

SCOUT: THE INTERNATIONAL WORKHORSE

The Scout is a four-stage, solid-propellant launch vehicle used for a variety of space tasks by the United States and an impressive list of European nations.

Conceived by the National Aeronautics and Space Administration in 1958, the vehicle is produced by the Systems Division of Vought Corporation. In addition to serving as prime vehicle contractor, the Dallas company provides management, support and launch services.

A versatile and cost-effective launch vehicle, Scout is used by NASA and agencies of the Department of Defense for a number of types of missions — orbital, probe and re-entry. On the international scene, it has important roles in the space programs of Great Britain, Italy, France, Germany, The Netherlands and the 10-nation European Space Research Organization (ESRO).

Since its first mission in 1960, Scout has been the launch vehicle for more than 90 missions. It holds the record for consecutive successes among all NASA launch vehicles.

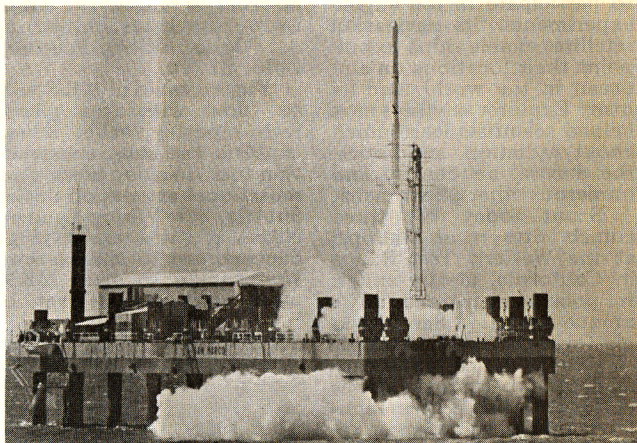


Photo Courtesy of NASA

The latest major boost came in the form of a new Alcol III first stage motor which made its first flight in 1972 and increases performance more than 25 percent.

A five-stage orbital version of the Scout was introduced with launch of NASA's Hawkeye satellite into a highly-elliptical orbit in 1974. Although fifth-stage motors previously had been used with Scout for re-entry missions, earlier motors were part of the payload. This fifth stage, powered by a 6,000-pound-thrust Aleyone IA motor, actually was part of the launch vehicle and separated from the payload in orbit.

Originally capable of placing a 131-pound (60 kg) satellite in a nominal 300-mile (480 km) orbit, the vehicle today can place 390 pounds (175 kg) in that orbit. Keeping pace with performance, Scout also offers a large-volume heat shield, an option that more than doubles payload volume — from 17.6 cu. ft. (.50 cu. m) to 35.6 cu. ft. (1.01 cu.

m) or about six times the volume of Scout's early payload shrouds. With the large heat shield, the vehicle stands 75 ft. high (22.9 m) and has a launch weight of 47,178 lbs. (21,400 kg).

Scout's four motors are: Alcol, first stage; Castor, second; Antares, third, and Altair, fourth. These solid motors are interconnected by Vought-built transition sections containing launch vehicle components. Guidance is by a strapped-down programmed gyro system.

The Scout program, conceived at NASA's Langley Research Center at Hampton, VA, was officially initiated with the signing of the first Scout contract in April, 1959. In just over one year, on July 1, 1960, the first Scout vehicle lifted off the pad at NASA's Wallops Station in Virginia.

Since then, Scout has performed numerous missions important to Apollo, Skylab and other space programs. Its payloads have sampled the dangers manned space-

(Continued on next page)

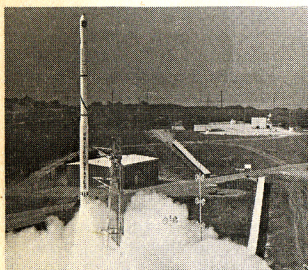


Photo Courtesy of NASA

Designed for growth from the outset of the program, the Scout has increased its performance capabilities more than threefold during its years of operation.

craft face from micrometeoroids, performed high speed re-entries to test materials required to bring spacecraft safely back through the atmosphere, and studied the problem of radio communications during the re-entry "blackout" period.

It became the first U.S. solid propellant launch vehicle ever to place a payload in orbit. It was the first to participate in ion engine experiments. Its navigation satellites enable ships to pinpoint their locations on any ocean in the world, and its many Explorer satellites have helped scientists learn much about radiation, magnetics, the aurora, air density and numerous other phenomena.

Scout today has three launch sites — at Wallops; at the Western Test Range in California, ideally suited for polar launches; and Italy's unique sea-based San Marco platform off the East Coast of Kenya, Africa, a site capable of equatorial launches at a cost far lower than similar launches using larger vehicles from the Kennedy Space Center in Florida.

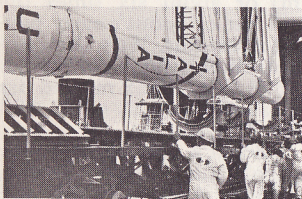


Photo Courtesy of NASA

While the Space Shuttle is scheduled to replace many of today's launch vehicles, needs for quick response in specialized missions are expected to make Scout an exception.

Scout now has available a fifth stage velocity package for highly elliptical orbits and probe missions to the Sun. Preliminary company studies also indicate that by continuing a policy of well-planned incremental improvements, Scout can again more than double its payload capability and increase its mission flexibility to meet new specialized requirements well into the 1980s.

Article compliments of the
Vaught Corporation, Dallas, TX.

A Reminder From the Editor:

MRN TO BE PUBLISHED SIX TIMES YEARLY

As I mentioned to you in the last issue, we are happy to announce the publication of "Model Rocket News" six times yearly. The MRN will be available on even numbered months (see publication schedule) in your return mail orders. To receive your bi-monthly copy simply place an order or request the latest issue from Estes Industries; Att: MRN Editor, Penrose, Colo. 81240.

Future issues of MRN will be filled with free plans, tech reports, rocket news, contests, cartoons, construction tips, finishing ideas, and sensational articles on Space Shuttle, the Viking Lander, NASA activities, and Flying Saucers, just to name a few. We promise to make MRN more exciting than ever. If

you're interested in contributing to MRN see this page for more details.

Due to the increasing costs of mailing, MRN will be mailed only very occasionally to Estes rocketeers. SO, YOUR BEST BET IS TO OBTAIN MODEL ROCKET NEWS WITH YOUR NEXT ORDER.

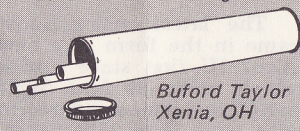
Dane Boles
MRN Editor

MRN PUBLICATION SCHEDULE

Vol.	No.	Month	Year
17	1	February	1977
17	2	April	1977
17	3	June	1977
17	4	August	1977
17	5	October	1977
17	6	December	1977

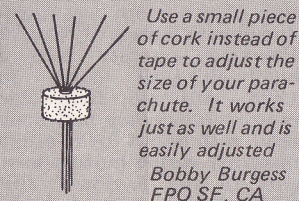
THE IDEA BOX BODY TUBE STORAGE

A good way to store & protect body tubes is to keep them in heavy cardboard mailing tubes.



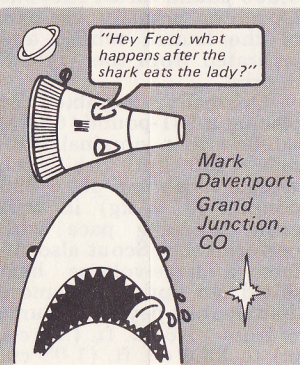
Buford Taylor
Xenia, OH

PARACHUTE



Use a small piece of cork instead of tape to adjust the size of your parachute. It works just as well and is easily adjusted

Bobby Burgess
FPO SF, CA



Mark Davenport
Grand Junction, CO

MRN WANTS YOUR CONTRIBUTIONS

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 be just 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!

FALCON

HONORABLE MENTION OCTOBER 1976
DESIGN OF THE MONTH CONTEST

By R. M. MOORE Hixson, TN

U.S.A.F. Air-To-Air Missile

Build the FALCON with Estes High Performance Parts and Accessories

SKILL LEVEL 3

PARTS LIST

		Cat. No.
A)	1 Body Tube (BT-60)	3075
B)	1 Nose Cone (BNC-60L)	70292
C)	1 Engine Mount (EH-2060)	3152
D)	1 Shock Cord	2276
E)	2 Launch Lugs	2321
F)	1 1/8" Dowel	3190
G)	2 Fin Stock (BFS-40L)	3174
H)	1 24" Parachute (PK-24)	2271
I)	1 Screw Eye	2280
J)	1 Shock Cord Mount (See page 7 for pattern)	

Additional Materials

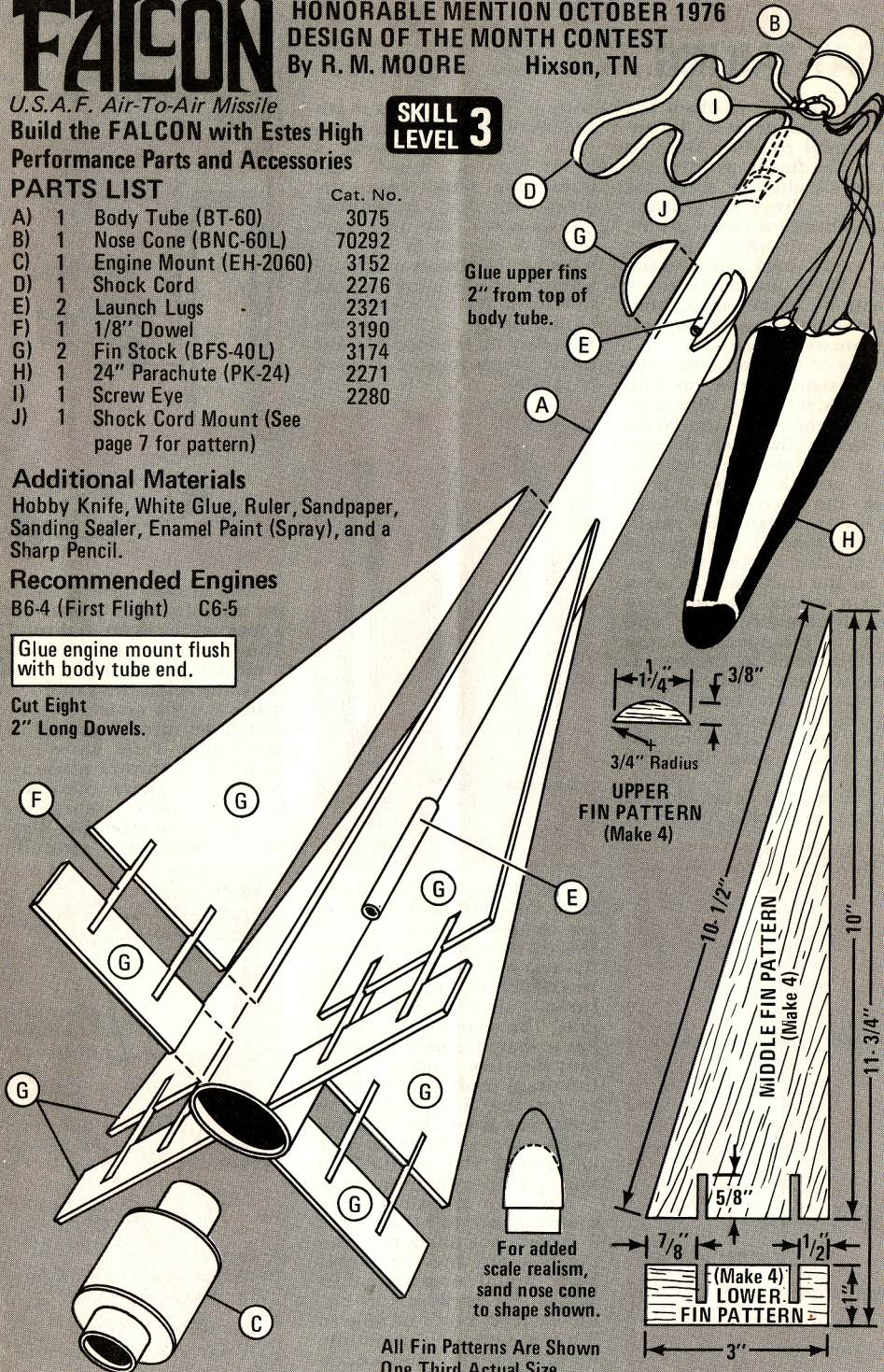
Hobby Knife, White Glue, Ruler, Sandpaper, Sanding Sealer, Enamel Paint (Spray), and a Sharp Pencil.

Recommended Engines

B6-4 (First Flight) C6-5

Glue engine mount flush with body tube end.

Cut Eight 2" Long Dowels.



Glue upper fins 2" from top of body tube.

UPPER FIN PATTERN (Make 4)

MIDDLE FIN PATTERN (Make 4)

LOWER FIN PATTERN (Make 4)

All Fin Patterns Are Shown One Third Actual Size.

Technical Note Tn-7

BOAT-TAILING

By William Simon, Mgr., Estes R&D

"Trade-off" is often the name of the game in designing model rockets. Do you make the fins large for maximum stability or small for minimum drag? Do you use a parachute for gentle recovery or a streamer to bring the model back close to the pad? There are many more questions that arise, and there is seldom a single, perfect answer for any.

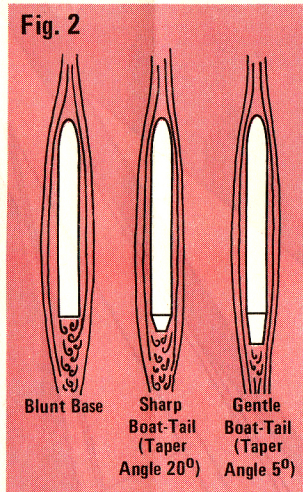
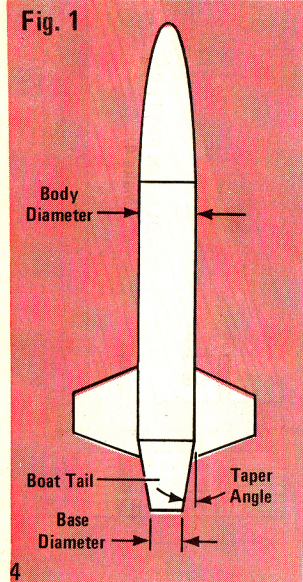
One of the first questions the designer faces on any new model is body tube size. On the one hand, the larger the tube's diameter, the easier it is to see the model in flight and the easier it is to pack the recovery system. On the other hand, the smaller the tube diameter, the higher the rocket will go.

So the rocketeer is faced with a choice. He can build a small diameter "bird" and have it disappear because it's too small to be seen at peak altitude. Or he can use a larger diameter model that's big enough to be seen, but won't go as high. What do you do in a case like this? Why, "cheat", of course.

The way to cheat Mother Nature in rocket design is

with a "boat-tail". As much as 30% of the drag on a rocket is caused by having a blunt rear or "base". The larger the blunt base, the greater the drag. A boat-tail gives a small base on a large body. As shown in figure 1, a boat-tail is simply a tapered section on the body. A boat tail on a BT-60 rocket can eliminate up to 91% of the base drag on the model! That much improvement is hard to ignore.

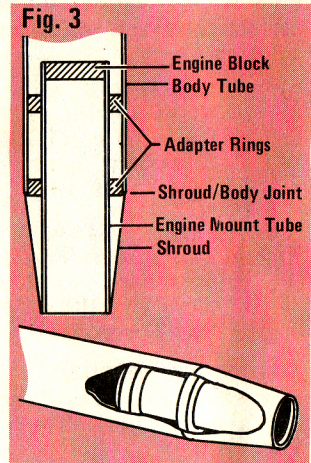
is to make a conical section out of stiff paper. Figure 3 shows the construction of a typical rear-end boat-tail. Notice that the assembly is kept as light and simple as possible.



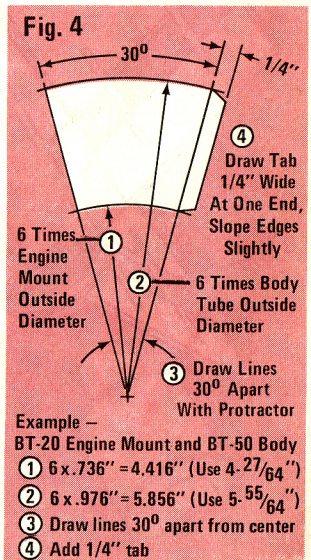
Air flow patterns around three different rocket bodies are shown in figure 2. The first design with a completely flat rear has a large turbulent wake. This turbulent (or disturbed) air flow causes high drag. The second rocket body has a sharp, rapidly tapering tail; the flow around it (and the drag) is almost the same as for the first body. The third has a gentle, shallow-angle taper. Air flows smoothly around the gentle boat tail, giving minimum drag.

To keep the air flowing smoothly around the rear of a model, the angle between the boat-tail and the rocket body should be no more than 5°. If the angle is too big, the air flow won't be able to "turn the corner" smoothly.

How do you build a boat-tail? The most common way



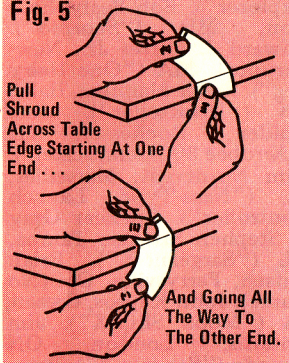
The hardest part of building a model with a boat-tail is making the tapered shroud. This must be a precision-made part. Fortunately, there are some things we can do to make the job easier. First to design the shroud, we follow the simple rules shown in figure 4. A shroud made according to these rules will have a 4.83° taper—just enough to be effective. Measure everything carefully



when you draw your shroud on a stiff piece of paper (the display panel from an Estes kit is suitable material).

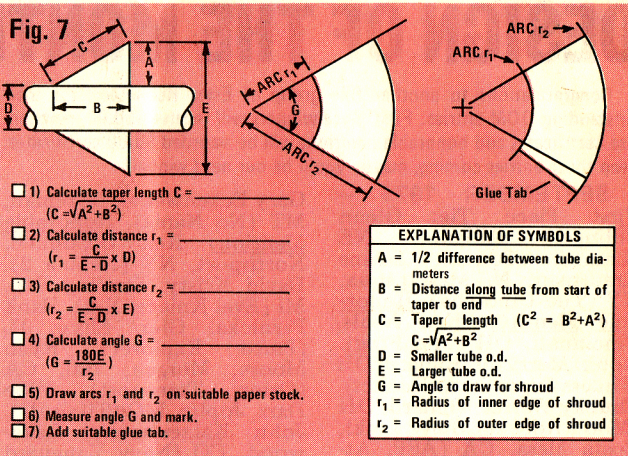
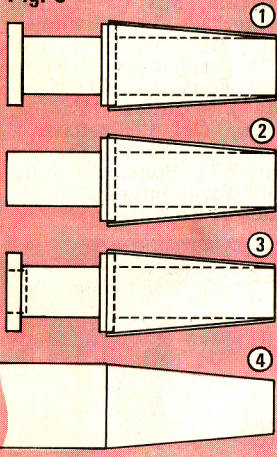
Once the shroud is drawn, cut it out carefully with a sharp pair of scissors, exactly on the edge lines. Now comes the tricky part -- forming and gluing. Pre-curl the shroud by pulling it down across the edge of a table. Turn it slightly as you pull to keep the table edge straight with the "center" of the shroud (figure 5).

Fig. 5



When gluing the shroud together, apply glue lightly, then position the edges of the shroud precisely. Hold the tab in place until the glue sets, then let the part dry completely before trying to install it on your model. It's a good idea to make several practice shrouds to perfect your technique before making the final shroud.

Fig. 6



Actual model assembly goes best when done in sequence (figure 6).

- 1) "Dry" assemble everything to check fit, but don't glue. Mark shroud and ring locations on engine mount tube.
- 2) Glue shroud, rear ring and engine mount tube together.
- 3) Install and glue forward ring and engine block.
- 4) Install shroud/engine mount assembly in rear of rocket body.
- 5) Fill and smooth joints as necessary with body putty.

Fins are best attached to the main body on a boat-tail bird. Unless very heavy paper is used for the shroud, it won't be stiff or strong enough to hold the fins well.

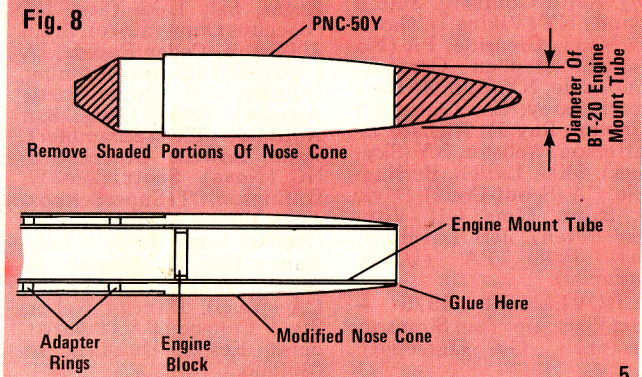
Special shrouds (longer, shorter, etc.) can also be used for boat-tails, though the design technique is more complicated. Figure 7 shows

a step-by-step procedure that can be used to design any size of shroud.

Another approach to boat-tailing involves using a modified plastic nose cone (such as the PNC-50Y) for the boat tail. Figure 8 shows a typical model built this way. This is a technique for the advanced rocketeer-precise assembly is very important.

This has been a very quick look at boat-tailing. For the rocketeer who is seriously interested in improving the performance of his birds, we suggest reading Estes Technical Report #TR-11, Aerodynamic Drag of Model Rockets, by Dr. Gerald M. Gregorek. This report contains much vital information on both theory and practice of drag reduction. To get valuable practice in shroud construction, pick up a multi-purpose adapter set, part #8030. Your birds will never look the same again.

Fig. 8



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 1976 — First

Place: Skip Welsh, Richardson, TX ("Sky Copter").
Honorable Mention: Jim McNamara, Danvers, MA ("Voyager U3"). Jim Smith, Newburyport, MA ("Atom Bomb"). Ronny Hoyt, Pottsboro, Tx ("Superlift-D"). Dave Dramer, Cincinnati, OH ("USS Ateroid"). Carl Pursiano, Ridgewood, NJ ("Interplanetary Space Explorer"). Bob Sealy, Fallston, MD ("Scorpio"). Edward J. Carter Jr., Newburyport, MA ("One Hairy Leg"). Richie Manning, Halls, TN ("Dispatcher"). Mike Golden, Rochester, MI ("Aerobee 300 (semi-scale)"). Kim Nordtvedt, Marseilles, IL ("Nasa-Type Launch Controller"). Spencer Gray & Stephen Straske, Tampa, FL ("Sargeant-X"). Brian Mitsch, Perrysville, OH (No Name). John Kepros, Cresco, IA ("Moon Ship-X"). Jim Botaitis, London, ON Canada ("Scorpio 3"). Peter C. Elias, Midland, MI ("Alpha Sigma III"). Lee C. Bowles, Richmond, VA ("Russian Guideline S.A.M. Missile").

FEBRUARY 1976 —

First Place Two-Way-Tie: Bob Richmond, Philadelphia, PA ("X-17"). Bill Engar, Salt Lake City, UT ("Starship Exodus").
Honorable Mention: Steve Klym, Des Moines, IA ("Aquila"). Greg Giergieliwicz, Chicago, IL ("Zimmer"). Jeff Daub, Burnsville, MN ("T Tail Straker"). J. Schwitalla, Flint, MI ("Heinkel 162 V-1"). Craig Bizjak & Tarry Fagey, Fanwood, NJ ("Concorde"). Chuck Zallow, Warren, OH ("Fireflash"). Kevin Aylesworth, Stevens Point, WI ("Booster"). John & Bill Page, Jamestown, RI ("Zach-A-Roid").

SEPTEMBER 1975 —

First Place Tie: Glenn Fillingler, Alliance, NE (Launch Tower). Duane Krautman, N. Massapequa, NY (The Umbrella).
Honorable Mention: Ken Nehls, Cincinnati, OH (The Frog). Robin Morrison, Hilliard, OH (Finless Super Straw Rocket). Chucky Warrix, Hilliard, OH (Moon Rocket). Steve Leski, Costa Mesa, CA (ASP, Atmospheric Sounding Projectile). Todd Trowbridge, Melbourne, KY (Phantom I). Peter Koorey, Maitland, FL (Star Seeker II). Ed Wankowski, Mt. Prospect, IL (Radian). R. G. Rauschenberg, Monongahela, PA (Seagull). Kevin Smith %James Slomski, Kaukauna, WI (No Name). Jerry Holcomb, Livonia, MI (F-104 Super Starfighter).

OCTOBER 1975 — First

Place Four-Way-Tie: Mark Cochran, Normal, IL (Colosus X17). R. M. Moore, Hixson, TN (USAF Falcon Air-to-Air Missile). Mitch Morgan, Eston, PA (UFO). Steve Sands and John McKee, Alton, IL (SACEFS V, Single and Cluster Engine Firing System V).
Honorable Mention: Craig Boucher, Trumbull, CT (Mach 4 Sounding Rocket). Steven R. King, Houston, TX (October 2). Thomas W. Brady, APO, NY (The Courier). Steve Michaels, Ionia, MI (Satellite 76). Keith Goldberg, Staten Island, NY (Viking I). Gavin Harbison, Glenside, PA (No Name). Stephen Gerzack, Uniondale, NY (Bumble Bee). Bruce Carey, Eau Claire, WI (Gamma Ray I). Richard D. Patterson, Webster, NY (Skyliner). Mike Lazich, Burlingame, CA (Scout-Craft). David M. Baum, Lima, OH (Voyager Seven). Jeff Davidson, Mill Hall, PA (U.S.S. Binomial).

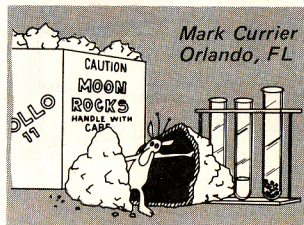
NOVEMBER 1975 —

First Place Tie: Paul Simpson, Savannah, GA (Intrepid).

Gary Eckenweiler, Bozeman, MT (No Name).
Honorable Mention: Ken O'Connell, Northport, NY (Nebula 2). David Kristy, Sterling Hts., MI (Evel Knievel X-2). Hank Pernicka, Glen Ellyn, IL (Pluto Explorer). Ryan Moore, Morgan, Hill, CA (Orion Transport). Mike Darr, Joplin, MO (Titan III). John Katzenberger, Lakewood, CO (Navy Vanguard Semi-Scale). Donald & Ken Kingsbury, Fountain Valley, CA (Spirit of "76"). Carl Fung, R.P.U. CA (The Laser). David Jacox, South Bend, IN (Barracuda). Patrick Lourigan, Chester, SC (Galaxy 500). Mike Williams, Gates Mills, OH (The Snipe). David Kaeser, Marion, IL (Multi-Launcher).

DECEMBER 1975 —

First Place Four-Way-Tie: Steve Jewkes, Los Gatos, CA (Starship York). Douglas McGonagle, Billerica, MA (Four Electronic Projects). Eric Smith, Bowie, MD (America). George W. Harris, Jr., Frederick, MD (Nike Program).
Honorable Mention: Paul Noel, Detroit, MI (Sky Slash). Buford Taylor, Xenia, OH (Empress Galaxy Cruiser). Timmy Wilson, Washburn, MO (Llanvabon II). George Rodney Nelson, Jr., Morehead City, NC (Glider Type Recovery System). John Mayhan, Harrisburg, PA (Pioneer). Bill Engar, Salt Lake City, UT (Bacchus Observatory). Brian J. Carson, Cedar Rapids, IA (Spirit of 76). Doug Bunning, Quinter, KS (Super Sonic Apache). Brent Craig, San Antonio, TX (Scrambler). Dana Lowell, Greensboro, NC (Nova). Scott Cole, W. Willington, CT (Super Schnoz). Jerry Hirssig, Manitowoc, WI (Rocket Boat). Keith W. Belt, Kansas City, MO (Jupiter 2). Bryce Smith, Los Angeles, CA (Wasp). Duncan Weber, State College, PA (Polaris). Scott Kesler, Dunkirk, IN (Spinner).



Mark Currier
Orlando, FL



HONORABLE MENTION MAY 1976
 DESIGN OF THE MONTH CONTEST
 By BERT WEIMER Litchfield, OH
 Build the MANTA-RAY with Estes High
 Performance Parts and Accessories

**SKILL
 LEVEL 3**

PARTS LIST

		Cat. No.
A)	1	Body Tube (BT-50W) 30372
B)	2	Body Tubes (BT-50) 3073
C)	2	Nose Cones (BNC-50BC) 70258
D)	1	Nose Cone (BNC-50Y) 8011
E)	1	Engine Mount (EH-2050) 3150
F)	1	Fin Stock (BFS-30L) 3170
G)	1	18" Parachute (PK-18) 2267
H)	1	12" Parachute (PK-12) 2264
I)	2	Shock Cords 2276
J)	1	Screw Eye 2283
K)	2	Launch Lugs 2321
L)	1	Nose Block 8026

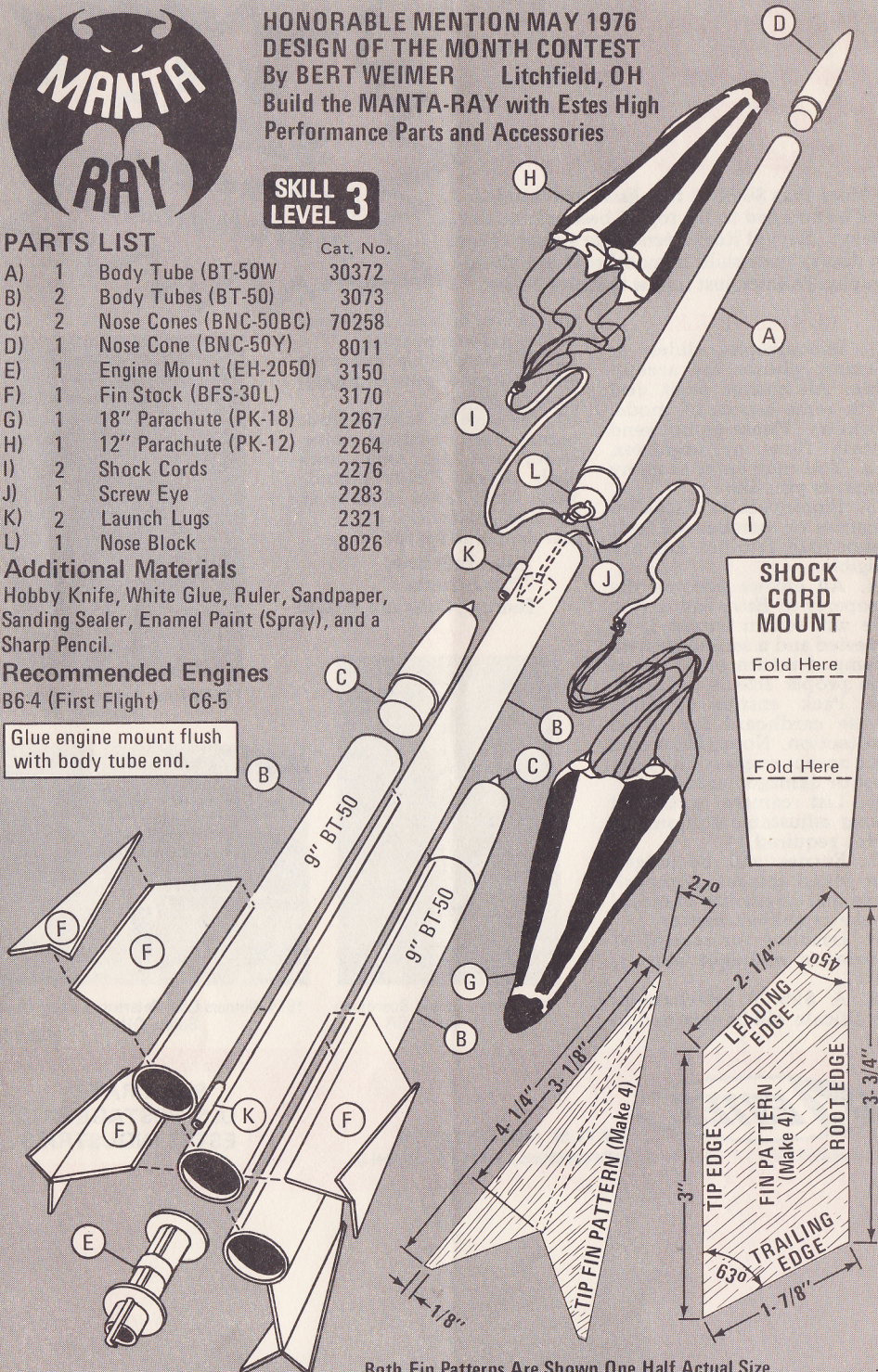
Additional Materials

Hobby Knife, White Glue, Ruler, Sandpaper, Sanding Sealer, Enamel Paint (Spray), and a Sharp Pencil.

Recommended Engines

B6-4 (First Flight) C6-5

Glue engine mount flush with body tube end.



Both Fin Patterns Are Shown One Half Actual Size.

photo contest

More than \$600 in free Estes merchandise will be awarded to the top 25 best entries. Hey.... Heyy....Heyyy! Rocketeers, here's your chance to display your skills in model rocketry photography. To enter, just follow the rules below.

CONTEST RULES

1. Photographs, slides, or Camroc photos are acceptable. All entries must deal with some aspect of model rocketry. Please do not send movie films or negatives.

2. You may enter as many times as you like

3. Employees of Estes Industries or members of their immediate families are not eligible.

4. All entries become the property of Estes Industries. We will return entries if requested and a self-addressed, stamped return envelope of the proper size is included.

5. Pack entries carefully - use cardboard for added protection. Note: Estes cannot accept responsibility for lost or damaged entries.

6. List camera setting if using adjustable equipment. (Not required.)

7. Entries will be judged for visual impact, composition, and originality of model rocketry subject matter.

8. Deadline for receipt of entries is midnight Mar. 1, 1977.

9. A \$25.00 merchandise certificate will be awarded to

the 25 best entries. Decisions of the judges are final.

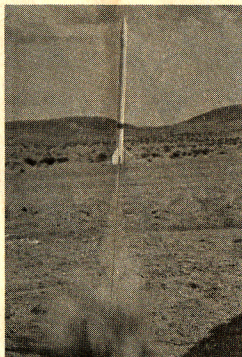
10. Winners will be announced in a future issue of Model Rocket News.

11. Be sure to include your name, age, address, city, state, and zip code with each entry. Please include your Skill Level if you are an EAC member.

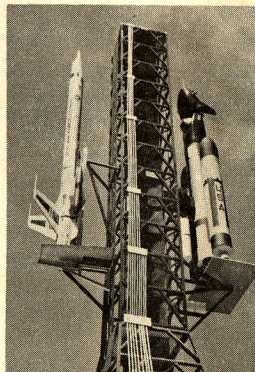
12. Mail entries to:

Estes Industries
"Photo Contest"
Penrose, Colorado 81240

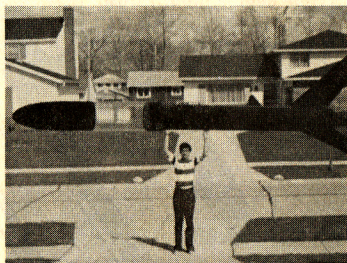
GOOD LUCK!



1974 Winner Harold Boardman
Tustin, CA



1974 Winner Ronald Carnicom
Hicksville, NY



1974 Winners Glen Peterson & Steve Nagy
Solon, OH
900,802



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