

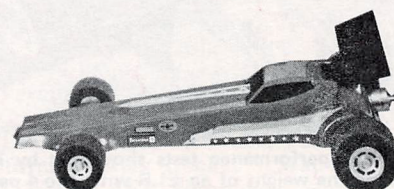
MODEL ROCKET NEWS

Vol. 14, No. 2
Oct./Nov. 1974

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INTRODUCING THE FANTASTIC ESTES LAND ROCKETS



SCREAMIN' EAGLE
4001



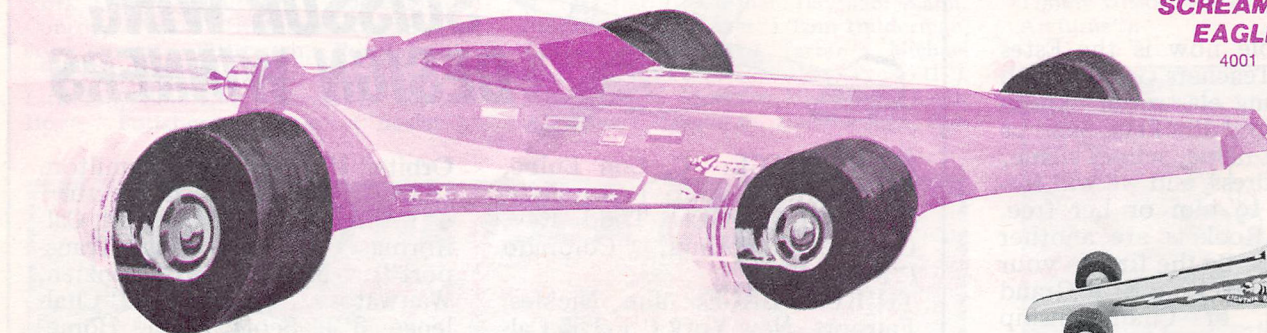
LIGHTNIN' BUG
4002



SCORCHER
4003



STARFIRE
4004

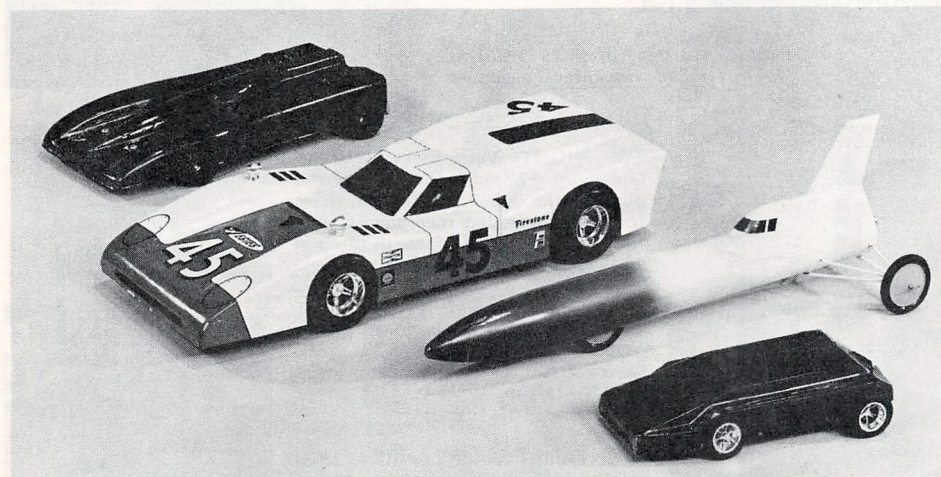


Rocket Power has finally gotten down to Earth. At last a safe, practical system of rocket propulsion for model cars is available.

For years our Estes Rocketeer Communications Department has received 100's of requests for rocket powered cars. Unfortunately, cars powered by standard solid propellant rocket engines present several problems for the consumer, such as horizontal blast deflection. However, the development of the cold propellant rocket engine using Estes

ColdPower fuel has solved these safety considerations. All the new Estes Land Rockets (ELR's) are powered by high performance XR-100 re-usable ColdPower engines for a really exciting and completely safe hobby.

The first ELR prototype was constructed in late 1971 and has been in development by the Estes R & D staff since that time. Each Land Rocket is uniquely designed in the Estes quality tradition. Body styles include two "funny cars", the

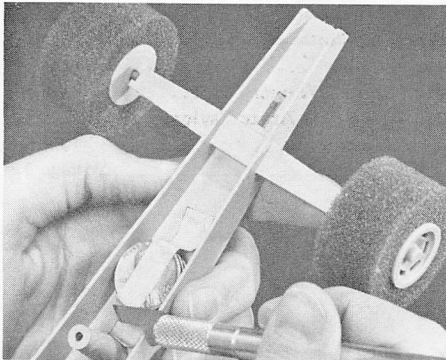


Early ELR prototypes featured a variety of designs. Various tire materials, body styles, chassis shapes, and engine sizes were tested to discover the very best combination of parts and materials.

"Lightnin' Bug" and "Screamin' Eagle", a "salt flats machine" called "Scorcher", and the "Starfire", a "rocket powered dragster". All feature interchangeable chassis, re-usable engine, T-wing airfoil, racing slicks, and colorful decals. Engineered for action and speed each model is easy to build and fun to race. All Estes Land Rockets are only \$3.95 each. For added fun a special ELR Race Kit (#4000) has also been produced and is available for only \$6.95 each. Race Kit in-

(Continued on page 2)

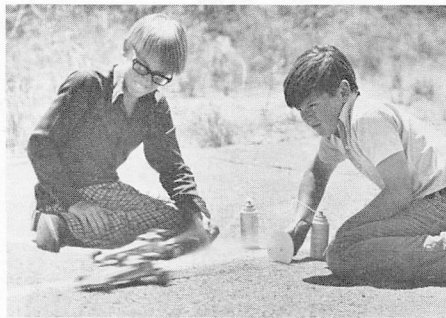
cludes standard "Screamin' Eagle" racer, drag chute, XR-100 engine, race flags, racing decals, ColdPower propellant, synchro line and anchor system, and Land Rocket Competition Guide.



Initial performance tests show that by increasing the weight of an ELR with 3 to 4 pennies the performance can be improved more than 10%.

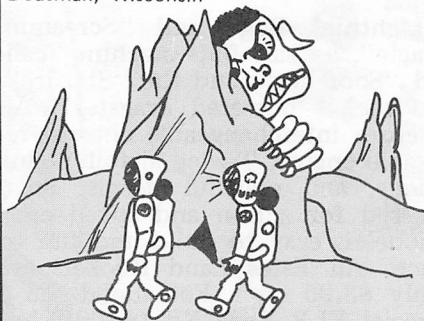
Also available now is the Estes Land Rocket Teachers Guide which features exciting classroom experiments using Land Rockets. Send us your teacher's name, school name, and school address, and we will forward a copy to him or her free.

Our Land Rockets are another first from Estes. Be the first in your area to hold an exciting ELR Grand Prix, LeMans, or Championship Drag.



The ELR Competition Guide included in each Land Rocket Race Kit (#4000) features more than 15 competitive events including drag racing, salt flats trials and the LeMans start. Cars in position....Get set....Go!!

Richard Weisenburger
Dousman, Wisconsin

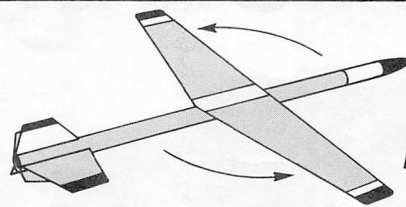


"I sure hope that there aren't any creatures on this planet. I wouldn't want to scare them."

Comet Kohoutek

Several dozen photos of Comet Kohoutek were received in response to our request in MRN Vol. 14 No. 1. The picture above taken by Joe Marietta of Riverside, California is an excellent presentation of the comet and has been judged the best photo received.

Congratulations to Joe Marietta who wins a \$25.00 merchandise certificate. You see Kohoutek really did exist after all!!



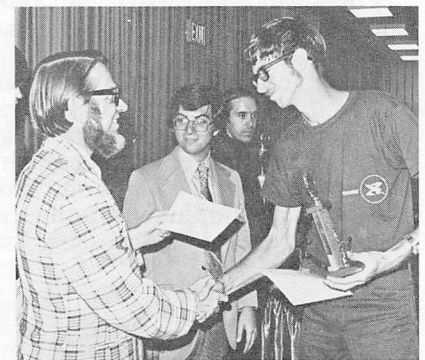
SCISSOR WING DESIGN WINNERS

FIRST PLACE: C. Lon Enloe, Florissant, Missouri ("Aquila").
SECOND PLACE: Todd Kay, Colorado Springs, Colorado ("Swing Wing").
THIRD PLACE: Jim Nickles, Fairport, New York ("F-155 Calisto").
HONORABLE MENTION: Clancy Carroll, Milwaukee, Wisconsin ("Interplanetary Space

Orbiter I"). Nathaniel Hamilton, Detroit, Michigan ("Projector-4"). Tim Brewer, Waterford, California ("Scissor Wing Transport"). Michael S. Denzien, Wauwatosa, Wisconsin ("Challenge 3"). Scott Koch, Homestead A.F.B., Florida ("Scissor Wing"). Craig McMurray, McPherson, Kansas ("Complilux").

NARAM-16

This summer the National Association of Rocketry hosted the 16th Annual National Model Rocketry Championships (NARAM-16) in Manassas, Virginia from August 4th thru the 9th. More than 200 top rocketeers representing all 50 states participated in the meet.



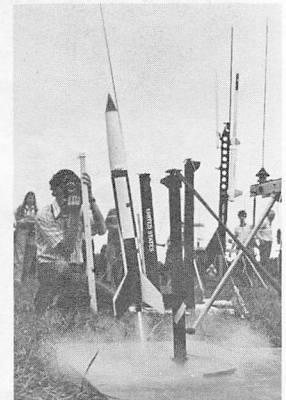
Photos courtesy of Alan Williams, N.A.R., Model Rocketeer magazine.



TOP RIGHT: Vern Estes congratulates Jim Philmon for his second place in the Super Scale event. Estes Industries awarded merchandise certificates for first thru fourth place in each age division for all events.

LEFT: Dane Boles, Estes Director of Rocketeer Communications, places new Maxi-Brute German V-2 on rack launcher for NARAM-16 demonstration. To left is Jay Apt, range safety officer and NAR trustee.

RIGHT: Jim Philmon's Astrobee 1500 streaks off scale launcher during Super Scale event.





"Design Of The Month Winners"

Congratulations to another fine group of Estes Rocketeers for their outstanding DOM entries. First place winners will receive \$50.00 merchandise certificates and honorable mentions will be awarded \$5.00 certificates. Keep those entries coming, maybe you'll be our next winner!

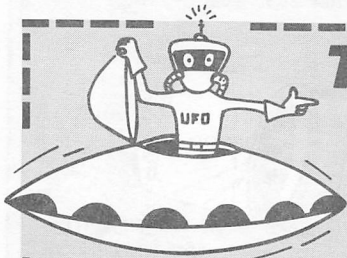
JANUARY 1974 - First Place; Tie Winners: Paul M. Newitt, Dixon, California ("Parallax"). Michael Hecker, Sussex, Wisconsin ("The Intrepid"). **Honorable Mention:** Pat Driscoll, Monterey Park, California ("Stratos"). Hommocks Middle School Rocketry Club, Mr. Tony Zagariello, Larchmont, New York ("Space Shuttle"). Eddie Mann, Conroe, Texas ("Kohutek Observer"). Joe Barrett, Pittsburgh, Pennsylvania ("Discoverer"). Gordon Van Schmitt, Littleton, Colorado ("Drone"). Ronny Hoyt, Pottsboro, Texas ("Ba-Jet").

Robert Orr, Lordstown, Ohio ("Mad Neuman"). Roy Tieskotter, Lawler, Iowa ("Spider"). Jeff Crump, Bettendorf, Iowa ("Voyager Lab I"). Steve Domotor, Pasadena, Maryland ("Bumble Bee"). Brad Hansen, Fresno, California ("Lockheed SR-71, semi-scale"). James Pyle, Lebanon, Virginia ("Space Refueler"). Mike Shirvers, Wareham, Massachusetts ("USS Enterprise"). John Montgomery, Russellville, Arkansas ("Space Patroler"). Garry Lipsburn, Frachville, Pennsylvania ("Nike-Ajax"). Dale Kitchen, Martinsville, Indiana ("UFO 1326").

FEBRUARY 1974 - First Place: Steven Lee, Clarksville, Tennessee ("Aspiration"). **Honorable Mention:** John M. Brooks, Azle, Texas ("SR-71"). James A. Casselberry, Jr., Lake Forest, Illinois ("Equinox I"). Jeff Corey, Byron, New York ("Spirit of '76"). Billy Davis, Stillwater, Oklahoma ("Myra II"). Tom Eisenmenger, Winston-Salem, North Carolina ("Mercury ONE"). Gordon Hartgrove, Greensboro, North Carolina ("Trask-Hart II"). Donald Hayman, Miami, Florida ("Legg Rocket"). Tom Hulderman, Lakeside, California ("Tartar"). Michael Kirst, Milwaukee, Wisconsin ("Tycho II"). Mike Kubacki, Manistee, Michigan ("Earth 2"). Stuart Marquette, Hillsborough, Cal-

ifornia ("Star Finder"). Bob Mac Dwight, Santa Rosa, California ("Vesta"). Dale Mc Elroy, Chickasha, Oklahoma ("Payload Flasher"). Stewart M. Seaholm, Des Plaines, Illinois ("Der Drache"). R. O. Snure, Las Vegas, Nevada ("Phibos I"). Greg Trask, Greensboro, North Carolina ("Trask-Hart II").

MARCH 1974 - First Place; Tie Winners: Robert Bradshaw, Broomall, Pennsylvania ("Sky Plane"). Glenn Frederick, Salem, New Hampshire ("Interstellar Probe"). **Honorable Mention:** Tim Brewer, Waterford, California ("Sky Flip"). Chuck Milstead, Georgetown, South Carolina ("Mirror Image"). Chas. Muncy, Jr., Morgantown, West Virginia ("Flex Wing"). Mark Nussbaum, Upland, Indiana ("Jupiter-C"). Steve Perrin, Irving, Texas ("Improved Launcher"). Gerry Pette, Irasburg, Vermont ("Viper II"). K. C. Tamel, Oak Creek, Wisconsin ("I Don't Know What To Call It"). Jim Walls, Pasadena, California ("Ajax Rocket"). Wade Wiley, F. E. Warren AFB, Wyoming ("Starfighter"). Timmy Wilson, Washburn, Missouri ("USS Arcturus").



THE IDEA BOX

DETAIL BRUSH

An old eye shadow or nail polish brush makes an excellent detail or touch-up paint brush.

Eric Sjoberg
Honolulu, Hawaii

SAFETY TIP FOR LAUNCH ROD

Paint launch rod tip red so it can be easily seen.

Donald R. Gable Jr.
Berlin, Wisconsin

ACCURATE NOSE CONE TIPS

A hole cut in firm paper or card stock makes an accurate guide for painting the tips of nose cones. It can also be canted to produce unusual designs.

Philip McNamara
San Diego, California

RAPID CG LOCATOR

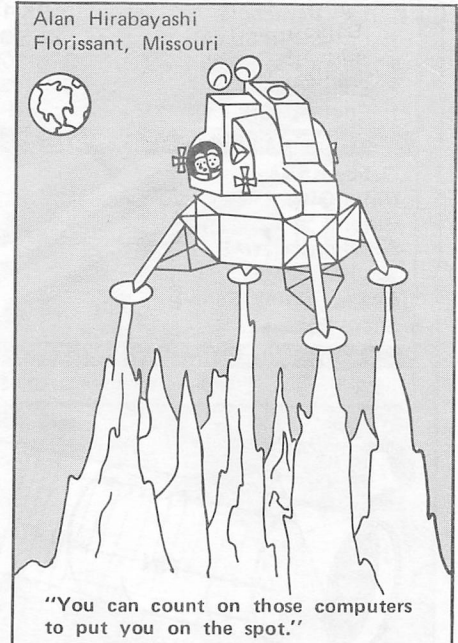
Coat hanger wire-bent to the shape illustrated and sharpened at both ends is ideal for finding the center of gravity of model rockets. It can be easily adjusted for different body diameters.

Mark Hood
A.P.O. San Francisco, California

CONVENIENT STORAGE BOX

Empty engine tubes make good storage boxes for small parts such as screw eyes and launch lugs.

David Stone
Auburn, Massachusetts



"You can count on those computers to put you on the spot."

Got any good ideas for MODEL ROCKET NEWS articles, technical information, cartoons, anecdotes, club news of unusual interest, etc.? Then why not submit them to us for possible publication? Our constant aim is to make MRN a better, more interesting magazine, and you might just be the type of contributor we need.

If you send us photos, please make sure that you pack them between cardboard sheets so that they won't get creased in the mail. All contributions become the property of Estes Industries and cannot be returned. Address all material to: MRN Editor, Estes Industries, Penrose, Colorado 81240.

Should your article or photos be used in MRN, we'll reward your efforts and talent with an Estes merchandise certificate, the amount of which will be determined by the MRN editorial staff. Hope to hear from you soon!

TARTAR

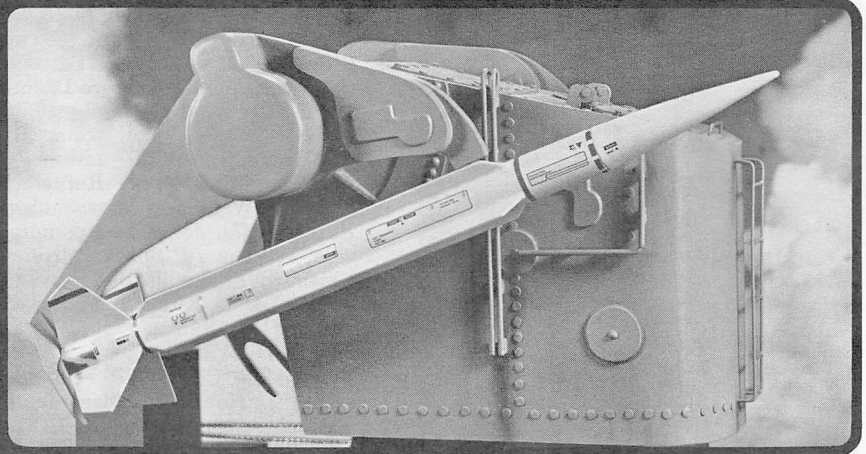
U.S. Navy Surface-to-Air Missile

SKILL LEVEL 2 SEMI-SCALE

HONORABLE MENTION
DESIGN OF THE MONTH

By TOM HULDERMAN
Lakeside, California

ESTES INDUSTRIES ROCKET PLAN NO. 83



★ BUILD THE TARTAR WITH ESTES HIGH PERFORMANCE PARTS AND ACCESSORIES.

PARTS LIST

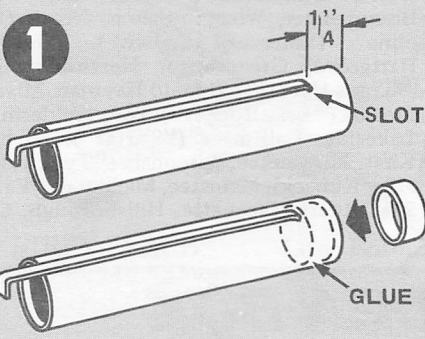
- 1 18" Body Tube BT-55
- 1 Nose Cone BNC-55AC
- 1 Launch Lug LL-2A
- 1 Screw Eye SE-2
- 1 Shock Cord SC-1
- 1 18" Parachute PK-18
- 1 Balsa Fin Stock BFS-30
- 1 Balsa Fin Stock BFS-30W
- 1 Engine Mount EH-2055
- 1 Engine Hook EH-2

ADDITIONAL MATERIALS

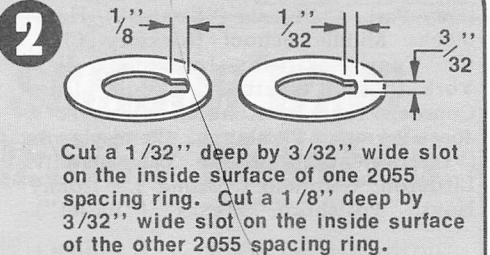
- Hobby Knife
- White Glue
- Ruler
- Sanding Material
- Sanding Sealer
- Enamel Paint (Spray)
- Sharp Pencil

RECOMMENDED ENGINES

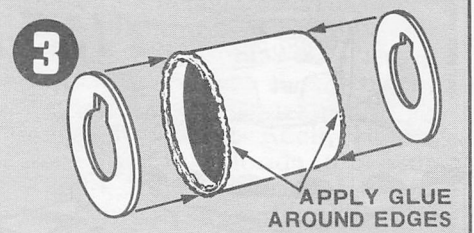
- B4-2
- B6-4
- C6-5



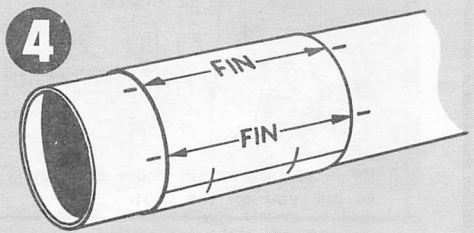
1 Mark the BT-20 engine tube 1/4" from one end. Punch a 1/8" wide slot on this mark and insert EH-2 engine hook. Spread glue 1/4" inside the end of the engine holder tube nearest the slot and insert the engine block. Push it in place until it touches engine hook and is flush with the end of the engine holder tube.



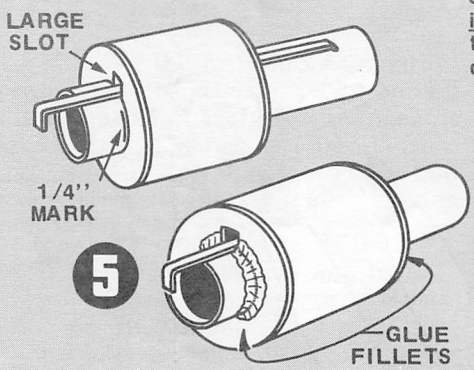
2 Cut a 1/32" deep by 3/32" wide slot on the inside surface of one 2055 spacing ring. Cut a 1/8" deep by 3/32" wide slot on the inside surface of the other 2055 spacing ring.



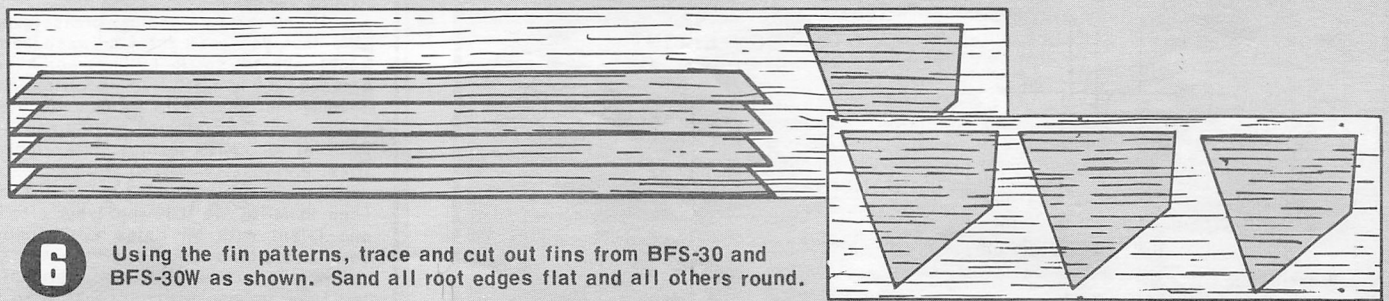
3 Apply a line of glue around each end of the stage coupler. Place a spacing ring on each end as shown and wipe off excess glue. Be sure that slots are in line with each other. Set this and the engine holder assembly aside to dry completely.



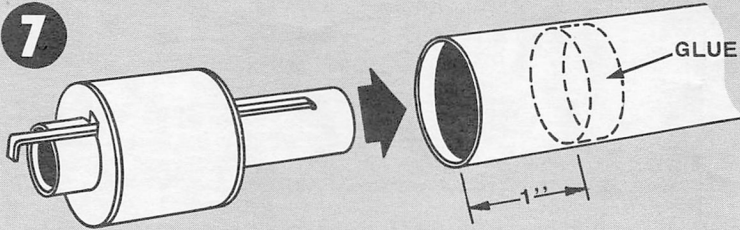
4 Cut out the body tube marking guide. Wrap it around the rear of the body tube and mark the tube at each arrow point. Remove the guide and draw a straight line the entire length of the tube connecting each matching front and rear mark.



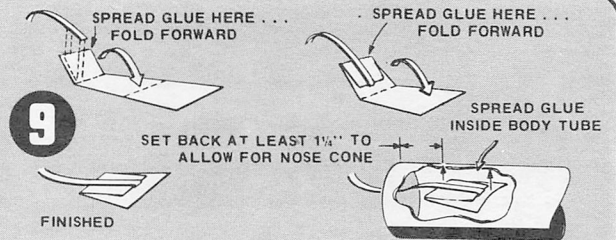
5 Mark the engine holder tube 1/4" from the end (end opposite engine block) as shown. Slide the engine holder assembly into the adapter ring so the spacing ring with the larger 1/8" X 3/32" slot is on the 1/4" mark. Apply a fillet of glue around each ring-body tube joint, being careful not to get glue in the spacing ring slots. Allow unit to dry completely.



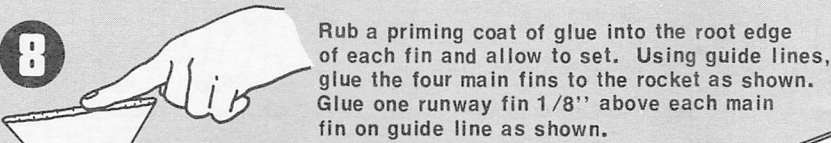
6 Using the fin patterns, trace and cut out fins from BFS-30 and BFS-30W as shown. Sand all root edges flat and all others round.



7 Spread a layer of glue 1" inside one end of the BT-55 body tube. Slide the engine mount assembly into the body tube until the end of the engine tube is flush with the BT-55. Do not pause during this operation or the glue may stick with the mount in the wrong place.

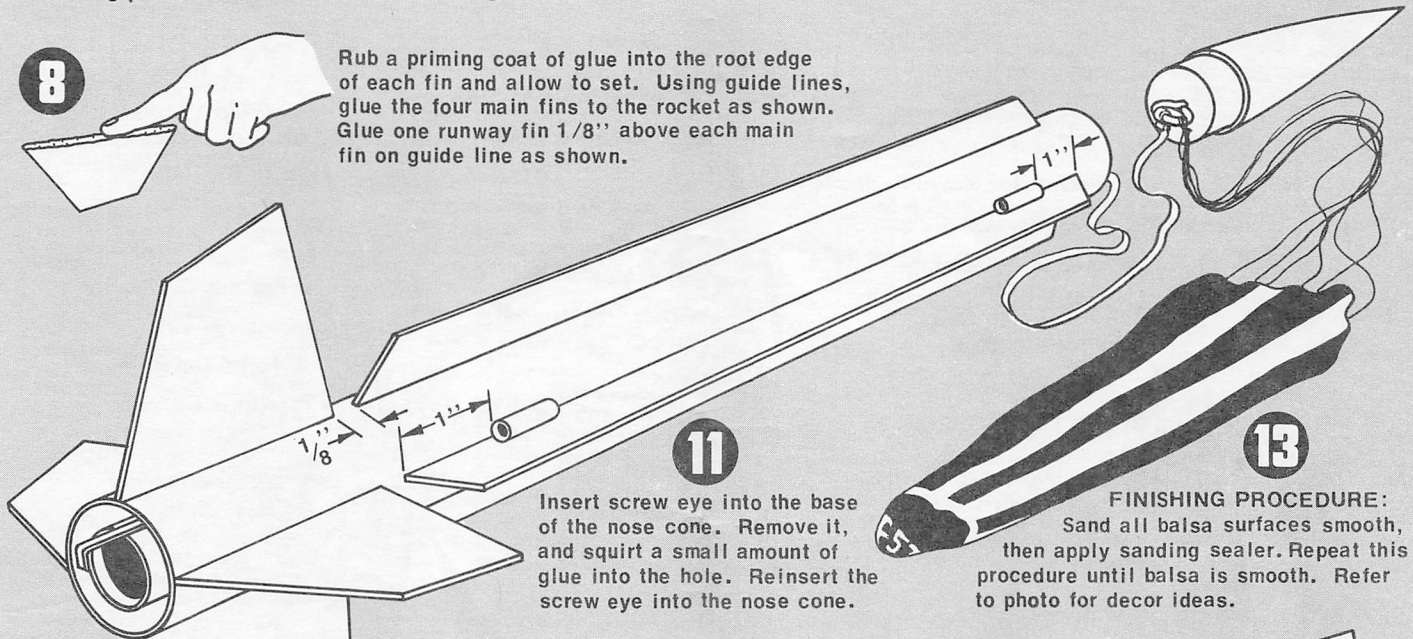


9 Cut out the shock cord mount. Assemble as shown. When gluing mount into body tube, press it down until glue sets.



8 Rub a priming coat of glue into the root edge of each fin and allow to set. Using guide lines, glue the four main fins to the rocket as shown. Glue one runway fin 1/8" above each main fin on guide line as shown.

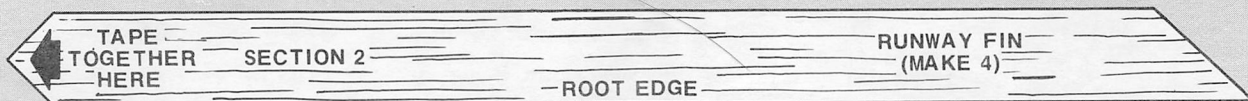
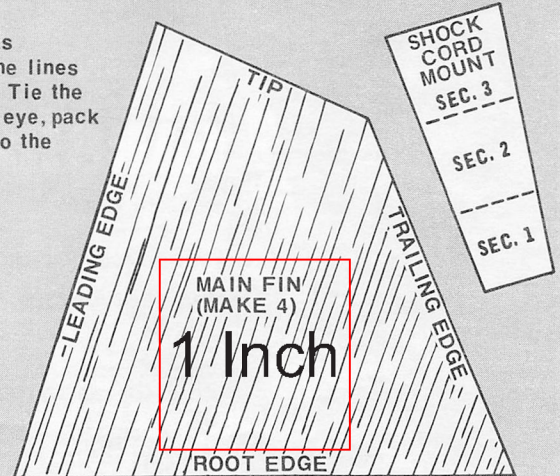
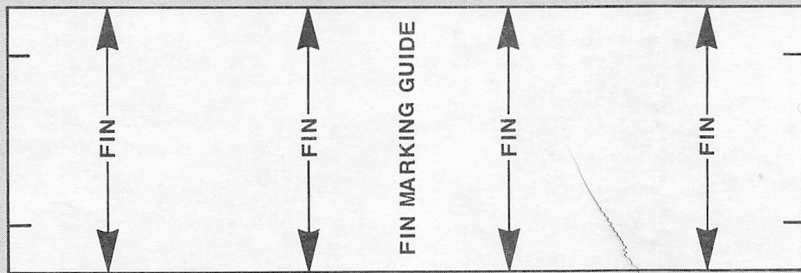
10 Cut launch lug (LL-2A) in half. Glue launch lugs between body tube and one runway fin 1" from each end of runway fin as shown.



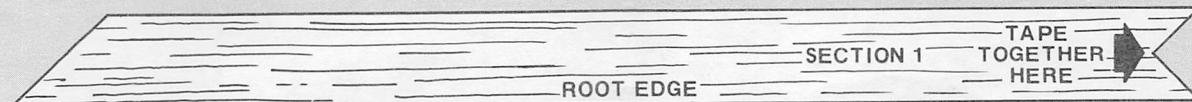
11 Insert screw eye into the base of the nose cone. Remove it, and squirt a small amount of glue into the hole. Reinsert the screw eye into the nose cone.

13 FINISHING PROCEDURE: Sand all balsa surfaces smooth, then apply sanding sealer. Repeat this procedure until balsa is smooth. Refer to photo for decor ideas.

12 Assemble the parachute according to its instructions. Apply a spot of glue to the lines where they loop around the screw eye. Tie the free end of the shock cord to the screw eye, pack parachute, and insert the nose cone into the body tube.



TAPE SECTION 1 AND SECTION 2 TOGETHER TO FORM A ONE PIECE PATTERN



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ASTRON PAYLOADERS

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1-31-75



OMEGA

Skill Level 3

- "D" Engine Powered
- Two-Stage Vehicle
- Recommended Cineroc Carrier
- Perfect for Heavy Payloads
- Large Payload Section
- Pop-and-Go Staging
- Die-Cut Fins
- Unique Fin Decals
- High Altitude Flights
- Parachute Recovery

Cat. No. 1200
Reg. \$6.50

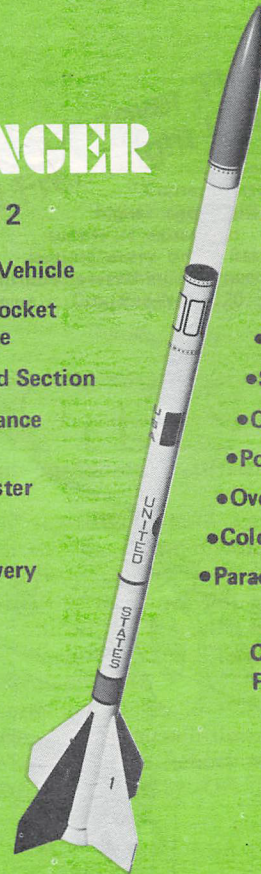


AVENCER

Skill Level 2

- Two-Stage Vehicle
- Sounding Rocket Appearance
- Large Payload Section
- High Performance Design
- Tumbling Booster
- 32" Tall
- Parachute Recovery

Cat. No. 1238
Reg. \$4.50

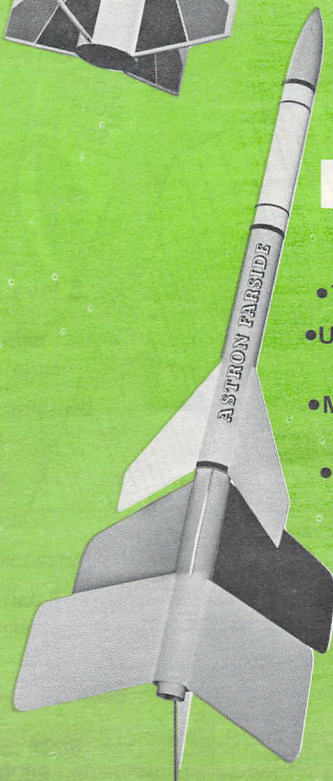


SHRIKE

Skill Level 3

- Two-Stage Vehicle
- Super High Performance
- Clear Payload Section
- Pop-and-Go Staging
- Over 29" Tall
- Colorful Decals
- Parachute Recovery

Cat. No. 1246
Reg. \$5.75

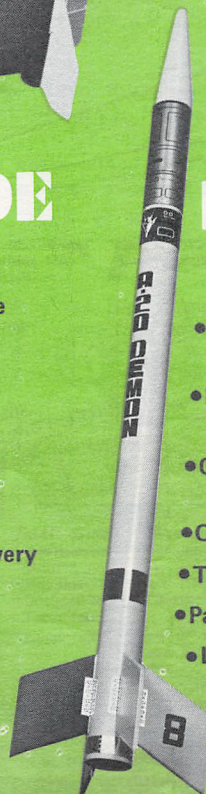


FARSHIDE

Skill Level 3

- Three-Stage Vehicle
- Ultra-High Altitude Probe
- Multi-Purpose Payload Carrier
- Cargo Payload Compartment
- Parachute Recovery
- Flights over 2,000 feet
- Super-High Performance

Cat. No. 1212
Reg. \$3.95

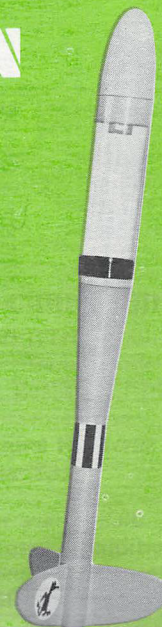


DEMON

Skill Level 2

- Ultra-High Performance
- Easy-Trak Metallic Decal
- Quick-Change Engine Mount
- Over 26" Tall
- Two-Color Decals
- Parachute Recovery
- Large Payload
- Die-Cut Fins

Cat. No. 1258
Reg. \$4.95



CAMROC CARRIER

Skill Level 3

- Recommended Camroc Vehicle
- Large Clear Payload Section
- Die-Cut Fins
- Stick-on Decals
- Parachute Recovery
- Can Be Modified To Handle Single "D" Engine
- Camera Not Included

Cat. No. 1266
Reg. \$2.95

MRN SPECIAL SAROS

PAYLOAD CARRIER

ONLY \$2.95 WITH MRN ORDER FORM

Regular \$3.95

Skill Level 2

- Scale-like Sounding Rocket Vehicle
- Futuristic Appearance
- High Performance Design
- Plastic Nose Cone, Adapter Section, and Fin Unit
- Embossed Metallic Fin Rivet Press-on
- Three-color Decals
- Payload Section
- Quick-Change Engine Mount
- Parachute Recovery
- Over 2 Feet Tall
- Exciting Flights

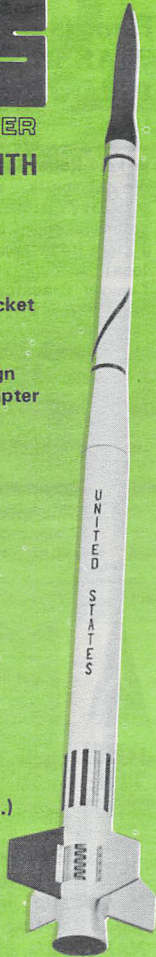
Recommended Engines:

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

(Use A8-3 for first flights.)

Cat. No. 1254

Offer good only with MRN order form (page 8). Offer expires 1-31-75.



NEW! 3/16" DIA.
MAXI-ROD



- Recommended For New Maxi-Brutes (German V-2 and Pershing 1-A)
- Fits Porta-Pad Tripod (RL-4)
- 36" Long
- Two-Piece Construction
- Collapsible For Easy Storage
- Screw-Together Fitting

Ship. wt. 12 oz.
Cat. No. #2239

ONLY \$1.25

NEW! FIN-KWIK ASSEMBLING FIXTURE
Fin-Kwik

Fast! Simple! Accurate!

- Position and Glue Fins Quickly and Easily
- Fits Body Tubes up to BT-70
- Designed for either 3 or 4 finned rockets
- Aligns fins exactly at 90° or 120° to each other
- Reduces assembling time
- Heavy duty metal construction
- Completely adjustable



Cat. No. 2713
Just \$6.95

NEW!

COMMAND COPTER

Discover The Thrill Of Free Flight Helicopters



ONLY \$4.95

(4101)

Soar to heights of 1,000 feet with Command Copter. Just start her up and let'er go. Watch'er climb higher and higher until she's almost out-of-sight. When fuel supply is exhausted, Command Copter autogyros down for a safe landing every time. Easy to assemble. Rotor span-24.25 inches. Kit includes everything you need less engine, fuel, and battery. Recommended engine is Cox Pee-Wee .020.

Bonus Kits

(Limit one per order. Offers expire 1-31-75.)

AERO-HI (Skill Level 1)

- Scale-Like Sounding Rocket Vehicle
 - Realistic Decor
 - High Performance Design
 - Features Fin Strap-On and Payload Coupler Decals
- Regular \$1.75

My order is over \$6.00

I have enclosed an additional 35¢.

Please send me: (check one)

AERO-HI (#0817) OR BETA (TK-45)

Your choice only 35¢ with \$6.00 order.

BETA

(Skill Level 2)

- Mini-Engine Powered
 - Two-Stage Vehicle
 - High Performance Design
 - Parachute Recovery
- Regular \$1.75



Your choice only 50¢ with \$9.00 order.

- ARCAS® (Skill Level 3)
 - Scale Model
 - Sounding Rocket Vehicle
 - Authentic ARCAS® Decal
 - Sleek Design
- Regular \$3.50

My order is over \$9.00

I have enclosed an additional 50¢.

Please send me: (check one)

ARCAS (K-26) OR SPRINT (K-49)

SPRINT

(Skill Level 3)

- High Performance Design
 - Competition Vehicle
 - Streamer Recovery
 - Low Drag Tail Cone
- Regular \$2.95



Your choice only 75¢ with \$12.00 order.

- BIG BERTHA (Skill Level 1)
 - Perfect Demo Model
 - Slow, Realistic Lift-Offs
 - Plastic Nose Cone
 - Parachute Recovery
- Regular \$3.95

My order is over \$12.00.

I have enclosed an additional 75¢.

Please send me: (check one)

BIG BERTHA (K-23) OR SANDHAWK (K-51)

Your choice only 75¢ with \$12.00 order.

SANDHAWK

(Skill Level 2)

- "D" Engine Powered
 - Super Scale Design
 - Sounding Rocket Vehicle
 - Detailed Plastic Fins
 - Over 30" Tall
- Regular \$3.95

NOTE: "Bonus Kit" offers good only with this order form. Limit, one "Kit" per order. Substitutions will be made when necessary. Offers Expire 1-31-75.



ORDER FORM

Dept. MRN-B

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1	<input type="checkbox"/>	#1447	EAC Membership Kit \$2.00		
2					
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Allow	\$.80	\$1.13	\$1.51	\$1.93	\$2.48
6 lbs.	\$3.13	\$3.73	\$4.33	\$4.93	\$5.53

For orders 9 ounces or less, send 9¢ per ounce.

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We do not ship orders C.O.D.

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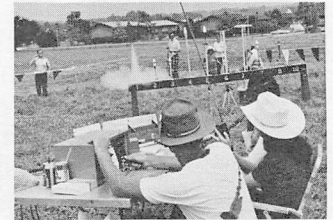
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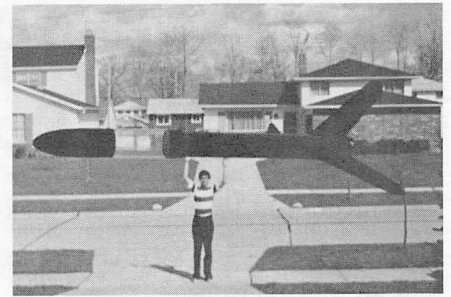
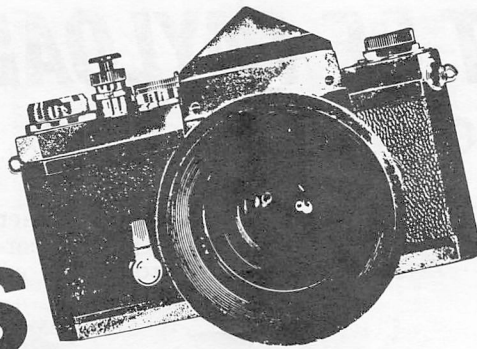
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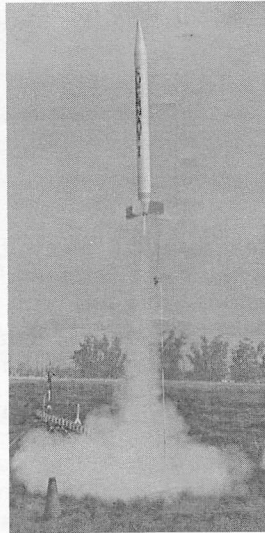
photo contest winners



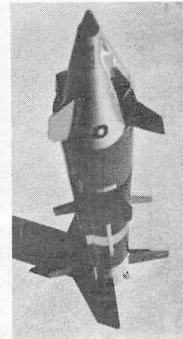
Glen Peterson & Steve Nagy
Solon, Ohio



Wade Wiley
FE Warren AFB, Wyoming



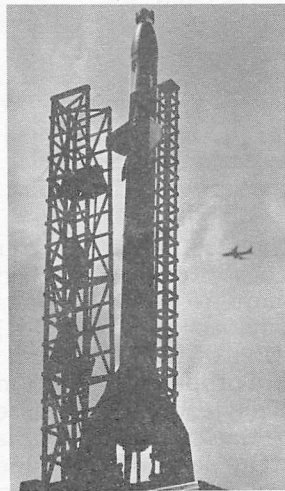
Korey Kline
Granada Hills, California



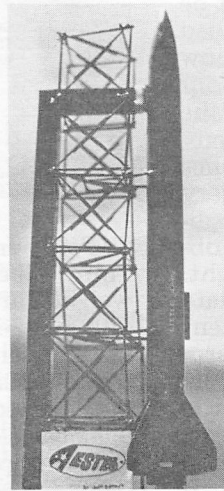
Herbert Gregory Jr.
Poway, California



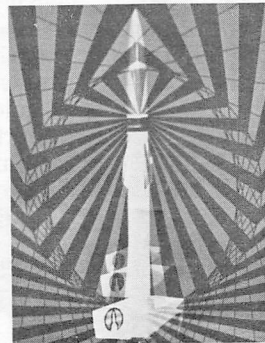
Buford Taylor
Zenia, Ohio



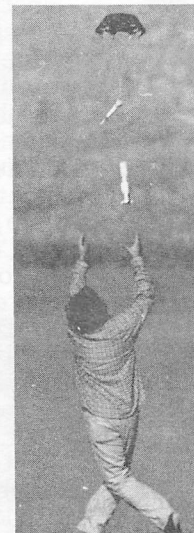
Douglas Kirk
San Antonio, Texas



Jeff Sprout
Dayton, Ohio



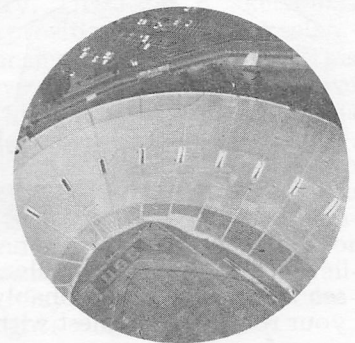
Gordon Bugg
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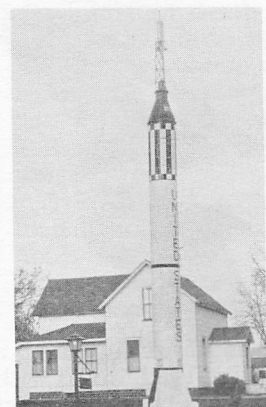
Peter Campbell
Torrance, California



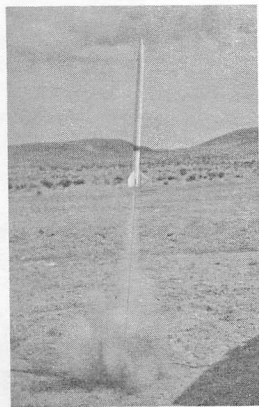
Paul Iwancio
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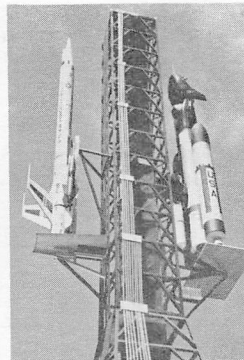
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Mountain Lake, Minn.



Harold Boardman
Tustin, California



Ronald Carnicom
Hicksville, New York



Stephen Herrlinger
APO San Francisco, Cal.

Due to limited space we have only been able to feature 15 of our 25 winning photos. Winning entries not shown are listed below. Congratulations to all winners who will each receive a \$20.00 merchandise certificate for their outstanding photos.

Elliott Nelson, Salt Lake City, Utah. Todd Rodgers, Pleasantville, New York. Chris Johnston, East Cleveland, Ohio. Herbert DeSind, Silver Spring, Maryland. Terry Bruning, Orem, Utah. Jimmy Pattee, Colorado Springs, Colorado. John Huerkamp, New Orleans, Louisiana. Alan Kirkeng, De Forest, Wisconsin. Doug Hansen, Salt Lake City, Utah. Leroy Bulger, Plymouth, New Hampshire.

THE FINE ART OF PAYLOAD LAUNCHING

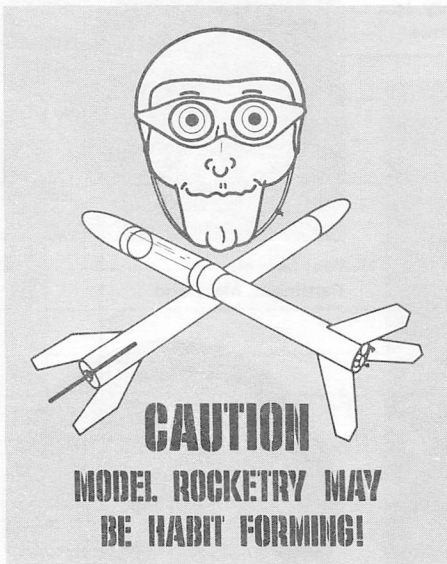
Technical Note TN-4 *by Robert L. Cannon, Education Director*

Why do you launch model rockets?

Is it for fun? Sure it is! But is that all there is to it?

Probably not. If all you want to do is see your rocket go up and then come back safely so you can launch it again, you are in the minority among model rocketeers. Most modelers want to know why things happen and how to make them happen. Specifically, they want to make the best rockets they can.

Once the model rocketry bug has taken a firm bite on you, you soon become involved in center of gravity-center of pressure relationships, fin area experiments, weight-optimizing problems, and other previously abstract studies.

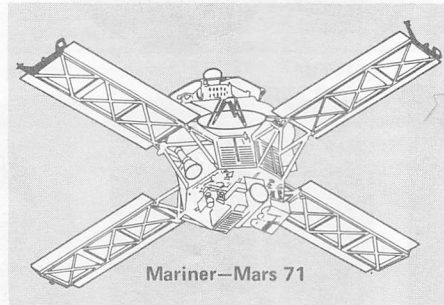


One of the first challenges you set for yourself is probably to get your rocket the highest with a given size of engine.

After you become proficient at reaching high altitudes, the parachute-duration fever may become "your" disease. After winning a few (meets), and losing a few (birds), you will probably want something else with which to test yourself. The payload passion may be your next mania.

Why is something put in a rocket before the rocket is launched? The professional may be sending up an instrument package to secure data on the atmosphere. The payload may be a scientific satellite to study Earth or to secure information on stars. Some payloads are spacecraft

whose missions are to study other planets. Occasionally, a rocket carries men on a mission to the moon.



You realize right away that a model rocket is not designed for orbital missions. In fact, you don't want your rocket to get far enough away to even stand a strong chance of losing it!

The question keeps re-occurring—"What can I launch?" It need not be anything scientific. The payload plague has struck, and you are now past all chance of avoiding it. Your only hope now is to control the course of the disease.

You notice your hand twitches uncontrollably. After nearly every twitch, it is holding some small object to get an idea of its weight. Your eyes squint as they calculate the size of payload compartment the object will require. Your arm jerks as you estimate whether the g-forces of take-off will damage the object.

Pretty soon a compulsion strikes. The object in your hand has got to go! Maybe you will launch it tomorrow, maybe it can't wait. The blue sky beckons, and the rocket awaits!

SPECIMEN	WEIGHT (TYPICAL) IN GRAMS & OZ.	LENGTH (TYPICAL) IN MM. & INCHES	WIDTH (TYPICAL) IN MM. & INCHES
Grade A large hen's egg	64 grams 2.25 oz.	70 mm. 2.8 in.	50 mm. 2.0 in.
Grade A small hen's egg	58 grams 2.04 oz.	57 mm. 2.25 in.	40 mm. 1.6 in.
Grasshopper	2 grams 0.07 oz.	37 mm. 1.5 in.	10 mm. 0.4 in.
Fly	0.25 grams 0.01 oz.	10 mm. 0.4 in.	5 mm. 0.2 in.
Spider	0.25 grams 0.01 oz.	10 mm. 0.4 in.	3 mm. 0.1 in.
Earthworm	4 grams 0.14 oz.	64 mm. 2.5 in.	3 mm. 0.1 in.
Beetle	0.5 grams 0.02 oz.	25 mm. 1.0 in.	5 mm. 0.2 in.
Cricket	0.3 grams 0.01 oz.	25 mm. 1.0 in.	7 mm. 0.3 in.
Guppy	0.5 grams 0.02 oz.	37 mm. 1.5 in.	10 mm. 0.4 in.

Soon you have several "space launches" behind you. Most of them were pretty good, I hope. Did you lose any payloads because the nose cone wasn't tight enough on the payload compartment? Did any payloads, complete with rocket, make an unexpectedly swift re-entry, with a very compact parachute (rolled too tightly, stuck in the body tube, or just plain melted)? Did a "Rocketus eatumupus" manage to snag one as it drifted past?

At this point you probably begin to lose interest in launching payloads. Don't! Payloads launching can be very worthwhile and can be a lot of fun for a long period of time. After your first few launches of rocks, payload weights, and handy insects, you can really get down to serious payloading.

Cat. No.	Body Mat'l.	Fits	Inside Dia.	Inside Length	Overall Length	Wt. in oz.	Net	Ship.
PS-20A	Clear Plastic	BT-20	.710"	2"	4.00"	.16	1	
PS-20C	Clear Plastic	BT-20	.950"	3"	7.00"	.40	4	
PS-30B	Regular Tube	BT-30	.725"	2"	3.75"	.24	1	
PS-50A	Clear Plastic	BT-50	.950"	3"	6.50"	.39	4	
PS-50C	Clear Plastic	BT-50	1.59"	4"	10.50"	1.00	11	
PS-50E	Clear Plastic	BT-50	1.75"	4"	10.50"	1.10	11	
PS-55B	Regular Tube	BT-55	1.28"	3"	7.63"	.53	11	
PS-60A	Clear Plastic	BT-60	1.59"	4"	9.50"	.98	11	
PS-60C	Clear Plastic	BT-60	1.75"	4"	9.50"	1.00	11	

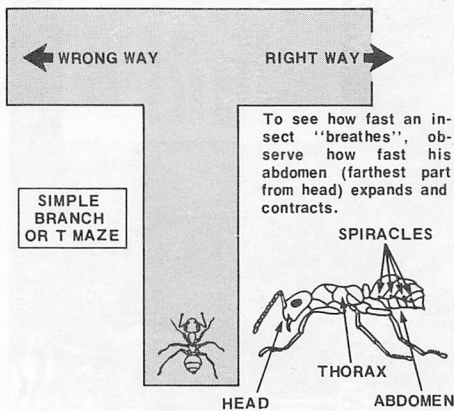
Payload Sections include nose cone, body tube, adapter or bulk head.

For performance tests of your "bird", launches of official payload weights are hard to beat. (Official one ounce payload weight, PL-1.) Careful selection of the best engine for the mission, proper construction of that special payloader, and precise packaging of the payload weights are all important parts of the game before you push that button to launch your bird for the official, tracked flight.



If you feel the desire to launch a small biological payload, do so with care. Wasps and bees make compact passengers for all but the very smallest payload compartments. However....

Crickets, grasshoppers, and flies may be launched. Even if you goof, these creatures stand an excellent chance of surviving an error on your part. But don't launch them and recover them and expect to learn much by just looking at them. Some rocketeers "train" their passengers to do a simple one-branch maze or something similar, then test their reactions after flight. The results won't mean much if the specimen was damaged by poor handling or packaging in the payload compartment. Another problem can be that the effects you attribute to the g-forces experienced on the flight may be caused instead by a shortage of air in a too-small payload capsule.



To see how fast an insect "breathes", observe how fast his abdomen (farthest part from head) expands and contracts.

Insect launches are not likely to lead to the discovery of much valuable data, but they can be one step in becoming proficient in handling payloads. A well-designed experiment can provide meaningful research data on the effect of rocket flight on an insect.

When you feel that you are good at handling biological payloads, I mean really good, then don't launch a hamster or a mouse! It appears that about nine out of ten launches of live hamsters or mice end successfully. About every tenth launch, however, the passenger suffers serious injury or death due to a human error. It is about as kind to stomp the poor mouse to death as it is to let him die because of your mistake, and he probably won't be scared half-to-death for anywhere near as long.

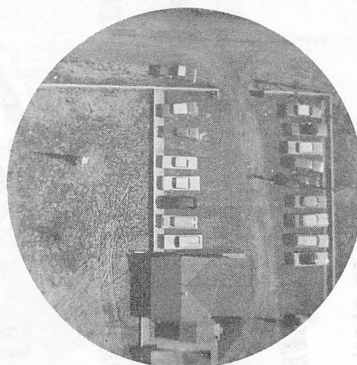
To really test your biological payload handling capabilities, launch a hen's egg. Use a raw one. (Hard-boiling is no fair.) If you can properly handle, package, launch, and recover the egg in good condition, excellent! If not, you can always have scrambled eggs for breakfast. This, unfortunately, leaves the payload compartment of your rocket in a "yucky" condition.



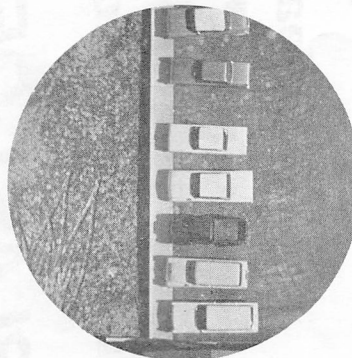
Launching and safely recovering a raw hen's egg is not as easy as it sounds. If you think it is easy, just try it.

When you are ready to get into instrument payloads, you have a wide-open field.

Aerial photography is very exciting. Use the Estes Camroc to take single-exposure, still photographs of your selected area. Launching the Camroc to a high altitude lets the camera take a photograph of a very large area. Launch to lower elevation results in a photo in which a smaller area is photographed, but everything appears bigger.



CAMROC PHOTO

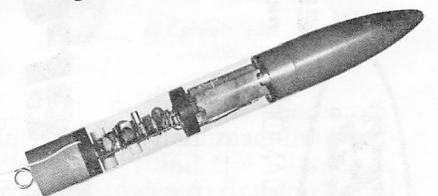


CAMROC PHOTO (ENLARGED)

To make a photographic map of a very large area, a mosaic (composite made up of many small parts) is made of a number of different aerial photographs, each of which has been photographically enlarged or reduced so that the photos appear to have been taken from the same elevation. A project of this nature can be challenging, very rewarding, and a lot of fun. An aerial map makes a great science project.

For a fascinating experience, launch a Cineroc as the payload on your next mission. The view is fantastic! In addition to the thrill of watching the ground "drop away" beneath and the booster separate and tumble away at staging, the movie produced can be subjected to frame-by-frame analysis. This analysis, coupled with careful enlargement of selected frames can let you determine the velocities and/or accelerations of your rocket, the actual heights at which some specific event such as staging occurred, and the spin rate of your rocket. In addition, the film permits evaluation of the terrain photographed. You can study the surface of the ground in a way probably never before possible to you. Study your house and property. Discover things you never saw before as you see things in a new perspective.

Instruments other than cameras may be launched. These instruments can be self-recording or may radio their data back to the ground by telemetry. The Estes Rocketronics system provides an excellent telemetry transmitter, the Transroc. This tiny device has a range of up to five miles while in flight and of hundreds of yards even when on the ground. The basic mode of operation is as a beacon for tracking and finding the rocket. Sensors to measure temperatures and spin rates are available for the Transroc. A microphone is available to relay the sounds of the complete flight.



Working within the size and weight limitations of model rocketry, producing accurate scientific instruments is quite a challenge. A number of different instrument systems are possible. They need not be complex, but should be simple and able to withstand the forces encountered in model rocket flight.



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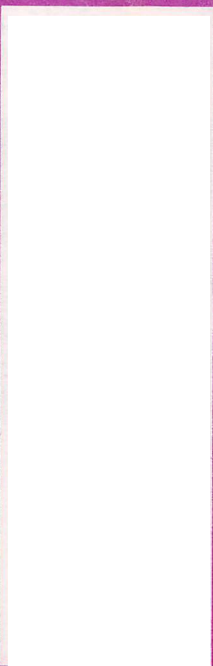
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