative distance of 40 miles aboard the LRV. However, because of the limitations of the portable life support systems, the vehicle's range will be restricted to a radius of about three miles from the lunar module. From this distance, the astronauts can walk back to the LM. The three-mile radius contains about 28 square miles for investigation, more than double the area that could be explored on foot.



The prime crew of the Apollo 15 mission is shown here with the Lunar Roving Vehicle, better known as the "moon buggy." From left: James B. Irwin, lunar module pilot; David R. Scott, commander; Alfred M. Worden, Jr., command module pilot. The LRV has a color TV camera which can be operated by remote control while Scott and Irwin explore the lunar surface during their sorties.

FOLLOW APOLLO 15

Estes Industries once again encourages you to salute the Apollo lunar mission with a launch of your own within two weeks of the July 26 launch. This symbolic launch will provide an exciting space mission in miniature for you and will enable you to receive a handsome certificate on which your successful "Follow Apollo 15" launch will be acknowledged by Vern Estes, president of Estes Industries. To receive this certificate, simply send a letter to Estes Industries, P.O. Box 227, Penrose, Colorado 81240, giving your name and address and the type of rocket you launched.

LITTLE BIRDS WITH THE BIG POWER

Estes introduces the MINI-BRUTES, small in size, but high in performance

What you see on this MRN cover is no optical illusion--it's not the Jolly Green Giant playing with a rocket! That's an average size hand holding the featherweight recovery *Mosquito,* one of the three models in the brand new Estes MINI-BRUTE line of inexpensive, easy-to-assemble, cardboard and balsa high performance birds--the result of many years of research at Estes.

Looking at this little fellow, you wouldn't think it could go very high. He is tiny, all right. Body diameter: 0.541 in. Length: 3.9 in. Weight 0.1 oz. without engine. But don't let appearances fool you. With one of the 1/2A's in the new Estes "T" Series especially designed for the MINI-BRUTES, the *Mosquito* will have you look 600 feet up. Put in a "T" Series A--and set your sights higher. Low drag because of small body diameter does the trick. (The MINI-BRUTES have up to 46% less drag than the best standard size rockets.)

Just as much fun to fly as the *Mosquito* (Cat. No. 711-TK-1) are the *Screamer* (Cat. No. 711-TK-2) and the *Mini Bertha* (Cat. No. 711-TK-3). The *Screamer,* a 7.8 in. long streamer recovery bird, has a 0.541 in. body diameter and weighs only 0.225 oz. The parachute recovery *Mini Bertha* is 11.25 in. long, has a 0.736 in. body diameter, and weighs a mere 0.484 oz. Although tiny enough to fit in your range box, these "fun birds" give fantastic performances with the new Estes "T" Series engines. With a 1/2A engine, the *Screamer* will go 500 feet, and the *Mini Bertha,* 400 feet.

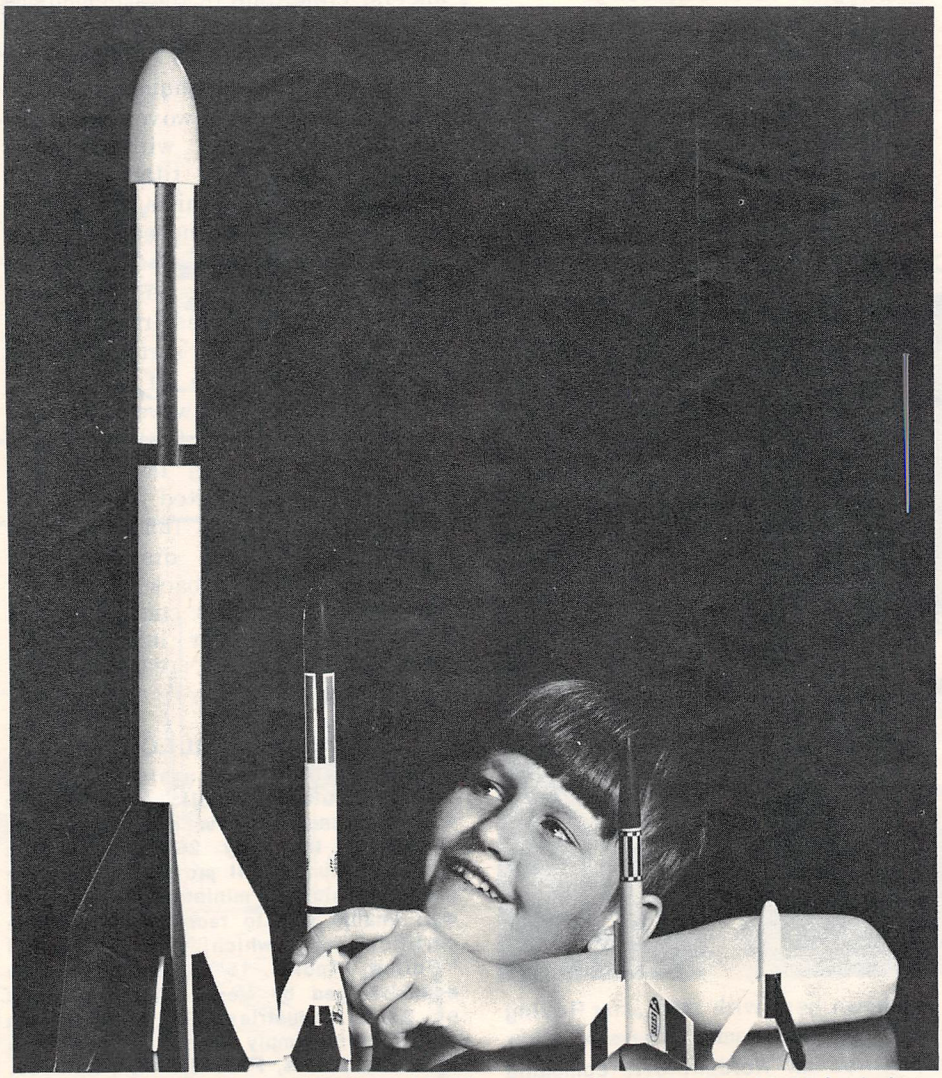
The new Estes mini-engines are 1.75 in. long--one full inch shorter than the Series I and II engines. (Actual size photo)

The "T" Series engines are ideal for record-breaking boost gliders. Fantastic altitude performances are also possible with the "T" Series engines.

All "T" Series engines--big performance in a small, light casing--are 1.75 in. long (a full inch shorter than a Series I engine) and have a 0.505 in. diameter (small enough to slip inside the casing of a C engine). Average weight is 0.228 oz. (6.5 grams). The "T" Series engines have a peak thrust of 8 Newtons and an average thrust of 3 Newtons.

The new Estes MINI-BRUTE line is being introduced this month and can be obtained now. There will be a special "Fleet Pack" containing all three birds. The engines will be sold four to a pack.

"5..4..3..2..1..lift-off!" It's launch time for Estes MINI-BRUTES, the little birds with the big power.



Twelve-year-old Bruce Donohue has fun comparing the new 11.25-inch long Estes Mini Bertha with its 24-inch long sister, the Big Bertha. The other two MINI-BRUTES are the Screamer (7.8 in.) and, at far right, Mosquito (3.9 in.).