

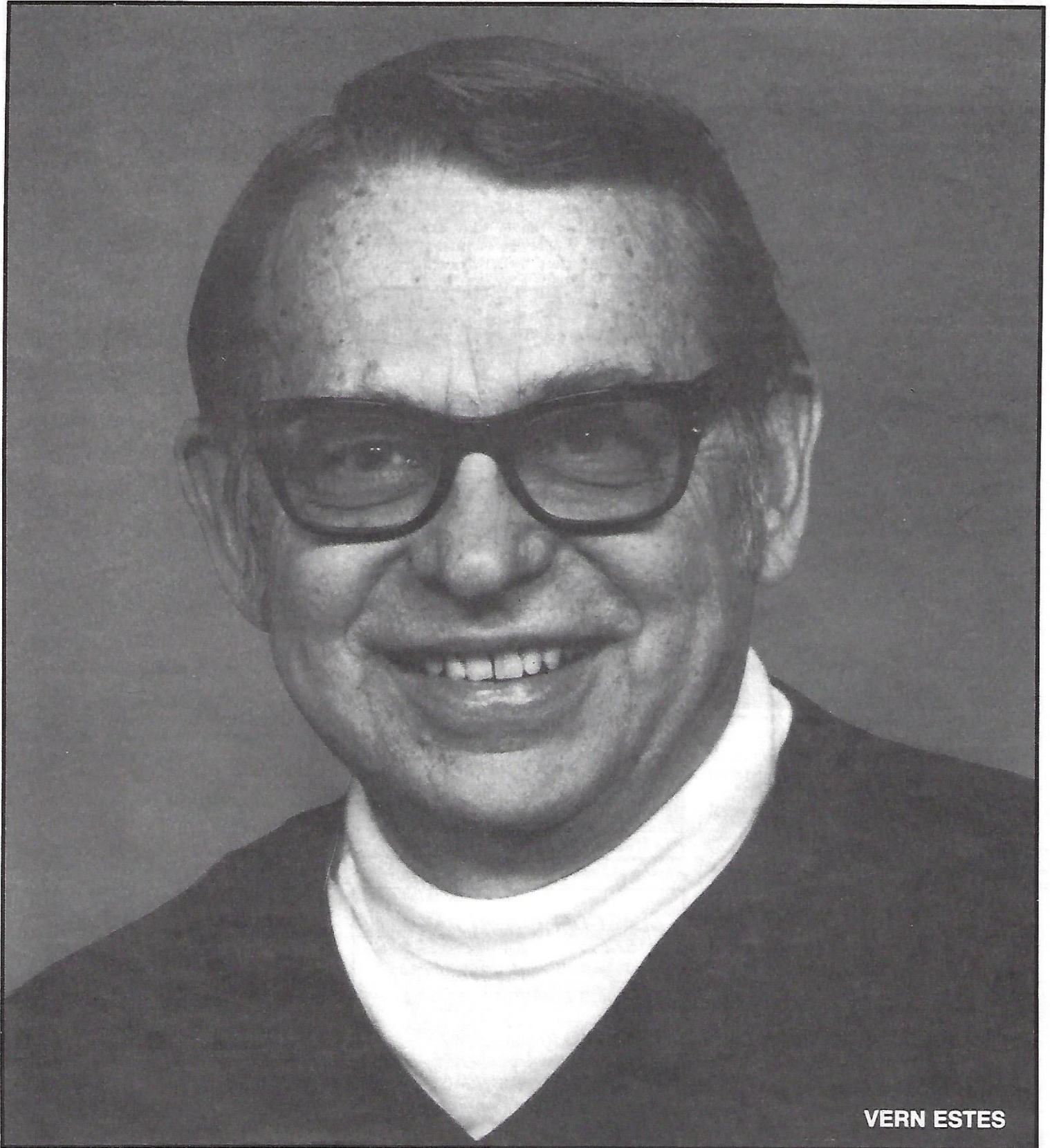


# MODEL ROCKET NEWS

# M A G A Z I N E

FALL  
1989

DEDICATED TO AND PUBLISHED FOR ESTES ROCKETEERS, AMERICA'S FUTURE IN SPACE



VERN ESTES

## SCOUT SHOW

By Steven Richman, Scoutmaster, Troop 109, Flushing, NY

Scout Troop 109 of the Dan Beard Council, Flushing, New York took part in the 1989 Scout Show of the Greater New York Councils of the Boy Scouts of America.

In preparation for the show our boys built the models you supplied as well as those purchased by the Troop. We tried to show the full range of recovery systems and the wide range of models available. The boys enjoyed building the rockets. I believe that they learned a great deal from the experience. The boys voted not to launch any of the rockets prior to the show so they could display the rockets in perfect condition. Launching all of the rockets took place later on a camping weekend.

The show was held April 1, 1989 and was attended by more than 63,000 people. It included a Scout Olympics and stage shows, but the primary focus was on the 450 display booths prepared by individual Cub Scout, Boy Scout, and Explorer units. At these booths Scouts exhibited and demonstrated Scout skills, hobbies, and crafts. We were able to set up all of our rockets labeled with their names and pertinent information on two tables. The tables also held informative pamphlets and other printed information sent to us by Estes.



Some of our Troop with their rockets.



One of our exhibit tables.

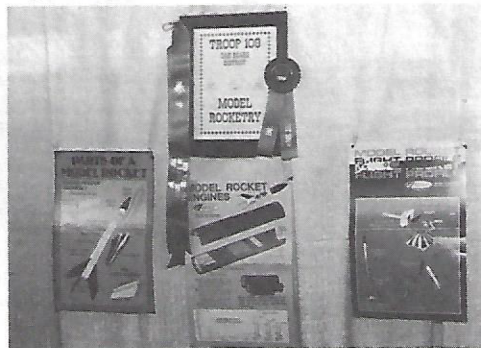
Our boys staffed the booth on a rotating basis. Each team of boys did an excellent job of answering questions and teaching the rudiments of model rocketry. There was at all times one Scout building a model rocket so that interested individuals could observe the process.

Our booth was very popular with Scouts, their parents, and Scout leaders. Many leaders showed great interest in model rocketry and were given the information packets which Estes supplied. We had Scoutmasters and Cubmasters sign for the kits so that only one kit packet was given to a group.

Over the course of the day judges circulated throughout the two ocean liner terminals that housed the display booths. In the morning all units received a green ribbon in recognition of their participation. In the early afternoon a small number of Troops received blue "Top Honors" ribbons. Toward the end of the day a handful of those units were awarded "Best of Show" ribbons. I am pleased to report that Troop 109's model rocket display was among the few that took the "Best of Show" award!



Explaining a model rocket to visitors.



Part of our exhibit and our ribbons.

Photos of Estes are courtesy of Gleda Estes.

### BLAST-OFF FLIGHT PAK™ #1672 ..... \$23.89

- \* 24 high performance Estes engines
- \* PLUS 30 igniters
- \* PLUS recovery wadding
- \* SIX each of A8-3, B6-4, C6-5, and C6-5 Estes engines

**A BARGAIN**



## NEW KITS! SLEEK PERFORMER

- \* 6.75 inches of streamlined rocket just waiting to race into the sky
- \* Nice rocket for impressing your friends
- \* Skill Level 1
- \* Launch this speedy bird with Estes 1/2A3-2T, 1/2A3-4T (First Flight), A3-4T, or A10-3T model rocket engines

**MEANIE™ #0877 . \$4.59**

### Perfect For Crowd-Pleasing!

- \* BIG! Massive 1.637 inches in diameter!
- \* 13.6 inches long
- \* Large enough to be very impressive, but small enough to be a good performer!
- \* The convenience features you want in a fun rocket to be launched again and again --quick-release engine mount, parachute recovery, easy-to-finish plastic nose cone
- \* Skill Level 1
- \* Flights to 800 feet
- \* Majestic flights with Estes A8-3 (First Flight), B4-4, B6-4, or C6-5 engines!

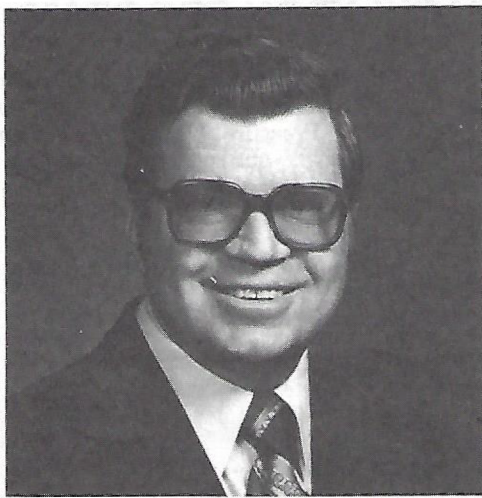
**RASCAL™ #2021 . \$8.69**

## ESTES MODEL ROCKET NEWS MAGAZINE

Bob Cannon ..... Editor  
Charles Webb ..... Photographer  
Bob Pacheco ..... Graphic Design  
Margaret Swope ..... Typesetter

Unless otherwise stated, all the model rocketry kits advertised in this magazine are hobby kits requiring assembly. Launch system, engines, glue, and finishing supplies are not included. Recommended for ages 10 through adult. Adult supervision suggested for those under 12 years of age. Prices subject to change without notice.

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## MESSAGES FROM LAUNCH CONTROL

### VERN ESTES

This issue is dedicated to a very special model rocketeer, Vern Estes. Vern founded this company 31 years ago. He was very significant in creating model rocketry. His influence was crucial to the development of model rocketry as we know it. Although he is no longer actively associated with this company, it bears his name, and it carries onward the traditions of practicality, creativity, quality, and safety which he initiated.

I am not going to write a long testimonial to Vern Estes. I'll leave the formal testimonials to the others whose tributes appear on pages 6-7 and 12 of this issue. Suffice to say, Vern hired me 21½ years ago to be director of education for Estes Industries. I'm not sure that either of us knew exactly what I would do, but Vern wanted to make model rocketry as educational as possible, and he was willing to bet that I could help. I guess I succeeded as Vern had not fired me by the time he left the company to pursue new projects.

If you have an interesting story, recollection, photo, or anecdote about Vern that you would like to share with our readers, why not submit it as an article for possible publication?

### ROCKETRY SCIENCE™ KIT

This new kit is ideal for learning more about model rocketry. It comes complete with a great set of hardware items. We developed it to help serious rocketeers learn model rocketry, and have a lot of fun in the process.

The Project Manual is an excellent 32 page guide to becoming an expert model rocketeer. It shows you how to build and operate everything in the set, plus it explains why things operate. It includes 36 Projects/Experiments which you can do.

The projects are great for fun, and they can make excellent Science Fair projects. And the set is a great way to relive those golden days when you first got started in model rocketry, then lead you to explore new levels of achievement. We tried to make it an outstanding experience for you.

### NEW SOFTWARE PROGRAM

In this issue appears the latest computer software program by Mike Dorffler, New Product Manager of the Estes Product Development team. See page 4 for the new Center of Pressure Calculation Program by Mike. This program makes finding a sometimes difficult to determine parameter of a model rocket reliable and relatively easy.

### CONTEST

Currently Estes Industries is running three contests. The Alien Being Contest ends on October 30, 1989. The rules for this contest were printed on the inside cover of the mailing wrapper for the 1989 catalog. If you cannot find a copy of the rules, send a SASE (self-addressed, stamped envelope) to Alien Being Contest, Estes Industries, 1295 H Street, Penrose, CO 81240. Mark "Alien Being Contest" in the lower left hand corner of the self-addressed, stamped envelope you send us.

The other two contests are on-going contests. The rules for the Free Plan Contest appear on this page. The rules for the Design of the Month Contest appear on page 14 of this issue.

Enter all three contests, and enter often. Share those great new ideas. Good luck!

### NEW BOOK

A new book about space is INTRODUCTION TO SPACE: The Science of Spaceflight by Thomas D. Damon. If you want to learn more about space, spaceflight, and how we are attempting to explore space, you will find this book interesting. It is published by Orbit Book Company. For more information, write to the publisher and request information about this book. The publisher may be contacted at: Orbit Book Company, Box 9542, Melbourne, FL 32902-8542.

### BITS OF HISTORY

On November 7, 1918 Robert Goddard demonstrated a solid fuel rocket.

On November 17, 1970 Luna 17 softlanded on the Moon and deployed the first unmanned lunar rover.

On November 13, 1971 Mariner 9 became the first spacecraft to orbit Mars.

### ESTES SPACE PROGRAM™

The Estes Space Program™ continues to grow. If you haven't yet purchased your ESP membership package, do it now! The program is described on page 24 of the 1989 Estes catalog.

There are now ten Achievement Awards available. These awards which ESP members can earn are:

- Single Stage Model Rocket Flight
- Multi-Stage Model Rocket Flight
- Payload Model Rocket Flight
- Scale Model Rocket Flight
- Glider Model Rocket Flight
- Science Fair Model Rocket Project
- School Demonstration Model Rocket Project
- Estes Aerospace Club
- Space Shuttle Support Mission

### Aerial Photography

I hope that you earn each of them, and have a lot of fun and learning in the process! We created them to provide you with a systematic way to improve your model rocketry skills, learn more about the science in rocketry and model rocketry, and have fun!

### FREE PLAN CONTEST

In 1987 we initiated the Free Plan Contest. It is very much like the Design of the Month Contest. It is somewhat more difficult, however, and the prize is larger.

The hobby of model rocketry has always encouraged creativity and the test of new ideas. New ideas and techniques have been shared to make the hobby more fun and rewarding for everyone. The Free Plan Contest was created to encourage you to experiment to find new and useful model rocket designs.

The more accurate and detailed the entry, the better the chance of winning. Do your best, and Good Luck! We will share most of the winners through publication in Model Rocket News Magazine.

1. Design a unique new model rocket. Plans based on current or previously existing model rocket kits will be disqualified.

2. The model rocket plans must be clear and accurate. All pertinent measurements must be provided. Make good blueprint-type drawings. Freehand drawings have little chance of winning.

3. Only parts available from the current Estes catalog or easily fabricated by the rocketeer are permitted.

4. The plans must include a complete and accurate parts list containing both the names and part numbers of all standard parts and the number of each needed.

5. Actually build and test-fly the model rocket. It must be stable in flight.

6. Fly the completed rocket with different Estes engines. List in the instructions the engines which produced safe, stable flights.

7. Do not send us the completed rocket, but include a good photograph of the completed rocket with the plans. This photo does not have to be included on the instructions.

8. The entire plan and instructions must be printable as one or two 7¾ x 10 ¼ inch pages in Model Rocket News Magazine.

9. All entries become the property of Estes Industries. None will be returned.

10. Winners will each receive a merchandise certificate of \$100 from Estes Industries.

11. The winners will be selected by our panel of judges. All decisions will be final. The number of winners is at the discretion of the judges. Winning entries may be published in various Estes publications.

12. All winning entries must meet the standards established in the NAR/HIA Model Rocketry Safety Code.

13. Put your name, address, city, state, and zip code clearly on the back of each entry.

14. Employees of Estes Industries and their immediate families are not eligible to enter.

# CHILDHOOD FASCINATION LED TO SPACE CAREER FOR ROSS

By Shanna Flowers of the Sentinel Staff. Reprinted with permission from Orlando (FL) Sentinel of November 27, 1988.

**KISSIMMEE**--Jerry Ross has come a long way since his boyhood days when he launched a model rocket with the family's pet mouse as the payload.

Selected as a NASA astronaut in 1980, Ross walked in space five years later with Atlantis crew member Sherwood Spring who helped him erect a 45-foot aluminum tower.

This week, Ross, 40, is set to return to space aboard the shuttle Atlantis as a mission specialist.

Ross' mother, Phyllis, said her son had been preparing for a career in space since he was a youngster growing up in Crown Point, Indiana, a town of 12,500 residents.

"It just seems sort of natural that he would be going up," she said.

Ross was born on January 20, 1948. As a youngster, he was "impish" and "inquisitive," Mrs. Ross said.

He built model rockets and launched them in the family's back yard. One day, he sent up a rocket carrying the family's white mouse.



Mother of Jerry Ross says he was "impish" and "inquisitive".

Ross religiously followed news accounts of America's early space exploration. He was an excited grade school boy in 1961 when Alan Shepard became the first American to fly into space, and John Glenn was the first American to orbit the Earth a year later.

"He was fascinated by all of that," Mrs. Ross said. Shortly afterward, Ross "settled down" after deciding to pursue a career in space exploration, his mother said.

He graduated from Crown Point High School in 1966 and later received bachelor and master's degrees in mechanical engineering from Purdue University.

An Air Force ROTC student at Purdue, Ross received his commission when he graduated. He went on active duty in 1972 and was assigned to Wright-Patterson Air Force Base in Ohio.

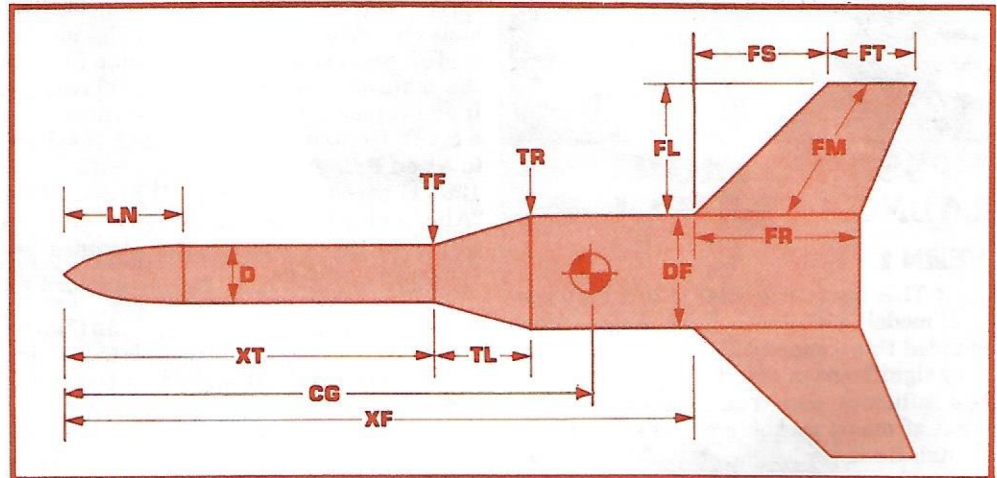
# CENTER OF PRESSURE CALCULATION PROGRAM

Here is a new software program by our own Mike Dorffler. Accurately calculating the Center of Pressure is one of the most difficult, yet important, problems in designing model rockets. This program for the Apple II series of computers provides a convenient, reliable way to calculate the Center of Pressure.

Use this program to determine the Center of Pressure for your own designs.

Stable model rockets must have the Center of Gravity a reasonable distance ahead of the Center of Pressure. If the CG is too far ahead of the CP, your rocket may weathercock into the breeze. If the CG is not far enough ahead of the CP, your rocket will not be stable.

Enter all measurements in millimeters. Use the diagram to determine what the various measurements called for are.



```

10 REM -----
20 REM MODEL ROCKET CENTER OF PRESSURE CALCULATOR
30 REM WRITTEN BY MIKE DORFFLER
40 REM COPYRIGHT (C) 1989 ESTES INDUSTRIES
50 REM -----
60 TEXT : HOME : PRINT CHR$(21): GOTO 160
70 HTAB 20 - INT ( LEN (A$) / 2): VTAB 7: PRINT A$: RETURN
80 WAIT 49152.128:K = PEEK (49152): POKE 49168,0: RETURN
90 VTAB 7: PRINT "ARE THESE FIGURES CORRECT? (Y/N)"
100 VTAB 7: HTAB 26: FLASH : PRINT "?: NORMAL
110 GOSUB 80: IF K < > 206 AND K < > 217 THEN 110
120 RETURN
130 GOSUB 140:V = V + 1: VTAB 7: PRINT T$:V = V + 1
140 FOR H = 1 TO 37 STEP 4: VTAB 7: HTAB H: PRINT "-----": NEXT
150 RETURN
160 HOME :V = 5: GOSUB 140:V = 8: GOSUB 140
170 A$ = "MODEL ROCKET":V = 6: GOSUB 70
180 A$ = "CENTER OF PRESSURE CALCULATOR":V = 7: GOSUB 70
190 A$ = "BY MIKE DORFFLER":V = 10: GOSUB 70
200 A$ = "COPYRIGHT (C) 1989 ESTES INDUSTRIES":V = 12: GOSUB 70
210 A$ = "ENTER ALL DIMENSIONS IN MILLIMETERS":V = 19: GOSUB 70
220 A$ = "PRESS (RETURN) TO BEGIN":V = 21: GOSUB 70
230 GOSUB 80: IF K < > 141 THEN 230
240 REM -----
250 REM NOSE CONE DATA ENTRY
260 REM -----
270 FOR J = 1 TO 3:TF(J) = 0:TR(J) = 0:TL(J) = 0:XT(J) = 0
280 TN(J) = 0:TCP(J) = 0:FR(J) = 0:FT(J) = 0:FL(J) = 0
290 FM(J) = 0:FS(J) = 0:BR(J) = 0:XF(J) = 0:FP(J) = 0:PCP(J) = 0
300 NEXT J:N$ = 2:T = 1:F = 1
310 HOME :V = 3:T$ = "NOSE CONE INFORMATION": GOSUB 130: PRINT
320 INPUT "ENTER NOSE CONE BASE DIA (D).....":DN
330 INPUT "ENTER NOSE CONE LENGTH (LN).....":XN
340 PRINT "ENTER (C)ONE, (O)GIVE, (P)ARABOLA."
350 VTAB 10: HTAB 36: FLASH : PRINT "?: NORMAL
360 GOSUB 80: IF K < > 195 AND K < > 207 AND K < > 208 THEN 360
370 VTAB 10: HTAB 36: PRINT CHR$(K): PRINT
380 IF K = 195 THEN NCP = XN * .47
390 IF K = 207 THEN NCP = XN * .5
400 IF K = 208 THEN NCP = XN * .5
410 INPUT "ENTER NOSE TIP TO MODEL CG (CG).....":CG
420 V = 18: GOSUB 90: IF K = 206 THEN 310
430 VTAB 18: PRINT "DOES MODEL HAVE ANY TRANSITIONS? (Y/N)"
440 VTAB 18: HTAB 32: FLASH : PRINT "?: NORMAL
450 GOSUB 110: IF K = 206 THEN 630
460 REM -----
470 REM TRANSITION DATA ENTRY
480 REM -----
490 HOME :V = 3
500 T$ = "TRANSITION * + CHR$(176 + T) + * DIMENSIONS": GOSUB 130
510 INPUT "ENTER TRANSITION FRONT DIA. (TF).....":TF(T)
520 INPUT "ENTER TRANSITION REAR DIA. (TR).....":TR(T)
530 INPUT "ENTER TRANSITION LENGTH (TL).....":TL(T): PRINT
540 PRINT "ENTER DISTANCE FROM NOSE TIP TO *
550 INPUT "FORWARD DIA. OF TRANSITION (XT).....":XT(T): PRINT
560 V = 18: GOSUB 90: IF K = 206 THEN 500

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570 TN(T) = ((TR(T) / DN) * (2)) - ((TF(T) / DN) * (2)) * 2
580 T$ = 1 + (1 - (TF(T) / TR(T))) / (1 - ((TF(T) / TR(T)) * (2)))
590 TCP(T) = XT(T) + (TL(T) / 3) * T$: IF T = 3 THEN 630
600 VTAB 18: PRINT "ARE THERE ANY MORE TRANSITIONS? (Y/N)"
610 VTAB 18: HTAB 31: FLASH : PRINT "?: NORMAL
620 GOSUB 110: IF K = 217 THEN T = T + 1: GOTO 490
630 REM -----
640 REM FIN DATA ENTRY
650 REM -----
660 HOME :V = 3
670 T$ = "FIN SET * + CHR$(176 + F) + * DIMENSIONS": GOSUB 130
680 PRINT "NUMBER OF FINS (3 OR 4)....."
690 VTAB 7: HTAB 36: FLASH : PRINT "?: NORMAL
700 GOSUB 80: IF K < > 179 AND K < > 180 THEN 700
710 VTAB 7: HTAB 36: PRINT CHR$(K):N = K - 176: PRINT
720 INPUT "ENTER FIN SET ROOT CHORD (FR).....":FR(F)
730 INPUT "ENTER FIN SET TIP CHORD (FT).....":FT(F)
740 INPUT "ENTER FIN SET SEMI-SPAN (FL).....":FL(F)
750 INPUT "ENTER FIN SET MID-LENGTH (FM).....":FM(F)
760 INPUT "ENTER FIN SET FIN SWEEP (FS).....":FS(F)
770 INPUT "ENTER BODY TUBE DIA. AT FINS (DF).....":DF:BR(F) = DF / 2
780 INPUT "ENTER NOSE TIP TO FIN L.E. (XF).....":XF(F)
790 V = 18: GOSUB 90: IF K = 206 THEN 660
800 IF N = 3 THEN AF = 13.85 * ((FL(F) / DN) * (2))
810 IF N = 4 THEN AF = 16 * ((FL(F) / DN) * (2))
820 ZA = 2 * FM(F):ZB = FR(F) + FT(F):ZC = (ZA / ZB) * (2)
830 ZD = 1 + ZC:ZE = SQRT (ZD):ZF = 1 + ZE:ZG = AF / ZF
840 ZH = FL(F) + BR(F):ZI = BR(F) / ZH:ZJ = 1 + ZI:ZK = ZJ * ZG
850 ZL = FS(F) / 3:ZM = 2 * FT(F):ZN = ZM + FR(F):ZO = ZN / ZB
860 ZP = ZL * ZO:ZQ = FR(F) * FT(F):ZR = ZO / ZP
870 ZS = ZB - ZR:ZT = ZS / 6:ZU = XF(F) + ZP + ZT
880 FP(F) = ZK:PCP(F) = ZU
890 IF F = 3 THEN 930
900 VTAB 18: CALL - 958: VTAB 18: PRINT "ANY MORE FIN SETS? (Y/N)"
910 VTAB 18: HTAB 18: FLASH : PRINT "?: NORMAL
920 GOSUB 110: IF K = 217 THEN F = F + 1: GOTO 660
930 REM -----
940 REM FINAL CP CALCULATION
950 REM -----
960 M1 = 2 + TN(1) + TN(2) + TN(3) + FF(1) + FF(2) + FF(3)
970 M2 = 2 * NNF:M3 = TN(1) * TCP(1):M4 = TN(2) * TCP(2)
980 M5 = TN(3) * TCP(3):M6 = FF(1) * FCP(1):M7 = FF(2) * FCP(2)
990 M8 = FF(3) * FCP(3):M9 = M2 + M3 + M4 + M5 + M6 + M7 + M8
1000 LCP = INT (M9 / M1): REM LOCATION OF CP
1010 BA = LCP - CG:BB = BA / DN: REM CALIBERS
1020 HOME :V = 3:T$ = "MODEL CENTER OF PRESSURE RESULTS": GOSUB 130
1030 PRINT "CP IS LOCATED *LCP* MM BEHIND NOSE TIP."
1040 PRINT "CG IS LOCATED *CG* MM BEHIND NOSE TIP": PRINT
1050 R$ = "STABLE MODEL ROCKET DESIGN."
1060 IF BA < 0 THEN R$ = "UNSTABLE MODEL ROCKET DESIGN!"
1070 IF BB < 1 THEN R$ = "QUESTIONABLE MODEL ROCKET DESIGN."
1080 FLASH : PRINT R$: NORMAL : PRINT
1090 VTAB 23: PRINT "RUN ANOTHER CALCULATION? (Y/N)": GOSUB 110
1100 IF K = 217 THEN 240
1110 TEXT : HOME : VTAB 21: END

```

In 1979, Ross was assigned to the payload division at the Lyndon B. Johnson Space Center in Houston.

A year later he was selected to be an astronaut.

Mrs. Ross said when her son went up in space three years ago, more than 200 friends and family members drove to Florida to watch the launch.

When he returned, Crown point officials welcomed him home. Mrs. Ross said well-wishers are expected to travel to Florida to witness this week's launch.

"The whole family is so excited he realized his dream," Mrs. Ross said.

Ross and his wife, Karen, have a daughter, Amy, 17, and son, Scott, 16.

# MANNED SPACE FLIGHT LAUNCH VEHICLES

By Gregory P. Kennedy, NAR #12874, Space Center, Alamogordo, NM

With the (re-)introduction of the Saturn V (product #2001), model rocketeers can present a flying history of the American space program.

The first American manned space venture was **Mercury**, which sought to place a pilot in orbit about Earth. The first Mercury tests were with a rocket named **Little Joe**. This relatively small rocket, fired from Wallops Island, Virginia, tested the Mercury launch escape system. Mercury carried its first passengers during these flights. Two Mercury-Little Joes carried rhesus monkeys named Sam and Miss Sam. (Sam was an acronym for the Air Force School of Aerospace Medicine at Brooks Air Force Base in Texas.)

The next Mercury launch vehicle was the **Redstone**. In 1958, the Redstone was the basis for the Jupiter-C (kit #1976), which launched America's first satellite, **Explorer 1**. Before committing Mercury to a world-circling flight, NASA managers wanted a sub-orbital test which would take the spacecraft briefly into space, then return it. The Redstone was selected for this role.

The first Mercury Redstone mission was an embarrassing failure. The Redstone engine shut down just as the vehicle lifted-off, and it settled back on the pad. This triggered the launch escape system which separated from the spacecraft, leaving it on the booster. Then, at the proper time, the capsule's parachutes deployed, fluttered alongside the Redstone. Within a month, NASA was ready to try again. Mercury Redstone 1A blasted off on December 19, 1960. The next Mercury Redstone flight carried Ham, the first chimpanzee into space, on January 31, 1961. One more unmanned Mercury Redstone flight occurred, the **Mercury-Redstone Booster Development (MR-BD)** flight on March 24, 1961. This flight did not carry a numerical designation because program managers added it as a final test of the Redstone rocket before committing it to manned space flight.

On May 5, 1961, Alan B. Shepard, Jr., became the first American in space. He named his spacecraft **Freedom 7**. You can build a flying replica of Shepard's Mercury Redstone with kit #1921. Shepard reached an altitude of 116.5 miles and landed 302.8 miles downrange. His flight lasted 15 minutes 22 seconds.

Astronaut Virgil I. "Gus" Grissom became the second American in space on July 21, 1961 with a sub-orbital flight like Shepard's. He named his spacecraft **Liberty Bell 7**. Unfortunately, after splashdown the explosive bolts which secured the hatch detonated, and the spacecraft quickly filled with water. Grissom barely had time to escape before Liberty Bell was lost.

After the sub-orbital missions, Mercury shifted to the orbital flights which used the more powerful **Atlas** rocket. On February 20, 1962, John H. Glenn, Jr. became the first American to orbit Earth aboard **Friendship 7**. Three more Mercury missions followed, culminating with Gordon Cooper's 34-hour flight in **Faith 7**.

By this time preparations were well underway for Mercury's successor, **Project Gemini**. Shortly after **Freedom 7**, President John F. Kennedy announced the goal of landing a person on the moon before 1970. This effort became **Project Apollo**. However, in between Mercury's orbital flights and Apollo's lunar expeditions, another program was needed. This in-between program, **Project Gemini**, developed the techniques needed for flight to the moon. Modified **Titan** missiles propelled the Gemini spacecraft, which carried two pilots, into orbit. You can build a flying model of the Gemini Titan with kit #1978.

The program began with two unmanned tests followed by the first piloted flight, **Gemini 3**, on March 23, 1965. The Estes kit represents this particular vehicle. Nine missions followed in 1965 and 1966. During these flights, astronauts conducted orbital rendezvous and dockings, worked outside their spacecraft protected only by a space suit, and spent up to two weeks in space.

After Gemini came **Apollo**. Like Mercury, Apollo launch escape system testing used a booster named **Little Joe**. The Apollo rocket was called the **Little Joe II**, and was much larger than its Mercury predecessor. This rocket was launched from White Sands Missile Range in New Mexico. Altogether, there were four **Apollo Little Joe II** flights between 1964 and 1966.

However, the best known Apollo boosters were the **Saturn** family of launch vehicles. The first of these, the **Saturn I**, made ten unmanned flights. Next came the **Saturn IB**. The first manned flight of the

program, **Apollo 7**, used this booster. The next mission, **Apollo 8**, saw astronauts orbiting the moon on Christmas Eve, 1968. This was the first manned flight of the huge **Saturn V**. Estes kit #2001 is a faithful replica of this gigantic rocket. Even though this is one of the largest rockets in the Estes Industries catalog, it is still only 1/100th the size of the original!

On July 20, 1969, Astronauts Neil Armstrong and Buzz Aldrin fulfilled Apollo's goal during **Apollo 11**. Six more **Saturn V**'s carried Americans to the moon. On five of the missions, astronauts successfully landed on the lunar surface. The flight which did not land was **Apollo 13**, which was aborted following an explosion in the Apollo Service Module. But astronauts Lovell, Swigert, and Haise looped around the moon one time before starting back to Earth.

One final flight was made with the **Saturn V**, the launch of the **Skylab** space station for NASA's next manned space project. In 1973 and 1974, three teams of astronauts visited the station using Apollo spacecraft. The manned portions of **Skylab** used the **Saturn 1B**. The Saturn 1B was also used for the **Apollo Soyuz Test Project** in July, 1975. This was the last American manned space flight using an expendable booster.

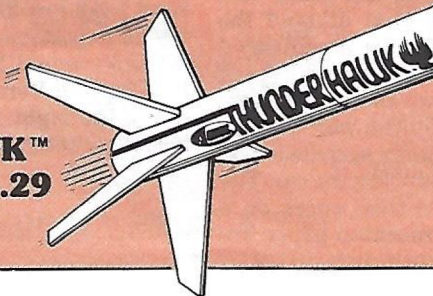
The next time Americans headed for space, they rode the **Space Shuttle**. On April 12, 1981, astronauts John Young and Robert Crippen lifted off from the Kennedy Space Center aboard the **Space Shuttle Columbia**. Like your model rockets, the Space Shuttle is reusable. And you can build a realistic replica of it with kit #1284. What's even more exciting, the Orbiter on the Estes kit separates from the External Tank and glides back just like the real thing!

So, with kits found in the Estes catalogs, you can build your own flying "museum" with replicas of the Mercury, Gemini, Apollo, Skylab, and Space Shuttle launchers.

See pages 32, 44, 46, 50, 52, and 54 of the 1989 catalog for scale models of U.S. manned spacecraft. Not all kits mentioned are currently available, but may be found in some hobby shops.

**ESTES THUNDER HAWK™**

**THUNDERHAWK™**  
#2002 . . . . \$6.29



**MASSIVE ROCKET FOR SPECTACULAR LAUNCHES!**

- \* 22 inch long sport flier is really impressive!
- \* Wide 0.976 inch body
- \* Excellent performance--flights to over 1,100 feet!
- \* Five fins for ultra-stable flights!
- \* A bargain!
- \* Extremely pleasing performance with Estes A8-3 (First Flight), B4-4, B6-4, or C6-5 engines

# THE MAN WHO TAMED THE ROCKET

By G. Harry Stine, NAR#2, Phoenix, AZ

A rocket engine was once described as a "demon in a bottle" which is probably right because a rocket engine is indeed a bottle with a hole in one end and an internal demon consisting of rocket propellant which, when ignited, turns into lots of hot gas under pressure. When this gas rushes out the open end of the bottle--what we call a nozzle--it produces a thrust force. If you don't handle the demon just right, you're in a heap of trouble.

Exorcising this demon so it was safe enough to put in the hands of people everywhere was a hard job thirty years ago. The man who did it best is my friend and colleague, Vernon David Estes, NAR #360, the founder of Estes Industries, Inc. and the man whose name is now synonymous with model rocketry everywhere.

I first met Vern in 1958 after I'd been introduced to model rocketry by the late Orville H. Carlisle of Norfolk, Nebraska. I'd started Model Missiles, Inc. in Denver, Colorado to make and sell model rocket kits and engines. I needed someone to make the rocket engines for me. Our first engine supplier couldn't maintain the sort of outstanding quality control we've all grown to expect of model rocket engines. So I began looking around Denver for someone who knew something about rockets and had the sort of Yankee ingenuity that would be required to set up a fully automatic model rocket engine manufacturing plant.

I was introduced to a young man with a crew cut and wearing glasses. It was Vern Estes who, at that time, ran a business at 5505 N. Tejon Street in Denver building garages and remodeling homes. Vern's father was in the wholesale fireworks business, and Vern had some experience with sky-rockets. I explained my problem to Vern and asked him if he could make model rocket engines for me. He said he'd think about it and let me know.

It took Vern about six weeks during which time he borrowed a lot of books I had on professional solid propellant rockets and spent time with me discussing the project. Finally, he showed up on a hot July day in 1958 at Model Missiles, Inc. office at 1159 California Street in Denver and announced, "I can make your rocket engines for you, and I'll make them better than the ones you are now selling".

During the next six months Vern labored to build a fully automatic model rocket engine manufacturing system in the open sheds behind his home on Tejon Street. He had a welding outfit, a drill press, and an old Sear Roebuck lathe whose electric motor didn't have a starting capacitor on it, requiring him to pull it through by hand to get it started. With these simple tools Vern built "Mabel," the world's first model rocket engine machine.

Handling black powder is like messing around with a wild bull elephant. In its granular form, black powder is a "Class B Explosive" that can be ignited by a spark or by friction. Once loaded into a model rocket engine, however, it is extremely safe as thirty years of testing and more than 300 million engines have shown beyond a shadow of a doubt. Building a machine to handle black powder and squeeze it into paper engine casings without having it blow up in the process wasn't easy.

One cold Colorado day in December 1958 with snow on the ground all around the open shed and all of us slowly freezing in the dry, blustery wind, Vern turned on Mabel and started making experimental model rocket engines with it. Mabel could make 100 engines in sequence. Vern would dump the empty tubes into one hopper, powdered clay into another, and propellant powder in others. Mabel was driven by pneumatic (air) and hydraulic (oil) pressures. No electricity was used around Mabel. The air pressure came from an ordinary service station air compressor located away from Mabel, while hydraulic pressure was supplied by an old Buick power steering pump driven by an electrical motor, again located remotely from Mabel.

Mabel was the product of "high technology tinkering," and Vern was and still is very, very good at this sort of thing. He's a born mechanic...and a very smart one at that.

When Mabel was running, it was fascinating to watch and hear. Pistons went up and down. Mechanical arms moved back and forth. Things rotated. And sounded something like:  
Hiss...Kachunk...Fizz...Clunk...Chunk-chunk-chunk...Psssss...Groan...Snap-snap... Over and over again. Every few seconds a completed model rocket engine would drop out into a big cardboard box.

Vern would then static-test the engines. This involved putting them nozzle-up on a postage scale to measure the thrust. Not all the early experimental engines worked right. Getting Mabel adjusted properly to make good engines on a consistent basis was time-consuming and required endless days of fiddling and diddling to get everything just right. Sometimes the experimental engines would blow their nozzles. Sometimes they wouldn't produce enough thrust. Sometimes they'd produce too much. Vern used up a lot of cheap postal scales.

Then he built a static test stand with a swinging pivoted arm that allowed the engine thrust to push against a calibrated spring. A big paddle moved through an oil bath as a damper to keep the spring from bouncing the arm around the way a shock absorber works on an auto suspension to keep the springs from bouncing the car. The machine traced a thrust-time curve on a moving strip of adding machine paper. Ingenious for its time but primitive today.

Finally, all of the problems were solved, and Mabel was turning out the sort of high-quality model rocket engine that everyone has come to expect from Estes. On January 15, 1959, the very first production model rocket engine, a Model Missiles, Inc. Type A-4 (We hadn't yet developed today's standardized NAR engine nomenclature.) popped out of Mabel. I still have it, and I'm looking at it as I write this. Except for a thinner paper casing, a ceramic head cap instead of a paper one, and some small technical improvements in the nozzle, today's Estes A8-4 is the same. (However, Mabel was long ago retired, and new machines have taken its place.)

But Model Missiles, Inc. couldn't sell model rocket engines as fast as Vern could make them with Mabel, and the contract between "Estes Enterprises, Inc." (as Estes Industries, Inc. was known in those days) allowed Vern to independently sell engines by mail order, a marketing procedure not being used by Model Missiles, Inc. who sold only through hobby stores. Thus, Vern began to build his own business in model rocketry.

Vern began looking for a remote location so the business could grow. He and Gleda, his wife, bought some farmland in a little town in Colorado's Arkansas River valley called Penrose whose only claim to fame until then had been its apples. Today, of course, it is the Model Rocket Capital of the World.

The early Penrose years weren't easy for Vern and Gleda. They were literally pioneers in the classic Western tradition. Their house--now the R&D department of the Estes plant--got its water from a cistern which had to be filled regularly to provide running water so that the indoor plumbing would work. But they had room to build their business...and they did.

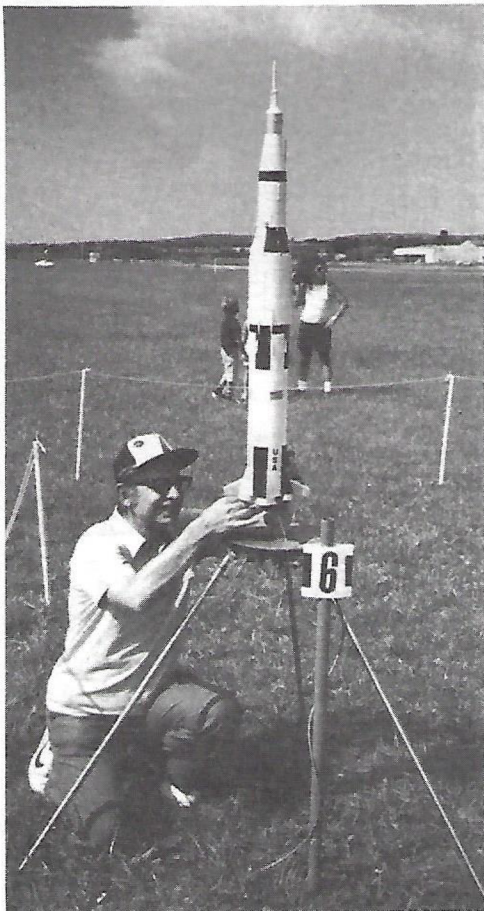
Vern sold Estes Industries, Inc. to Damon Corporation in 1969 and stayed on for a few years to ensure that his rigid standards for quality control of not only the engines but also the Estes model rocket kits were strictly observed as they still are today.

I guess maybe I'm telling stories out of school here, but Vern and I were reminiscing one day about those early days and all the risks we'd taken getting model rocketry going. We both admitted to one another that we'd probably been young and rash to try what we did. As a matter of fact, Vern and I agreed that if we--or anyone else--tried to start model rocketry today, it would probably be impossible. The business and technical risks would be considered too high. So it looks like Vern and I came along at precisely the right moment in history to get model rocketry off the launch pad.

# DEMON

And it wouldn't have been possible at all if it hadn't been for Vern's enthusiasm and willingness to move ahead and the continual support of his wife Gleda who was as deeply involved in the business as Vern and who was actually a better model builder and contest flyer than her husband. (Sorry about that, Vern!)

Vern, from one old rocketeer to another, you've done a fine job, and you've earned every bit of what you've got because you've done it with hard work. Our world would be a better place if more people were like you!



Vern Estes of Canon City, CO, founder of Estes Industries, preps the new Estes Saturn V for launch at NARAM-30 held the first week in August 1988 at Huntsville, AL. He helped with the Estes manufacturer's demonstration.

## SOME COMMENTS BY AN ASTRONAUT WHO "GREW UP" WITH MODEL ROCKETRY

By Jay Apt, NASA Astronaut, Houston, TX

In 1962 I first learned about model rocketry when a friend gave me a copy of the Estes catalog (a version hand-stapled by Gleda Estes). That catalog held all the essentials of Vern Estes' great gifts to the young people of America: An exciting hobby that offered challenges to folks at all levels of skill, and at the same time instilled in them the responsibility to keep the hobby safe. The catalog, and Vern himself, never talked down to us. Instead, he offered us the tools to pick a kit (My first was an Astron Mark.), learn proper engine selection, select a launch site, and later to learn how to design our own models.

I have had the great good fortune of working with Vern Estes for the last 25 years in the National Association of Rocketry, where he currently serves as a member of the Board of Trustees. At countless rocket meets and conventions, his has always been a voice of enthusiasm and quiet reason. As a matter of fact, his calm approach to the frequently emotional debates in our hobby has been a model for me to copy in tense situations in the space program. Vern's support of the young people in the hobby has been unwavering. When I (at the age of 16) approached him with the brand-new idea of the Pittsburgh Spring Convention in 1966, he jumped right in and made it possible for us to have a first-year attendance of over 200 people! He has always encouraged folks to extend their skills and to learn new things.

It is no accident that the things which made Estes Industries a guiding light of the hobby made good business sense as well. The principles of doing all possible work in-house so that the staff can control quality and make changes easily, of providing the customers with a wide range of choice and always keeping in touch with the hobby, of educating the modelers, and of providing fast and reliable service at a price people could afford—all of these are finally being rediscovered by business school graduates trying to keep up with the Japanese. It turns out that Vern's most important contribution to the young people of my generation may very well have been to teach us that hard work and attention to detail are really the only way of succeeding—in model rocketry, in business, and in life!



**UPDATED  
VERSION OF  
VERN ESTES'  
1959  
CLASSIC!**



- \* Balsa nose cone
- \* Balsa fins, pre-cut
- \* Break-apart recovery
- \* 7.5 inches long
- \* Only 0.39 ounces
- \* Modern version of the classic Estes Kit No. 1! Every fleet needs an Estes Scout!
- \* Flights to 600 feet!
- \* Skill Level 1
- \* Great flights with Estes 1/2A3-4T (First Flight), A3-4T, or A10-3T engines

**SCOUT III™**  
#0878 . . . . . \$3.89

## MAGNUM™



### POWER ROCKETRY!

- \* BIG!—34.625 inches long  
1.637 inches in diameter

**MAGNUM™ #2032 . \$17.99**

- \* Clear payload compartment
- \* 24 inch parachute for lowering its large bulk gently
- \* Skill Level 2
- \* Two-stage. Can fly about a quarter-mile high!
- \* Top stage alone performs well with Estes B4-4, B6-4 (First Flight), B8-5, or C6-5 engine
- \* Maximum performance with Estes D12-0 in the booster and Estes A8-5 (First Flight), B4-6, B6-6, or C6-7
- \* Requires Maxi™ for launch

## ROCKET ENTHUSIAST INTRODUCES "THE GAME OF SPACE"

Linder Winter, a teacher in the Woodland Park, Colorado, schools, has been a strong model rocketry advocate for the past seventeen years. His students construct an average of 200 rockets per year, both during and after school. Many students continue model rocketry in 4-H and go on to win awards at county and state competitions.

Using his years of experience as a space science teacher, Mr. Winter has created a unique game called "The Game of Space". This exciting game is for anyone who enjoys learning about space and sharing the knowledge with friends and family. It is great for the classroom, also. For further information, write Other Worlds Educational Enterprises, Box 6193, Woodland Park, CO 80866-6193.

**Q. What did the moon say to the star?**

**A. Boy, are you far out!**

**Q. Which is heavier, a half moon or a full moon?**

**A. A half moon, because a full moon is lighter.**

**Q. Why do so many people enjoy astronomy?**

**A. Because it is so heavenly.**

*Contributed by Jeff Lake, Fort Madison, IA*

## AEROTREK

**AEROTREK: Model Rocket Altitude Prediction Toolkit** is a collection of altitude prediction programs for the Apple II series of computers. These extremely useful programs were written by Mike Dorffler, New Products Manager of the Estes Product Development team.

The programs operate very quickly. They are easy to use. Simple selection of values from the screen provide quick, easy input of data. Purchase this product to make your altitude predictions easy and accurate.

These programs are:

INTRODUCTION

SINGLE STAGE

TWO STAGE

THREE STAGE

SINGLE STAGE CLUSTER

INCREMENTED WEIGHT (to optimize weight)

DESIGNER'S SCRATCHPAD

LUNAR LAUNCH (performance of model rocket launched on moon)

### AEROTREK

#9033 . . . . . \$19.95



**AEROTREK:**

**Model Rocket Altitude Prediction Toolkit**

## MRNM CONTRIBUTIONS NEEDED!

Send us YOUR news. Write a letter with suggestions and ideas.

We like your Idea Box tips. Share that great idea!

Articles--technical, humorous, or simply reports on your model rocketry activities--are welcome.

Cartoons are always welcome. Your cartoon stands a much better chance of use if we don't have to redraw it before we can print it.

We give preference to contributions by ESP™ members. But we won't exclude your contribution if you are not yet an ESP™ member.

Put each separate contribution on a separate sheet of paper. Please put your name and complete address on each thing you send in.

Thanks!

**Q. How many planets were in our solar system before Pluto was discovered?**

**A. Nine**

*Contributed by Marcus Jaurigue, Phoenix, AZ*

**Q. What did the cow answer when asked "What is Earth's satellite?"**

**A. The Moooooooon**

*Contributed by Danny Flemings, Houston, TX*



*Fred Craven doing his tuxedo three-step while prepping his Jay Hawk target drone. Photo by Alan Williams.*

## Twilight Launch

*By David Crocker, Clarkston, WA*

I recently discovered a way to have some crepuscular (twilight) nonsense with my rocket. Yes, I launch my rockets at twilight. Crazy, you say? I'll never find them in the dark! Au-contraires!

Cylume light sticks will fit inside the body tube of larger models. They have a convenient ring to attach to a shroud line. They are bright enough to track easily. As soon as the ejection charge pops, "Instant visual tracking." Put wadding between the light stick and the engine. Pack the parachute on top of the stick. Don't forget to break the stick prior to launch!

Sometimes you will find novelty jewelry using the same materials which can be used in smaller body tubes. If you have a clear body tube, as in the Hercules, you get to watch the upward flight as well as the recovery. The same company makes a small light stick called a "Lunker Light" which is available at some fishing tackle stores. These should be put partway into a piece of surgical tubing. Tie the shroud to the other and attach it to your nose cone.

Remember--Fly in a clear area. Don't run when you can't see. Take your time, recover your rockets safely, and have fun!



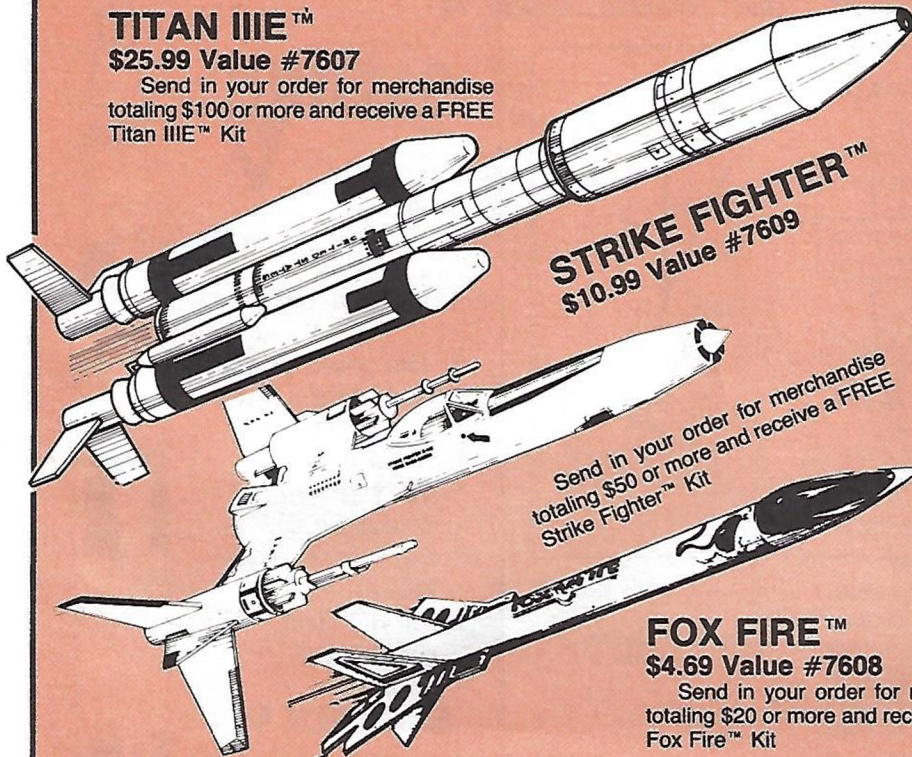
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**ESTES SPACE PROGRAM™**  
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Send in your order for merchandise totaling \$30 or more and receive a FREE Estes Space Program™ Membership (See catalog page 24)

*Important: If you do not list your free kit, you will not receive it.*



These special free offers are available only for orders received by February 28, 1990. Orders must be accompanied by full payment (check, money order, Master Card, or Visa charge). Order qualification for a free kit is based on amount of merchandise ordered. If you qualify for one of these free rocket kits, just list the names and special kit number from this page as the last item on your order. List "Free" in the column for total price. These special offers may not be used with other special offers, bonus coupons, or discount.

# ESTES SPACE PROGRAM™

How many Estes Space Program™ Achievement Awards have you earned?

The ESP was developed to provide for you a way to test your model rocketry knowledge and skills. As you master each new area of model rocketry you can earn an Achievement Award. The award proves that you have learned and demonstrated a model rocketry skill.

There are now a total of 10 Achievement Awards which you can earn. These awards are summarized below. With each award is a brief description of what you must do to qualify. The first five awards have coupons on the ESP Official Information Sheet which you received in your ESP Membership Packet. There are nine extra Official Validation Seals on this sheet which you can use to prove your membership when you send in for special offers or earn some of the newer awards. Be sure to include an Official Validation Seal, a brief report as required to report on your achievement, proof of purchase of the model rocket flown, and \$2.00 for each award earned. Generally, the report names the model rocket flown, the engine used to launch it, the date and time and place of the launch, and the approximate altitude reached.



Successfully build, fly and recover a single stage model rocket.



Successfully build, fly, and recover all stages of a multi-stage model rocket.



Successfully build, fly, and recover a scale model rocket of a rocket which once existed.



Successfully build, fly, and recover a payload-carrying model rocket with a payload.



Successfully build, launch, and recover a rocket-powered glider. The glider may be a boost glider, a rocket glider, or a pop-pod glider. Flight time must be at least 30 seconds.



Enter a project involving model rocketry in your school's Science Fair. The project does not have to win. If you are no longer in school, prepare a project suitable for a Science Fair as though you were entering it. Then send photos of the project and your report to us. Entries will not be returned.



If you were a member of the old Estes Aerospace Club, send us proof of that membership. This is a kind of "Old Boys Club" award that only former EAC members may earn.



This award is earned by giving a model rocketry demonstration to a class at a school.



Successfully build, launch, and recover an aerial camera and take a good photograph of something on the ground with the camera while it is in flight.



Give a public demonstration launch during a Space Shuttle mission. Include in your launch information about the current Space Shuttle mission. The rocket you launch does not have to be a Space Shuttle, although this is recommended.

Earn all ten awards! Each award should be fun to earn. And each award earned proves your expertise in another area of model rocketry.

Wear your Achievement Award Patches with pride!

**If you have not yet joined the Estes Space Program™ (#1443, \$8.69), join now, and join the fun!**

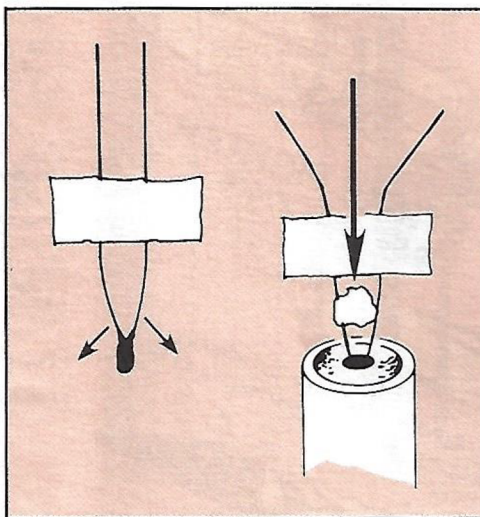
# REINVENTING MODEL ROCKETRY

By Nate Chronister, New Paltz, NY

Model rocketry has advanced a long way since the hobby's origins. Unfortunately, sport model rocketry has changed little except for the invention of the Estes Solar igniter, now called the Estes igniter. This igniter allows use of smaller launch batteries than was previously possible.

Some people get discouraged with all the things you have to carry to the launch site and all the things you have to do. In this article I propose a few things which can make things a lot easier for beginners. Even for expert modelers, these can make sport flying more fun.

Systems which protect the parachute from ejection gases without recovery wadding have been proposed. None have seen widespread use, so I invented a simple one. A cardboard disk behind the 'chute protects it during ejection. Then the shock cord pulls the disc and 'chute from the back of the nose section of the body tube. This device can be used in any rocket, adds little weight, and can replace recovery wadding.

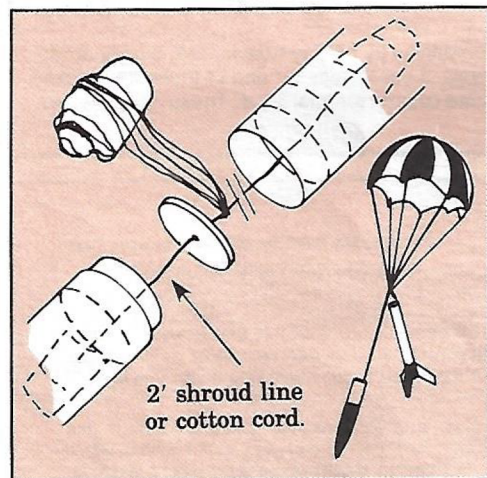


Here are some requirements for my ultimate sport model rocket:

1. It must not require extensive flight preparation.
2. It must be simple and inexpensive.
3. It must be durable.
4. It must be readily visible. Paint the rocket black and use an orange parachute. If it has no parachute, paint it orange. Black is the most visible color in the air. Red, orange, and fluorescent paint are easily seen on the ground.

For your ideal model rocket, design and build it to have whatever flight characteristics you prefer. Heavy weight causes a slow liftoff. High drag produces low altitude flights. Small, low drag rockets may go too high, making tracking and recovery difficult. Too much streamer can produce excessive drift.

Incorporate these ideas, and your own, to make better model rockets.



Some people have had trouble learning to use igniters properly. I often wonder why they don't put them in at the factory. But with the right technique and a little practice you can get perfect ignition every time. You can put the igniters in the comfort of your own home or insert them at the launch site.

Here is the way I insert Estes igniters:

1. Holding the igniter by its tip, make sure that the wires are not touching.
2. Put the igniter into the engine making sure that you insert it all the way till the tip is in firm contact with the bottom of the nozzle.
3. Use a ball-point pen or a toothpick to pack a small piece of flameproof recovery wadding into the nozzle and down against the igniter tip. This helps hold the igniter in place as well as preventing the lead wires from shorting.

These pre-installed igniters can end some of your problems at the range.

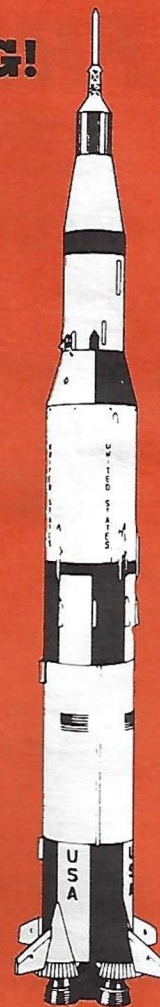
## THE KING!

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#2001

- \* The pride of any rocketeer's fleet!
- \* Beautiful 1/100 scale model
- \* 43 $\frac{1}{4}$  inches of awesome scale
- \* Fly it with Estes D12-3 engines
- \* Maxi<sup>™</sup> Rod required

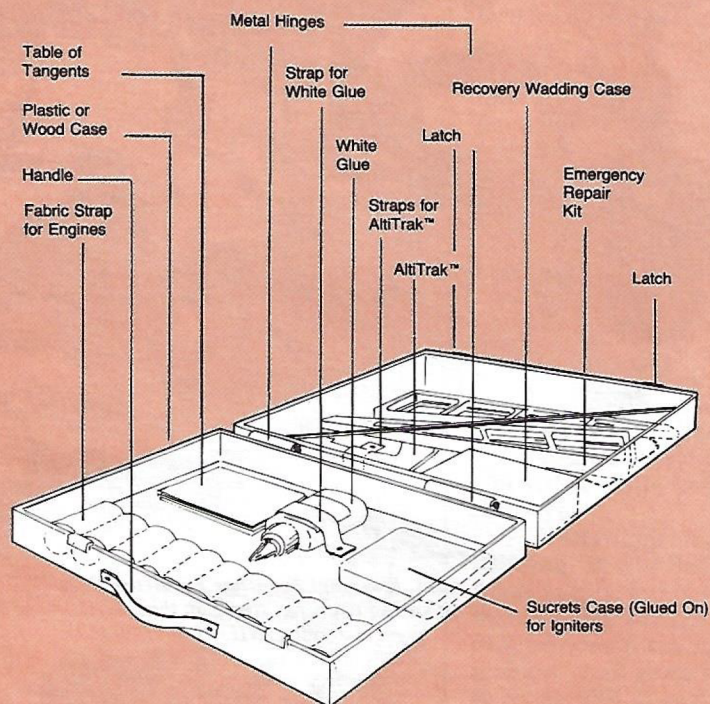
**SATURN V<sup>™</sup>**  
#2001  
**\$52.29**



Estes Vice President Joe DiStefano hands U.S. Team Member Phil Barnes of Gaithersburg, Maryland the first place trophy for parachute duration while NAR President J. Patrick Miller (left) and Contest Director Ed Pearson (right) look on. Event was at the US/USSR Spacemodeling Competition, September 30-October 3, 1988 at NASA's Wallops Flight Facility. Presentation possible courtesy of Estes Industries. Photo credit: NASA



# IDEA BOX

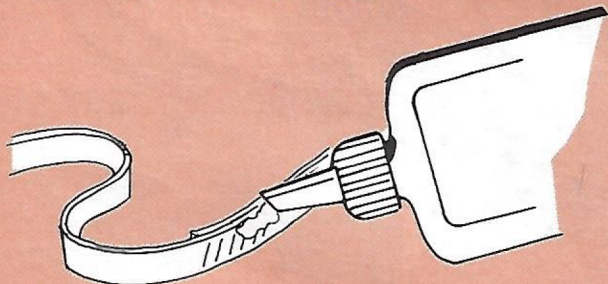


## DELUXE RANGE BOX

This unique range box was designed to provide a number of convenience features. While it requires some work on your part, if it fits your needs, it is worth it!

If it doesn't fit your needs, why not design and build your own custom range box?

*Contributed by Ryan Raines, Keezletown, VA*



## JOINING LENGTHS OF SHOCK CORD

Ever wonder if the length of shock cord you have is enough? With 36" cord, you have no problems. But the 1/4" wide cord doesn't come in 36" lengths. Here is a way to splice shock cords effectively.

Overlap the shock cord ends about 1/2". Sew the ends together with six to eight stitches of strong thread. Knot each end. Cut off the thread near the knots. Then saturate the exposed thread with white glue and let the glue dry.

This process is so durable that the shock cord will break elsewhere before it breaks at this connection.

Lengthening the shock cord reduces snap-back that might damage nose cone, body tube, or wooden fins.

Be careful when using this technique as the spliced section is not as small and flexible as is the rest of the shock cord.

*Contributed by David M. Baum, Allentown, PA*

## MANY USES FOR "TWIST TIES"

Twist ties are found on many bread products, toys, and other items. The plastic coated ones are usually the most durable.

A tie may make a non-conducting standoff for a rocket which does not have swept-back fins. A tie can hold the firing leads against the launch pad to reduce the chance of accidentally pulling out the igniter.

A tie can hold the neatly coiled lead wires for your electrical ignition system.

Twist ties may be twisted together at their ends to make a longer tie.

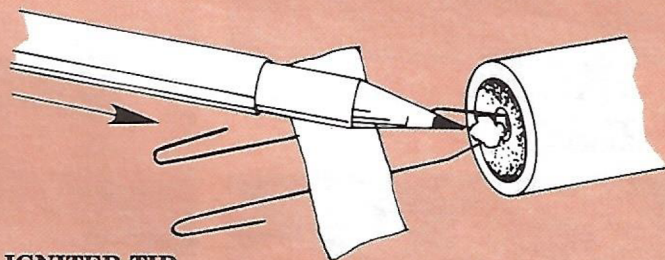
Keep extra ties in your range box for replacements or for unanticipated needs.

*Submitted by Wayne Williams, Elkton, SD*

## CUSTOM PARTS

Make custom features for your model rockets from parts which most people throw away. Example--Take the centers out of the centering rings. Drill small holes in the center of this cardboard with the proper size drill bit to hold 1/8 inch or 1/12 inch dowels. Make ion cannons, radar units, antenna, etc. from them with dowels. Use your imagination.

*Contributed by David Baum, Bethlehem, PA*



## IGNITER TIP

To help keep Estes igniters properly in place in the rocket engine's nozzle, put a small piece of recovery wadding into the engine nozzle after inserting the igniter. Carefully push the wadding in with a ball point pen or similar device. Do not use a pencil as the graphite in pencil "lead" can "short out" the igniter bridge wire. After pushing the pellet of paper carefully into the nozzle to make a "cork" to hold the igniter firmly into place, bend the lead wires to one side and curl back the end of each lead as shown in the kit instructions. (Editor--I often use this technique, and then I firmly mold two or three short sections of masking tape into place over the nozzle so that the lead wires are clearly outlined. This redundant system really holds the igniter in place!)

*Contributed by Ed Brown, Indianapolis, IN*

## "INSTANT" REPAIRS

Keep a tube of cyanoacrylate or other instant type of airplane glue in your launch box. This will permit you to repair broken fins and other problems in seconds.

*Contributed by Jason Smitko, Slidell, LA*

## IMPORTANT REMINDER

Make sure that the shock cord is tied tightly to your rocket's nose cone before each launch.

*Contributed by Brian D. Wells, Sanford, FL*

# THE QUIET MAN

By Mary Roberts, Marketing Administrator, Estes Industries

I first met Vern and his wife Gleda in 1973. Since then I have had the opportunity and the pleasure of working with him and his wife on numerous occasions.

A workaholic by nature, Vern is always on the job, either with his personal business or on one of his volunteer jobs. These volunteer activities include being a trustee for the National Association of Rocketry and a member of the Pyrotechnics Committee of the National Fire Protection Association. Performing each task with the same zeal, determination, and persistence, Vern always gets the job done, and done right!

Courteous and soft-spoken, Vern Estes is a man that people listen to as he is the quiet voice of reason. His shrewd and effective viewpoints, voiced in a simple, straightforward manner are valued by the people who work with him.

When listening, Vern offers his full attention to the speaker and responds with enthusiasm and encouragement.

I believe that Vern and his wife are dedicated to the young people of the world, especially those that have a vision of peace and greatness for humankind.



Boston Red Sox left fielder Mike Greenwell (on right, kneeling) launches his Estes Nova Payloader near Holiday Inn in Winter Haven, Florida during spring training. Red Sox third base Wade Boggs is holding his glasses. Photo by Larry Crowe, *Valley News* (Labanon, NH). Reprinted with permission from the April 6, 1988 issue.

## MORE ROCKET TERRITORY!

This photo was taken by ever-alert shutterbug and model rocketeer Art Nestor of Zelenople, PA. The barn is in Slippery Rock, PA. Incidentally, the name of Slippery Rock High School's football team is The Rockets.



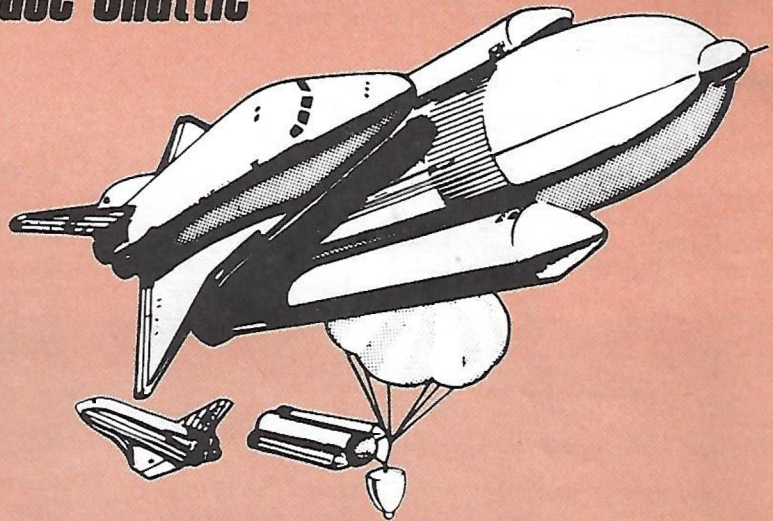
**Q. Why does Saturn have rings around it?**

**A. There wasn't enough Comet to scrub them off.**

Contributed by Mike Tucker, Danbury, CT

Model Rocketry's First  
**Space Shuttle™**

**FANTASTIC!**



- \* Beautiful 1/162nd scale model of THE U. S. space launch vehicle
- \* Spectacular flights!
- \* Fully detailed scale model
- \* Skill Level 4
- \* Shuttle length 13.6", orbiter length 9.0" with 7.1" wingspan
- \* Special, removable stabilizer fins for flight
- \* Orbiter glides back!
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- \* Awesome flights with Estes C5-3 (First Flight) or C6-3 engines

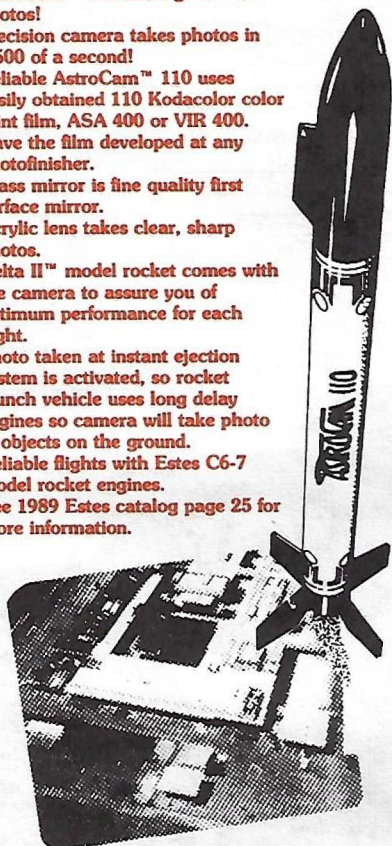
**SPACE SHUTTLE™**

**#1284 ..... \$21.29**

# TAKE GREAT AERIAL PHOTOS!

## ESTES ASTROCAM 110

- \* AstroCam™ 110 takes great color photos!
- \* Precision camera takes photos in 1/500 of a second!
- \* Reliable AstroCam™ 110 uses easily obtained 110 Kodacolor color print film, ASA 400 or VIR 400.
- \* Have the film developed at any photofinisher.
- \* Glass mirror is fine quality first surface mirror.
- \* Acrylic lens takes clear, sharp photos.
- \* Delta II™ model rocket comes with the camera to assure you of optimum performance for each flight.
- \* Photo taken at instant ejection system is activated, so rocket launch vehicle uses long delay engines so camera will take photo of objects on the ground.
- \* Reliable flights with Estes C6-7 model rocket engines.
- \* See 1989 Estes catalog page 25 for more information.



**ASTROCAM™ 110**  
#1327 ..... \$33.29



G. Harry Stine, NAR #2, at Pearl River (NY) Vulture Squadron's 15th Modroc/Space Seminar.

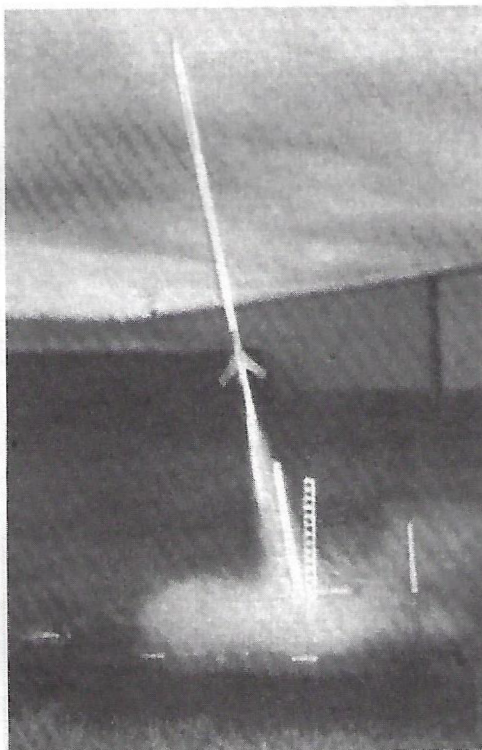
## CHRISTMAS DAY 1988

By John Enright, Jacksboro, TX

I first learned of model rocketry this fall (1988) when a co-worker mentioned that he'd found his old rocketry equipment at his grandmother's house, had dusted everything off, and was planning a launch. I was interested, and so were my two sons, so we drove out to the country early one Sunday morning and saw model rockets launched for the first time. I went out expecting oversized fireworks and came back amazed and carrying the address of Estes Industries.

Soon I had my own copy of the Estes catalog. I had my secretary order a Longshot, a Clipper, a Transtar Carrier, and a fin guide. I made my own launch system with a 12 volt power supply and an adjustable steel gantry on a concrete pad. The system meets the NAR safety code. I was pretty busy getting everything ready in time for Christmas while keeping it a secret from the boys.

Everything was ready Christmas morning. It was definitely a hit with the whole family. But the sky was overcast, and we had gusty winds all day. At three o'clock that afternoon the cable weather channel said the wind gusts were down to 16 mph, so we decided to go for it!



When it became too dark to safely recover our birds, we had logged four great launches, one fantastic snapshot, lots of exercise (recovering as far as a half mile down range), and an afternoon we'll all long remember. We lost a nose cone, broke a fin, and roughed up a body tube, but all in all our first launch was a great success. Much thanks to Estes and Model Rocket News Magazine for making our Christmas day launch so successful and enjoyable.



Pat Miller, NAR President, presenting Howard Galloway Award to Vern at 1983 NARAM.



Betty Estes (one of Vern and Gleda's three daughters), Vern, and Gleda, his wife. August 4, 1976.



Vern and Gleda Estes at World Spacemodeling Championship. Lakehurst, NJ, Naval Air Engineering Center. September 1987. Photo by Peter Galindez, a teacher from Hillburn, NY.

# Design of the Month Contest

Sorry if we fooled you, but the Design of the Month Contest is still alive and well. Several of you have called or written asking about the contest. Yes, the DOM Contest is still around!

Since the rules weren't printed in the catalog this year, here they are. Perhaps you would like to clip out this article or photocopy it so that you will have a copy of the rules to refer to when you prepare your entries.

**Each winning entry is worth a \$75 merchandise certificate to the rocketeer whose design won.**

1. All entries become the property of Estes Industries and cannot be returned.

2. Employees of Estes Industries and members of their immediate families are not eligible.

3. Any type of model rocketry design can be entered (rockets, boost-gliders, launching or recovery devices, etc.).

4. Designs should be new, original, and different, but they also need to be workable. The goal is to develop something new that other rocketeers can build and use successfully, too.

5. Entries will be judged on practicality, originality, neatness, completeness, and clarity. All plans must be flight tested and proven. Winning entries may be published in *Model Rocket News Magazine* or other Estes publications.

6. Your design entry should include a parts list and any instructions or diagrams you feel would be helpful. Be sure that your name and address are on each page of your entry.

7. Please do not send the actual model as it cannot be returned.

8. Photos of entries are greatly appreciated, but are not required.

9. You may send as many entries as you like.

10. New contest every month.

11. All designs reaching Estes Industries during the calendar month will be entered in that month's competition. (Date of receipt, not postmark, will determine the month in which a design will be entered.)

12. If two or more exceptional entries are received during any month, the judges may, at their discretion, make identical first-place awards or give additional honorable mentions.

13. Designs should be sent to **Design of the Month Contest, Estes Industries, 1295 H Street, Penrose, CO 81240.** However, all plans sent to us which are not specifically addressed to another contest or department will be automatically placed in the Design of the Month Contest.

14. Each month the designer of the winning entry will receive a certificate entitling him or her to \$75 in merchandise and an award certificate suitable for framing. Award winners will be notified by mail.

**GOOD LUCK!**

## ESTES CATALOG INDEX FOR 1989

By now you will have noted that the 1989 Estes catalog does not include the usual "Index" inside the back cover. You may save this index of the kits for use through the rest of this year.

KIT NAME	PAGE	PROD#
Alpha™	18	1225
Alpha III™	9	1256
Alpha III™ Starter Set	5	1406
Argosy™	40	1988
Astro™	10	1937
AstroCam™ 110	25	1327
Big Bertha™	22	1948
Blazer™	20	1956
Blue Star™	12	1991
BullPup 12D™	26	1972
Calypso™	34	2006
Comanche-3™	42	1382
Corsair™	48	1999
Dasher™	20	1992
Echo™	22	1950
Eggspres™	38	1996
Estes Space Program™	24	1443
Fireaero™	26	1953
Firehawk™	18	2014
Fox Fire™	30	1941
GeoSat LV™	50	1977
HelioCopter™	28	1995
Hercules™	40	1377
Iris™	32	2007
Javelin™	20	2005
Jupiter-C™	50	1976
Lancer™	20	1993
Laser™	16	1938
Liberty™	16	1989
Magnum™ Outfit	5	1422
Mercury Redstone	52	1921

KIT NAME	PAGE	PROD#
Minuteman™	8	0731
Nike Apache™	46	1957
Nimbus™	42	1971
Nova Payloader™	38	1960
Patriot™	8	0730
Phaser™	14	1984
Rain Maker™	34	2009
RamJet™	48	1994
Recruiter™	42	2013
Reliant™	10	1986
Screaming Eagle™ Starter Set	3	1417
SDI Satellite™	32	2003
Sentinel™	32	1987
Sizzler™	18	1906
Sizzler™ Starter Set	7	1432
Space Shuttle™	52	1284
Space Shuttle Columbia™	32	1385
Space Shuttle™ Set	7	1441
SR-71 Blackbird™	44	1942
Starbird™	38	1954
Star Rider™	40	2010
Stealth™	44	1929
Strike Fighter™	40	2015
Super Nova™	26	2011
S.W.A.T.™	42	2017
Thunderhawk™	10	2002
Tornado™	28	2004
Vagabond™ Starter Set	3	1423
Viking™	22	1949
Voyager II™	34	2000
Wizard™	16	1292
X-16™	46	1933
Yankee™	12	1381
Yankee Clipper™	24	1443
Yellow Jacket™	10	2008
Zinger™	12	1917

Q. What Estes rocket is the son of Zeus?

A. *Hercules*

Contributed by Tyler O'Neill, Penfield, NY

KIT NAME	MINI-ENGINE	PAGE	PROD#
Gnome™		9	0886
Hawkeye™		26	0873
Leprechaun™		14	0887
Micron™		22	0876
Mini Mean Machine™		18	0865
Mini-Scale Combo™ Pak		28	0874
Mini Tri™ Pak		30	0866
Mosquito™		12	0801
NASA X-15™		46	0889
Ninja™		10	0882
Pulsar™		12	0870
Skinny Mini™		16	0880
Sparrow™		14	0872
Sprite™		14	0885
Vector™		14	0871

KIT NAME	D-ENGINE	PAGE	PROD#
Black Brant II™		50	1958
Comanche-3™		42	1382
Der V-3™		36	1970
Explorer Aquarius™		64	2016
Magnum™ Outfit*		5	1422
Mean Machine™		36	1295
MegaSizz™		36	1998
Pathfinder™		44	1997
Phoenix™		44	1380
Ranger™		34	1955
Saturn V™		54	2001
Super Big Bertha™		36	2018
Titan III E™		54	2019



*Distinguished (?) visitor  
at NARAM-14.*

Q. Which Estes rocket is the smallest?

A. *Mosquito*

Q. Which Estes rocket is an Indian?

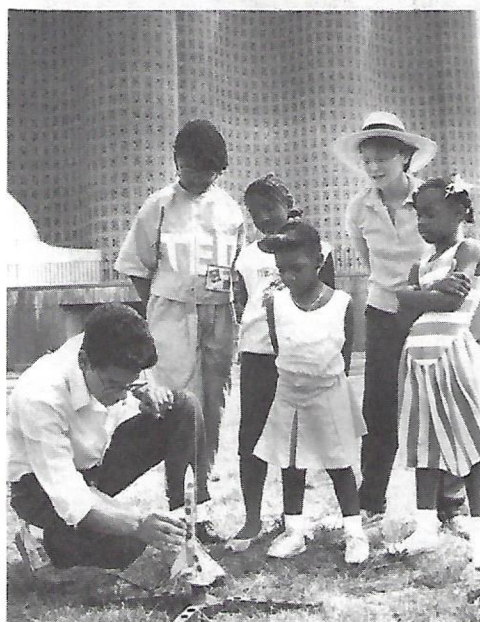
A. *Comanche-3*

## BLAST OFF AT NY HALL OF SCIENCE

The air around the New York Hall of Science from July 2 to August 28, 1988 was filled with almost anything that can glide, flap, or soar. This was Sky High Summer--a down-to-Earth festival of flight.

Visitors to the Hall in Queens were greeted with a barrage of model rockets, a swarm of kites, and a squadron of rubber-band-powered model airplanes.

During "Space Week" (July 20-24) many visitors signed up for workshops and learned the "right stuff" of model rocketry. Both children and adults built their own Estes Alpha model rockets and launched them on the 22-acres of land surrounding the Hall of Science. The model rockets blasted off in the shadow of full-sized rockets--Atlas-Mercury, Titan II-Gemini, and Saturn V first stage.



"Space Week" participants were also treated to a lecture/demonstration from NASA education specialist Jack Bannister from Goddard Space Center.

The New York Hall of Science is the only hands-on science and technology museum in the New York City area. Visitors are invited to explore, investigate, and experiment with all of the 130 exhibits at the Hall. In this way, science becomes understandable and fascinating, not stuffy or intimidating.

That's why the Hall of Science chose model rockets as an ideal vehicle for communicating principles of aerodynamics during Sky High Summer. The children had a wonderful time building, launching, and recovering their Estes rockets, and at the same time learned painlessly about drag, inertia, momentum, center of gravity, and other essentials. They are beginning to understand what keeps things up in the air.

For more information about upcoming events at the New York Hall of Science, just call (718)699-0005 or write to New York Hall of Science, 47-01 111th Street, Flushing Meadows Corona Park, New York 11368.

## RASCAL STARTER SET™

### BIGGEST LITTLE ROCKET YOU'LL EVER LAUNCH!



- \* Rascal™ rocket is 13.6 inches long...and a big 1.637 inches in diameter!
- \* Electron Beam™ Launch Control System is included.
- \* Porta-Pad® II is included.
- \* Mini-Alpha Book is included.
- \* Three Estes model rocket engines and four igniters are included.
- \* Sturdy Range Operations Box with handle is included.
- \* Impressive flights with Estes A8-3 (First Flight), B4-4, B6-4, and C6-5 engines
- \* A real value!

**RASCAL™ STARTER SET**  
#1424 . . . . . \$33.99

## WHERE HAS THE TIME GONE?

By Glenn Hofmann, Springhouse Junior High School, Allentown, PA

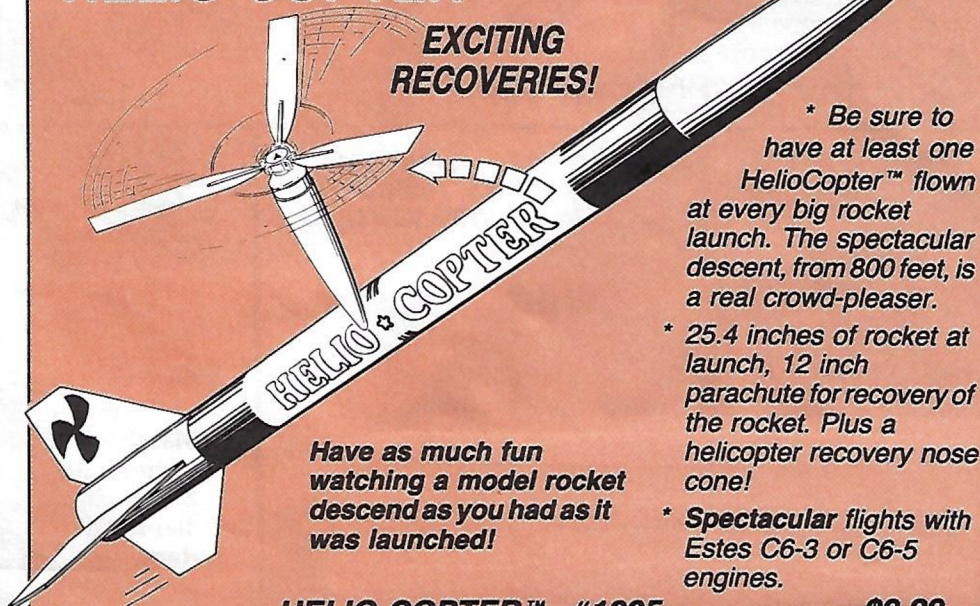
It is with a bittersweet memory that I write. Over a quarter century ago, I was introduced to the rewarding hobby of model rocketry. I can clearly remember those autumn afternoons in South Jersey when my father, brother, and I loaded up our VW Beetle in search of the always elusive field large enough for our unusual endeavor.

In some of the more humorous moments, I remember my father lifting me up to climb an old apple tree after he had unsuccessfully attempted the same only moments before. He had ended up on the ground with only his pride damaged and the rocket still swinging from branches out of reach above. Oh, there were memorable recoveries. Their creativity and perseverance only outdone by the reason we were there in the first place, launching our newest model rockets. That old Estes catalog showed more wear and dog-eared pages than the Sears "Wish Book"!

Now, over 25 years later, where has the time gone? The interest has been rekindled through formation of a brand new model rocket club we call "3,2,1-Blastoff" at Springhouse Junior High School where I am a 7-9 science teacher. The purpose of this letter is to request assistance in setting up the club properly so that these new rocketeers may develop the skills, interests, and memories to perpetuate this endeavor through a new generation. Could you please supply us ordering information for catalogs, audiovisual materials, or whatever else is available to start off our club?

(Editor--We supplied him copies of the last MRNM for his members, some catalogs, and a few other things to help recruit members for his club and to help his club members get started.)

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\* Be sure to have at least one HelioCopter™ flown at every big rocket launch. The spectacular descent, from 800 feet, is a real crowd-pleaser.

- \* 25.4 inches of rocket at launch, 12 inch parachute for recovery of the rocket. Plus a heliocopter recovery nose cone!
- \* Spectacular flights with Estes C6-3 or C6-5 engines.

Have as much fun watching a model rocket descend as you had as it was launched!

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Perfect For Science Fairs!  
Build A Complete Launch  
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And Tracking System  
And Build And Fly A  
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Rocket With A Payload  
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Great Missions!**

- \* Everything you need to build a great single stage rocket
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- \* And then add a clear payload compartment to it!
- \* And build and use:  
The PortaPad® II Launch Pad  
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The new Estes Altitude Tracker™ tracking device
- \* And learn how each operates!
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- \* Complete information on all of these is contained in your 36 page Project Manual!
- \* Over 30 great projects/experiments are detailed in the Project Manual
- \* Plus SEVEN dependable Estes model rocket engines with igniters and recovery wadding necessary for FIVE GREAT FLIGHTS!
- \* You start "from scratch" and build and learn and fly until you are a very competent model rocketeer!
- \* Compare effectiveness of parachute versus streamers.
- \* Three posters for you to complete to make a great display
- \* Great way for a beginner to quickly advance his rocketry skills and knowledge
- \* Fun way for an experienced rocketeer to live again those fun days as you earned your model rocketry skills
- \* You furnish the construction supplies and 4 AA alkaline dry cells.

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- \* Superb for display!
- \* Skill Level 4
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- \* Requires MaxiRod™ for launch

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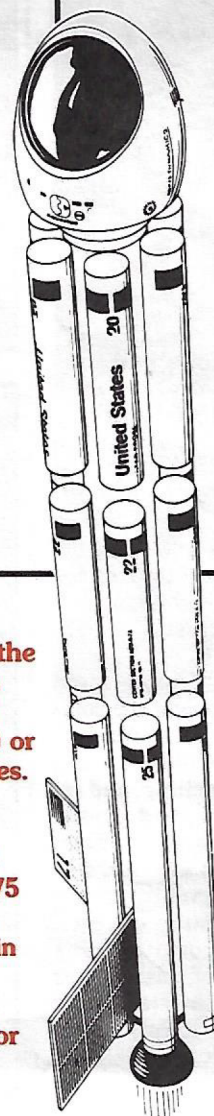
- \* Clear (see-through) payload compartment
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- \* Two-stage performance
- \* Extremely adequate 24.625 inches in height!
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- \* Only Skill Level 2
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- \* Exciting two-stage flights with powerful Estes B6-0 (First Flight) or C6-0 in the booster and A8-5 (First Flight), B4-6, B6-6, or C6-7 engines in the main stage.



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