

# SPECTRA

**OFFICIAL NEWSLETTER OF THE ESTES AEROSPACE CLUB**

Vol. 3 No. 1  
Jan. / Feb. 1976



## OUTA-THIS-WORLD Comic Strip Contest **WINNING ENTRIES**

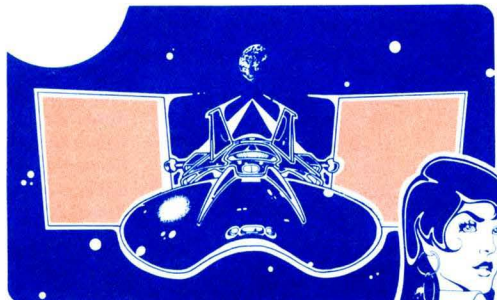


**Happy New Year  
EAC  
Rocketeers!!**

### THE PLYRA-TO-PLIARDES- HYPERLIGHT-PATROL BLUES

**1st Place Winner**

By Tony Boatright  
Melbourne, FL



**ONBOARD**  
FLARED MISSON TIME SECONDS:  
**1347105**

**COMPUTER ALERT:** SORRY TO INTERRUPT, GIRLS, BUT LONG-RANGE RESPONDERS INDICATE A HIGH-DENSITY FIELD EFFECT HAS MATCHED OUR TRAJECTORY ON AN INTERCEPT COURSE: 12 DEGREES RIGHT ASCENSION TO MEAN SYSTEM PLANE...



ALLYSON



MacKAY

**THE CREW:** Mission Commander June Allyson (astrophysics), and Pilot Stephanie MacKay (spacecraft systems). Both highly trained, and both totally unprepared for what is about to happen to them.



**JUNE:** I CONFIRM A TRACK ON OUR INTERCEPT COURSE. HYPERLIGHT AND GLIDING FAST, E.I.T. 1 MINUTE, 30 SECONDS. DEFINITELY NOT ANOTHER SHIP. IT READS AS PURE ENERGY...



STILL WITH US. INTERCEPT IN 46 SECONDS.

OKAY, NO LUCK. ESTABLISHING COMMUNICATIONS WITH IT. TRACKING LASERS LOCKED-ON. ATTACK PROCEDURE!

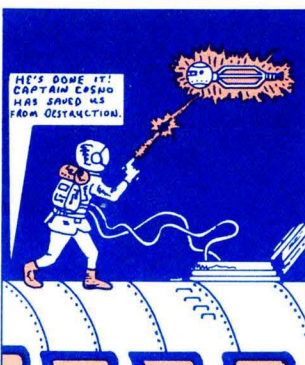
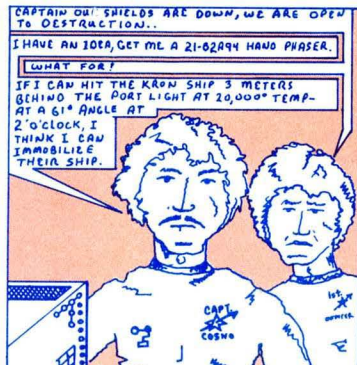
**COMPUTER ALERT!**  
CONTINUED  
NEXT  
ISSUE

**B**irth Starcraft Alexandria 7. The most sophisticated piece of hardware developed by man, and one of 24 such vehicles which explore and patrol beyond our solar system in the year 2088 A.D.  
A day and a half out toward Pluto, it's mirror-finish hull slices thru a sea of interstellar hydrogen now as massive solar amplifiers push the ship to a crucial level of acceleration where its secondary engines will ease it across the Einstein threshold of physical existence and into Hilbert Space...

### COSMO COMICS

By Whitley Roper Bergenfield, NJ

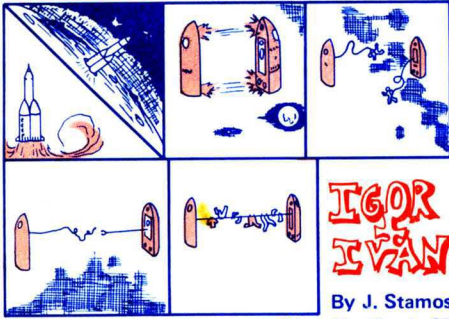
**Honorable Mention**



(More winning entries on page 2)

(Continued from front page)

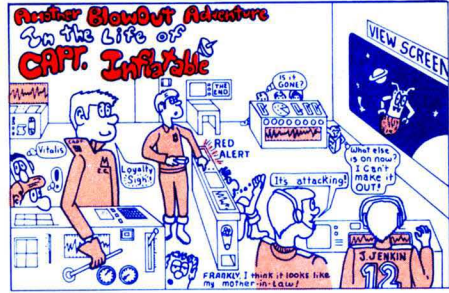
**Honorable Mention**



By J. Stamos  
West Hartford, CT

**Honorable Mention**

By Jimmy Van Gelderen Darien, IL



**WINNING ENTRIES**

**WINNER**

—Received \$75.00 Merchandise Certificate

Tony Boatright  
Melbourne, FL  
Skill Level 3

THE PLUTO TO PLEIADES HYPERLIGHT  
PATROL BLUES

**HONORABLE MENTIONS**

—Received \$15.00 Merchandise Certificates

Whitley Roper  
Bergenfield, NJ  
Skill Level 3  
COSMO COMICS

J. Stamos  
West Hartford, CT  
Skill Level 3  
IGOR & IVAN

Jimmy Van Gelderen  
Darien, IL  
Skill Level 1  
CAPTAIN  
INFLATABLE

Gregg Markowitz  
Yonkers, NY  
Skill Level 1  
COL. PLANET

Buford Taylor  
Xenia, OH  
Skill Level 1  
JOURNEYS OF  
THE GODDARD

Frank Balistreri  
San Jose, CA  
Skill Level 1  
MAJOR MOON

Paul Phillips  
Roslindale, MA  
Skill Level 3  
EXPLORER 8 -B

Alan Larsen  
Gilbertville, NY  
Skill Level 3  
CAPTURED

Keith Baxter  
New Haven, CT  
Skill Level 4  
ASTROGANOFF

Greg Sviatoslauský  
Stoughton, WI  
Skill Level 1  
BEETLE SPACELY

Robert Nickerson  
Chicago, IL  
Skill Level 1  
ME AND HERMAN

Shabaka Razak  
East Palo Alto, CA  
Skill Level 4  
ZCON T-ON

Ron Weisel  
Beachwood, OH  
Skill Level 1  
GALAXIES

J. B. Neal  
Magnolia, TX  
Skill Level 3  
PLANET WAR  
FOR EARTH

Dan Dodson  
Winston-Salem, NC  
Skill Level 1  
STAR TRASH

*Congratulations to all  
our EAC winners!*



**EAC ADVISORY  
BOARD No. 4  
Comments...**

This group of EAC rocketeers was asked to construct, test, and comment on our new Star Trek Starship Enterprise and Klingon Battle Cruiser. At time of publication we had received comments from 17 of the 20 EAC members on the Board. The major construction criticism for both of these kits was that the vacuum formed plastic parts pose a much more challenging construction project for those who had no prior experience working with vacuum formed parts. However, for the most part, EAC Board members indicated that after cutting out two or three pieces, they were able to get the hang of it O.K. The only other major comment involved the fact that perhaps the Klingon Battle Cruiser should utilize a more powerful engine such as the C6-3 for higher flights. All other reactions were similar to the following letters.

Gentlemen:

Being an avid fan of Star Trek for many years now, I was extremely pleased to find that I had been chosen as the one of many "test pilots" to review the new Starship Enterprise as part of EAC Advisory Board #4.

The word that best describes this kit is remarkable. I must note that the instructions were one of the best I've used as far as being clearly concise. I've also been amazed with this kit's operation under atmospheric conditions. Truly astonishing!!!

Thank you for the opportunity to support the EAC team and I would be greatly honored in the future to serve you again.

Sincerely,  
Ron Stoll  
Salt Lake City, UT

Dear Sir,

I wish to thank you very much for the opportunity of serving on the EAC Advisory Board.

The Starship Enterprise kit was of special interest to me because I am a Star Trek fan, thus making this particular model an excellent addition to my showcase. Furthermore the flight performance exceeded my expectations.

The only problem I found was in the assembly of the hull sections which have to be glued together, these sections must be maintained in a stationary position until the glue is set. The solution is to place the glued sections between two books until setting occurs. With this exception there were no problems whatsoever.

Now that you have created a flying Enterprise and a flying Klingon Battle Cruiser kit, why not invent a flying Romulan Warship, this way you'll have a complete set of Star Trek spaceships?

I wish to thank you again for selecting me to be a member of the EAC Advisory Board and I hope that my report was of some help to you.

Best regards,  
Michael V. Howard  
Houston, TX

Mr. Boles,

Awhile ago you sent me a new product called the Klingon Battle Cruiser. You asked me to build, test, and comment about it. So here's my report.

The instructions were good and easy to follow. The construction was easy also. The only thing I had a problem at was cutting out the plastic parts. If there was a way to die-cut them it would be much better.

I want to add that it flew beautifully. Thank you for allowing me to be on the Advisory Board No. 4.

Sincerely,  
John Ruck  
Elgin, IL

Dear Mr. Boles,

I would like to thank you for selecting me to be on the EAC Advisory Board #4 to test the "Klingon Battle Cruiser" #1274.

I enjoyed building it very much, also I think all the information and specifications about the real Klingon Battle Cruiser are "Great"

The only problem I had was cutting out the molded plastic parts, but after one or two you get the hang of it. I also found that a toothpick comes in handy for painting the windows on the primary hull. Thanks again.

Sincerely,  
Keith Peterie  
Washington, MO

**EAC Advisory  
Board No. 5**

With the introduction of each new Estes product a special group of EAC Rocketeers are selected to review it. They are sent a sample of the actual product and are asked to test it and comment directly to Estes engineers. Our fifth Group of EAC Advisory Board members, listed below, are currently evaluating our new Maxi-Brute Honest John and Mars Snooper II kits plus our Fin Quick assembling fixture.

Suggestions for new product ideas are always welcome from all EAC Rocketeers.

**SKILL LEVEL 2**

Karsten Fliegner  
New Paltz, NY

Scott Kurland  
Manchester, NH

Mike Kirkbride  
Norristown, PA

Ernest Soter  
Severna Park, MD

Darren Grey  
North Ft. Myers, FL

**SKILL LEVEL 3**

Kelly Slough  
Quincy, IL

John Sobocinski  
West Bloomfield, MI

Ron Hemenway  
Tacoma, WA

Phill Rappert  
Solon, OH

Michael Steed Jr.  
Janesville, WI

**SKILL LEVEL 4**

R. D. Fox Jr.  
Rosedale, IN

Chip Newman  
Dalton, PA

Peter Hand  
Simsbury, CT

William Brooks  
Montgomery, AL

Jeff Brown  
Tucson, AZ

**SKILL LEVEL 5**

Terry Gordon  
Owings Mills, MD

Jim Wolberg  
Glencoe, IL

Bobby Ackerman  
Pryor, OK

Billy Echols  
Lewisburg, WV

John Wetsch  
Killdeer, ND

**ATTENTION EAC ROCKETEERS**

EAC HQ wants you to share your ideas, projects, experiences, and suggestions with your fellow EAC members. Our desire is to make the EAC Newsletter an exciting and valuable publication for EAC rocketeers. Your assistance is needed to make this newsletter the main vehicle for communication between EAC members and chapters.

Send us your contributions for plans, tech articles, cartoons, anecdotes, club news, and other interesting items. 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 the Estes Aerospace Club and cannot be returned. Address all material to: EAC Newsletter Editor, c/o Estes Industries, Penrose, Colorado 81240.

Should your article or photos be used in the EAC Newsletter, we'll reward your efforts and talent with an Estes merchandise certificate, the amount which will be determined by the EAC HQ editorial staff.

Hope to hear from you soon!



# SKILL LEVEL ACHIEVEMENT ROLL

In recognition of their model rocketry accomplishments we have listed the names of EAC members who have achieved our highest and second highest skill levels since the publication of our last EAC Spectra Newsletter. Congratulations to these Skill Level 4 Advanced Rocketeers and Skill Level 5 Expert Rocketeers. Unfortunately, space requirements will not permit us to continue listing the achievement roll for all EAC members in each issue of Spectra. For information on skill level advancement write: EAC Headquarters, c/o Estes Industries, Penrose, CO 81240.

## EXPERT ROCKETEER

### Skill Level 5

- Anthony Abbatantono Harrison, NY
- Mark Abent Avoca, PA
- Roy Henderson Bobby Akerman Pryor, OK
- Frank Appleton Homestead, FL
- David Bock Dallas, TX
- Mr. Doug Bracy Quincy, MI
- Jack Byrne De Graf, MN
- Al Cellitti Lewiston, ME
- Christopher C. Chaja Barrington, IL
- Bill Crosby Kensington, MD
- Mark DiNunno Brockton, MA
- Perry Durgan Calcium, NY
- Billy Echols Lewisburg, WV
- Thomas Fenstemaker Austin, TX
- V. Fingar Manias, NY
- Larry Frankowiak Capac, MI
- Matthew Ganis New Rochelle, NY
- David A. Ginsburg Miami Beach, FL
- Gary Glover Plain City, OH
- Mr. John Goin Champaign, IL
- John Ruck Portage, IN
- Sam P. Hensley Jr. Marietta, GA
- Don Herbst Lockport, IL
- Mike Hood Nashville, TN
- David Husak Northampton, PA
- Mike Janko Mt. Clemens, MI
- David Johnson Temple City, CA
- John Katzenberger Lakewood, CO
- Darrell King Flint, MI
- David Krotee Baltimore, MD
- Mitch Luman Fremont, OH
- Russell Luckenbaugh Spring Grove, PA
- Andres Mukk Danbury, CT
- Richard Owens Gaithersburg, MD
- William Peters St. Louis, MO

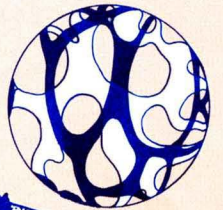
- William Scott Piel San Francisco, CA
- Roger Puchalshi Buffalo, NY
- Peter Jay Rubin Jericho, NY
- John Ruck Elgin, IL
- Reuben Schmitz Jr. Watertown, WI
- Richard Sharkey Mosinee, WI
- Bruce Allen Shartzert Ottawa, OH
- Lance Stonecypher El Cajon, CA
- Greg Twiss Albany, CA
- Mark Wagner Flint, MI
- Scott Ware Midland, MI
- John Wetsch Killdeer, ND
- Eric White Livonia, MI
- ADVANCED ROCKETEER Skill Level 4
- Brian Anderson Roseville, MN
- Phil Adopp Anchorage, AK
- Shawn Baca Albuquerque, NM

- James T. Bauer Jr. Morton Grove, IL
- Rich Bechinski La Crosse, IN
- Mark Benson Atlanta, GA
- Duane Beyer Hyde Park, NY
- John Beyer Chalfont, PA
- Gary Boganoff Fullerton, CA
- Richard Cleary Napanoch, NY
- Joy Cook Central Square, NY
- Russell Braun Pittsburgh, PA
- Richard Brence Knob Noster, MO
- Kurt Brink Cross Plains, WI
- Mark Brody Verona, NJ
- William Brooks Montgomery, AL
- Jeff Brown Tucson, AZ
- Steven Brown Meding, NY
- Ray Buckley Orlando, FL
- Carl Camp Newburgh, NY
- David L. Campbell Palatine, IL
- Eddie Carraway Georgetown, SC
- Mark Cavell Alexandria, VA
- Ron Celli West Babylon, NY
- Jeff Chamberlin Clearwater, FL
- Mr. Robert Chappell Atlanta, GA
- Mark Chaves Great Neck, NY
- Marcel Chouteau New Hope, PA
- Mr. John Cipriano Malibu, CA
- Richard Cleary Baltimore, MD
- Mr. Jeff Farinacci Orem, UT
- Laurent Ferrer II Granite City, IL
- Dan Forbet North Hollywood, CA
- Joe Frankiewicz Ingleside, IL
- Peter Garparini New Rochelle, NY
- John Geczy Hamilton, Ontario Canada
- Jeff Gerdin Eau Claire, WI
- David Gibson Dunstable, MA
- Tom Girouard New Port Richey, FL
- David Giosecki Taylor Springs, IL
- Jim Glowacki Romeo, MI
- Brook Gore Troy, IL
- John M. Gradwohl Lincoln, NE

- Glenn Drake Charlotte, NC
- Raymond Eastman N. Versailles, PA
- David Edkenzi Denver, CO
- Suzanne Ehart Los Alamos, NM
- Dion Chis Mandan, ND
- David Einoff Poughkeepsie, NY
- William Ellison Baltimore, MD
- Mr. Jeff Farinacci Orem, UT
- Laurent Ferrer II Granite City, IL
- Dan Forbet North Hollywood, CA
- Joe Frankiewicz Ingleside, IL
- Peter Garparini New Rochelle, NY
- John Geczy Hamilton, Ontario Canada
- Jeff Gerdin Eau Claire, WI
- David Gibson Dunstable, MA
- Tom Girouard New Port Richey, FL
- David Giosecki Taylor Springs, IL
- Jim Glowacki Romeo, MI
- Brook Gore Troy, IL
- John M. Gradwohl Lincoln, NE
- Billy Greenfield Princeton, NJ
- Michael Greenfield West Hartford, CT
- Andy Grey Southampton, PA
- Steve Groth Watertown, WI
- Bill Handlin Lincoln, IL
- Matt Harris Jackson, MI
- Mark Hartman Wasco, CA
- Steven Hayes Lancaster, OH
- Phil Hedges Lincoln, CO
- Ed Heise Pittsburgh, PA
- Eric Helmgren Albany, CA
- Ron Hemenway Tacoma, WA
- Trent Herman Pontiac, MI
- Jeff Hillman Sunnyvale, CA
- Rob Hollingsworth Beeville, TX
- Herbert C. Horni Buffalo, NY
- Steve Hughes Elkhorn, WI
- Larry Itzin Milwaukee, WI
- Chris Jansen Pacifica, CA
- Mike Johnson Monroe, LA
- Eric Jones Monongahela, PA
- Peter Jones Pittsburgh, PA
- Robert L. Kasa South Bend, IN
- Chris Keller Edgewater Park, NJ
- Daryl S. Ketchum Williamson, NY
- John Kimmons Brookings, SD

- Danny King Tampa, FL
- Ewart King Jr. Stamford, CT
- John Kirk Albert Lea, MN
- Mr. Teddy Kokas Lowell, MA
- Martin Kopper Staatsburg, NY
- Paul Kourajian Burnsville, MN
- Mr. Bob Kowalski Walbridge, OH
- Ken Kutney Jr. East Falmouth, MA
- Mike Laukitis Dubois, PA
- Dennis Lawyer Mentor, OH
- Steve Le Bato Lake Charles, LA
- Charlie Leekley Wayzata, MN
- John Lipa Allenton, MI
- Don Lyons Triangle, VA
- Robert Markham Jr. Cleveland, OH
- David Matseas Lowell, MA
- Jim Mault Olmsted Falls, OH
- Sidney R. Maxwell III Rochester, NY
- Richard M. Mehosky Upper Darby, PA
- Mr. Jay Menny Humble, TX
- Brian Keith Mitchell Mountain View, OK
- Leon Mueller Wentzville, MO
- Ben Mundy Mendram, NJ
- Mark McClurg Decatur, GA
- Robby McRight Baton Rouge, LA
- David MacDonald Concord, CA
- Abe Nainan Chevy Chase, MD
- Pete Newbold Wentzville, MO
- Richard Oldham Castro Valley, CA
- Mark O'Mealey Cherry Hill, NJ
- Nicky Optis Yonkers, NY
- Mr. Jim Packer Fort Wayne, IN
- Dave Pakes Coopersburg, PA
- Mr. Hank Pernicka Glen Elyn, IL
- Mark Peterson Temple City, CA
- Paul Peterson St. Paul, MN
- Craig Philips Grand Prairie, TX
- Billy Powell Knoxville, TN
- Mr. Dan Rees Centerville, OH
- Craig Philips Grand Prairie, TX
- Billy Powell Knoxville, TN
- Mr. Dan Rees Centerville, OH
- Terry Glenn Renfrow Hartford, KY
- Wendell Rhodes Deer Park, TX
- Bobby Rosamond New Orleans, LA
- Paul Ste. Marie Dayton, OH
- David Saubak Great Falls, MT
- John E. Schmoyer Pottstown, PA
- Paul Ste. Marie Dayton, OH
- David Saubak Great Falls, MT
- John E. Schmoyer Pottstown, PA
- David S. Schnipke Ottawa, OH
- Erick Scholz Piermont, NY
- Dan Schwab Apollo, PA
- Marlon J. C. Scott Gary, IN
- Steven D. Scott Fairborn, OH
- Gerald Shelley Pt. Orchard, WA
- Bobby Sims Decatur, GA
- Steven D. Scott Fairborn, OH
- Gerald Shelley Pt. Orchard, WA
- Bobby Sims Decatur, GA
- Robert Sirchia Irondequoit, NY
- Lauren Sjooben Concrete, WA
- Frank Skorina Allen Park, MI
- Emil Spatny Rego Park, NY
- Lauren Sjooben Concrete, WA
- Frank Skorina Allen Park, MI
- Emil Spatny Rego Park, NY
- Joe Spence Roseville, CA
- Craig Stoll Monroe, OH
- Brad Stratton Wausau, WI
- Mr. Duane Syx Security, CO
- Drew Szoeka Gary, IN
- Michael Tanecka Pasadena, TX
- Jimmie Lee Taylor Lawson, MO
- Keith Taylor Columbia, MO
- Rob Tedder Miami Lakes, FL
- Merritt E. Tiley III Wilmington, DE
- Ty Tobey Loganville, WI
- William Tokon Woodland, CA
- Jim Valiens New Castle, PA
- Dan Valuerde Orangeburg, NY
- Steven Vanderzanden Hart, MI
- Doug Warner Penfield, NY
- Matthew Wasielewski Webster, MA
- John Weber Otsego, MI
- Tom Willette Columbia Heights, MN
- Chuck Williams Richardson, TX
- Jeff Willis South Pasadena, CA
- Bob Witt Parkersburg, WV
- Ronald Wolfgang Springfield, PA
- William Wright Moberly, MO
- Mark Zadrozny McKees Rocks, PA

## ALIEN PLANET CONTEST



If you thought the EAC Creature Contest, Alien Spaceship Contest, and Outa-This World Comic Strip Contest were great, you'll really enjoy this one! So far EAC rocketeers have shown us what creatures from other worlds look like, the spacecrafts they travel in, and have even created action comics using these subjects. Now it is your chance to show us what a real "alien planet" looks like. What is its appearance both from outer space and if you were standing on the planet yourself? What kind of atmosphere and environment, does it have? What is its approximate position in our universe? As with our other "far-out" EAC contests you can really let your imagination go on this one. First place will receive a \$75.00 Merchandise Certificate and the first 15

runners-up will be awarded \$15.00 Certificates. The winning entry plus several of our runners-up will be featured in a future issue of the EAC Spectra. Just follow the contest rules to enter and we will be looking forward to seeing and learning about your mysterious "alien planet."

### RULES

1. You may enter as many times as you like.
2. Employees of Estes Industries or members of their immediate families are not eligible.
3. All entries become the property of Estes Industries and cannot be returned.
4. Previous entry in other EAC contests is NOT required.
5. Entries should include both a sketch of what your alien planet looks like from outer space and a sketch or drawing of what the planet would look like if you were standing directly upon the surface. Be sure to tell us the name of your planet and its approximate position in the universe. We would like to have you provide us with a brief explanation of the planet's atmosphere and environment and to tell us whether or not lifeforms such as plants, animals, or higher beings can exist there. If lifeforms do exist, a brief description of the

major types would be appreciated, but is not required.

6. Entries will be judged for degree of imagination, originality of explanation, uniqueness of entry, and general completeness.
7. Decision of the judges is final.
8. Deadline for receipt of all entries is Midnight, May 31, 1976.
9. Be sure to include your name, age, address, city, state, and zip code with each entry. Also be sure to include your EAC skill level. Mail entries to: Estes Industries, EAC Alien Planet Contest, Penrose, Colorado 81240.

### Good Luck and Great Imagination!

Phillip Malone  
Thoreau, NM

### LAUNCH LUG CONVERSION

Here's an easy way to convert your existing models to either 3/16" launch rod or "C" rail. Simply glue together a 1" long piece of 1/8" dowel, a stand-off made from scrap balsa and either a 1/4" launch lug or a "T" made from pieces of tongue depressor. The dowel should be wrapped with enough tape to give it a tight friction fit in the existing lug.

# Spaceship Contest Winners

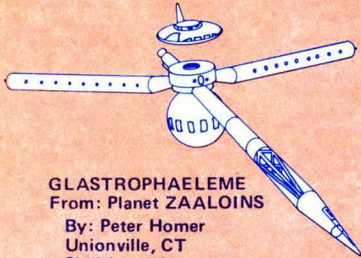
**1st place**

As we mentioned in the last Spectra, EAC Headquarters received more than 8,000 terrific entries for this contest. Due to limited space, however, we were only able to show half of the winning entries last issue. Featured below are the final 15 runners-up and the co-holder of our First Place Award. Congratulations to our first place winners who have each received a \$75.00 merchandise certificate and to our runners-up who have been awarded \$15.00 merchandise certificates. Thanks again for your great support.

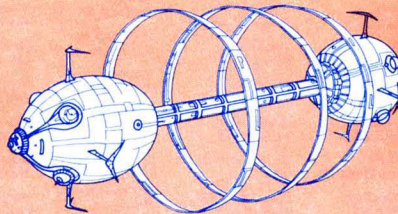


**EXPLORATION SHIP "EIROSSIS"**  
From the Constellation DRACO  
BY  
MIKE CONRAD  
JOPLIN, MO  
Skill Level 1

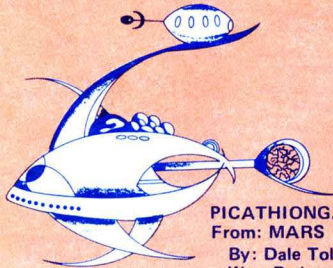
The EIROSSIS, Exploration Ship from the constellation DRACO, is propelled by expulsion of Tachyons (sub-nuclear particles that move faster than light). It is capable of speeds up to three times that of light, in interstellar space. Unmanned in the conventional sense, the entire ship is a cyborg. (An undeveloped brain was integrated, as an embryo, into the circuits of the master computer. Thus, the ship has the reflexes and thought patterns of a living Draconian, without the biological needs of a natural body.) The fore portion of the ship separates from the aft just in front of the twin antennae units, making it an atmosphere-compatible scout ship for surveying the features of planets at a close distance. Weaponry consists of twin projectors mounted on the guidance booms at the rear of the ship. These units fire a disruptor beam that is capable of interrupting the flow of energy through any material object. Mounted on the tips of the guidance booms are the two steering units, each a small nuclear engine used to change the direction of the ship by altering the propulsion vector. Six nuclear engines power the smaller atmosphere probe when it is separated from the bulk of the ship. Weight of the ship is 750 metric tons.



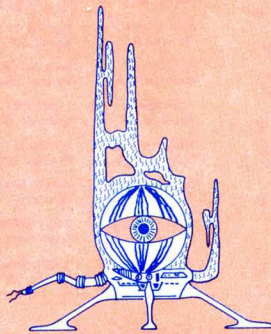
**GLASTROPHAELEME**  
From: Planet ZAALOINS  
By: Peter Homer  
Unionville, CT  
Skill Level 1



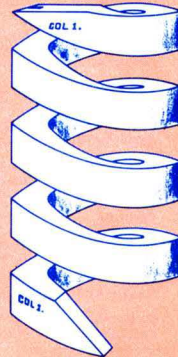
**AUGMAGETON** From:  
STAR in the URSA MINOR CONSTELLATION  
By: Dean Salls  
Tampa, FL  
Skill Level 1



**PICATHIONGATIS**  
From: MARS  
By: Dale Tolbert  
West Baden, IN  
Skill Level 3



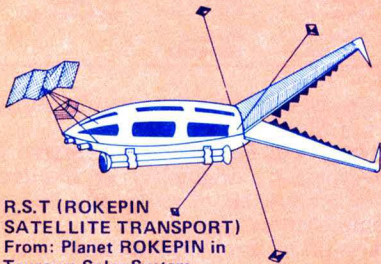
**GENASHAN SPACE PROBE**  
From: Planet GENASHA  
By: David Alegre  
Prescott, AZ  
Skill Level 1



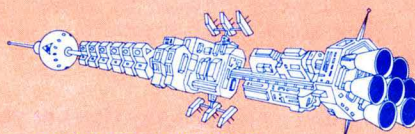
**COL. 1** From: Star Yeastute  
its 15th Planet TYRIATRA  
By: John Niches  
Newberg, OR  
Skill Level 1



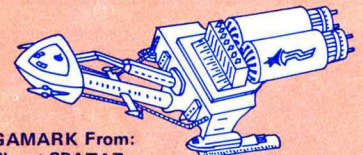
**NOVAR 4** From: Planet SERC  
By: J. B. Neal  
Magnolia, TX  
Skill Level 3



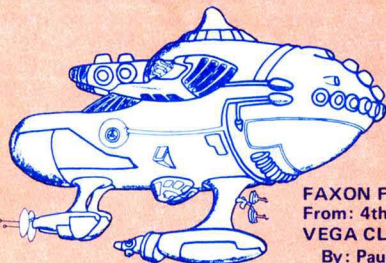
**R.S.T. (ROKEPIN SATELLITE TRANSPORT)**  
From: Planet ROKEPIN in Taurovn Solar System  
By: Richard Mullen  
Newton Highlands, MA  
Skill Level 1



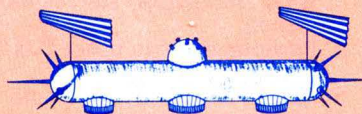
**ANDROMEDAN WARRIOR**  
From: GALAXY of ANDROMEDA  
By: Patrick Richard and Steve LeBato  
Lake Charles, LA  
Skill Level 3 and Skill Level 2 respectively



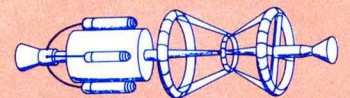
**GAMARK** From:  
Planet SPATAZ  
By: Tom Hartvigsen  
Salt Lake, UT  
Skill Level 1



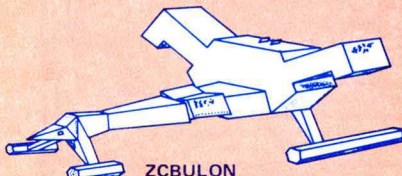
**FAXON FLASH**  
From: 4th Planet of VEGA CLOASHA  
By: Paul McCuen  
Kersey, CO  
Skill Level 1



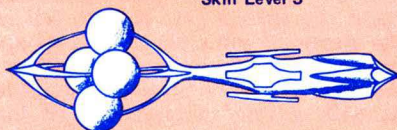
**SOLAR SEARCHER** From: MERCURY  
By: James Hicks  
Carbondale, PA  
Skill Level 3



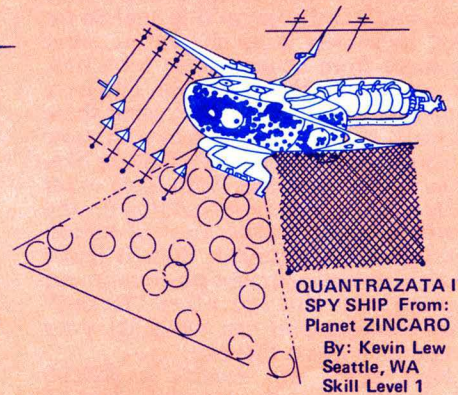
**SCARVONIER** From: Planet ZOROX  
By: Stephen Evan  
Virginia Beach, VA  
Skill Level 1



**ZCBULON**  
From: VIRGO CLUSTER  
By: Mike Englund  
Minneapolis, MN  
Skill Level 1



**PROTECTION SHIP**  
From: 9th Planet of R AGUILAE STAR SYSTEM  
By: Curtis Provance  
St. Louis, MO  
Skill Level 4



**QUANTRAZATA IV SPY SHIP** From:  
Planet ZINCARO  
By: Kevin Lew  
Seattle, WA  
Skill Level 1

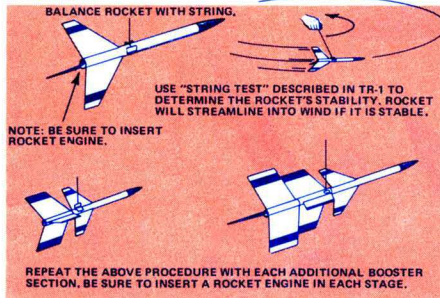
# EAC SPECIAL PROJECTS Part 5 Multi-Staging, Clustering, and Effects of Drag.

**NOTE:** This article explores two more interesting areas for EAC Special Projects. A new booklet entitled, "Projects in Model Rocketry" (Cat. No. 2831) is now available for only 25¢ to EAC rocketeers (Reg. 50¢) and features all special project information in one publication.

## STAGING AND CLUSTERING

### Effects of Streamlining

Staging is frequently used to reach maximum altitudes. Securing maximum altitudes requires minimizing drag. One method which can be used is streamlining fins while retaining stability.



### Optimization of Ballistic Coefficient

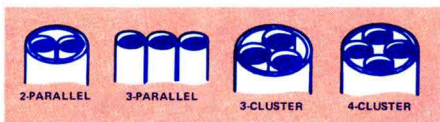
Another technique which deserves exploration is optimization of ballistic coefficient by careful control of the weight of each stage and each configuration of stages.

### Altitude Increase Through Staging

Construct a rocket employing two or three stages and make flight comparisons between it and a single-staged rocket. For accuracy both rockets should weigh approximately the same. Use combinations of engines in the staged rocket to equal the total impulse of the engine used in the single stage rocket. Each rocket should be flown and tracked at least three times before results are compared. Both rockets have the same thrust potential, but which one goes the highest, and why?

### Effects of Using Clusters of Engines

Construct a rocket with a large body tube diameter and provide for changing engine holders (one engine, two engine cluster, three engine cluster, etc.). Comparisons of flights with one engine, two engines, etc. can be simplified by adding weights to the rocket's nose cone or removing them so that initial weights (with engines) before launch are equalized. At least three flights should be tracked and averaged in each specific flight configuration before results are compared to see effects of additional power on altitudes achieved. For simplicity, all tests should be made using the same type of engine unless more than one series of tests is to be conducted. Be certain that the rocket will be stable in all flight configurations.



### Staging Versus Clustering

Studies of clusters of engines versus staging to cause a given payload to reach the maximum altitude are valid. Both theoretical studies and actual tracking of several launches each way should be made.

### Improved Staging Techniques

Research to perfect a reliable new method of staging engines which are separated from each other is an area worthy of study. Using ignition channels between the booster and the sustainer engine is one possible method. Ignition of upper stage engines (or clusters of engines) by flash-bulbs or other heat sources is an area for possible further research. Minimizing the weight while retaining 100% reliability for upper stage ignition by this method could prove a challenging undertaking.

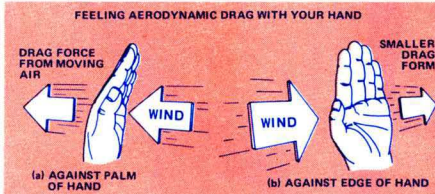
### A Booster As A Piston Launcher

The development of simple, reliable, and light-weight method of increasing altitude reached by making the booster serve, in effect, as the base for a piston launcher to make more efficient use of the initial gas generation by the upper stage engine is a challenging project.

## DRAG

### Effect of Minimizing Drag On Altitude Performance

Determining the actual effects of different finishes on rocket altitude performance is a good project. Theory indicates that a rocket with a smooth finish should go higher with a specified engine than a similar rocket with a rough finish. Is this really true? Launch a rocket three times with a specific type of motor before sanding or sealing the fins or nose cones. Then carefully sand and seal the balsa, carefully paint and polish the rocket, and launch it again three more times with the same type of engine. Track all six flights and compare averages for each set of three flights.

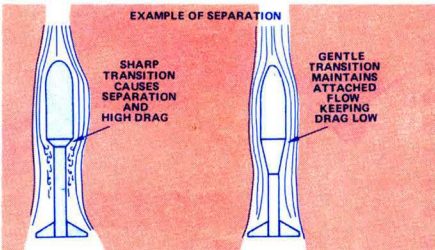


### Drag Determination

Try to determine the actual drag of your model rocket. After estimating the drag on your rocket, use this estimate to predict the altitude which will be reached with a specific engine. Launch the rocket three or more times with this type of engine. Use the tracked altitude to determine the real drag on your rocket.

### Drag Reduction Techniques and Their Effects

Drag is the nemesis of model rocketry. Of the efforts which go into maximizing performance, the greatest share seem to go into reducing drag. Streamlining the rocket's shape, airfoiling fins, using shrouds to taper transitions in body size, boat-tailing, etc. all help reduce drag. Learning more about both the theoretical and the real aspects of drag can really improve the performance of your rocket if the things learned are put into practice.

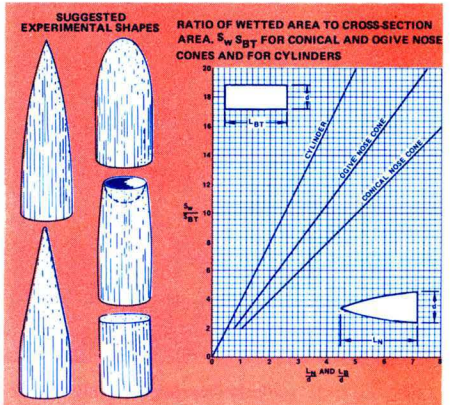


### Fin Shape and Altitude Performance

Using fins of different shapes can affect rocket performance.

### Nose Cone Shape and Drag

The effects of variations in nose cone shape on drag and hence on a rocket's altitude performance are a topic suitable for much theoretical work and extensive testing.



### Derivation of a Formula for Altitude Increase With Different Types of Engines

Launch one rocket (whose specific empty weight and frontal area you know) at least three times with each of the different engines recommended for that rocket (as 1/2A6-2, A8-3, B6-4, and C6-5 as one possible series of engines for a particular rocket). See if you can derive a mathematical relationship which shows the increase in altitude to be expected when using an engine of twice as great a total impulse as the one used in the previous flight. Possibly series relationships exist, and possibly no consistent relationships will be found.

### Effects of Changes In Weight of a Rocket on Altitude

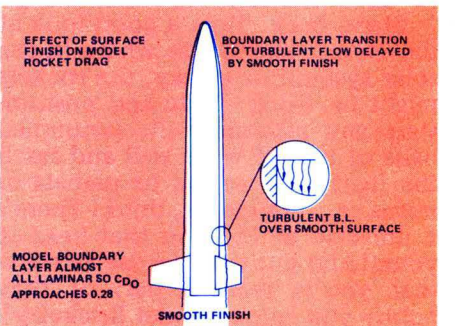
Repeated launches of one rocket, preferably a lightweight, high-performance type, with one type of engine can be made if at least three flights are made and tracked with each weight increase. Steps of ten or twenty grams may be used. Possibly, some surprising results may be determined as the ballistic coefficient is changed by changes in weight.

### Effect of Delay Smoke on Rocket Performance

Does the smoke generated by the delay and smoke tracking element as the rocket coasts actually cancel the effect of the potentially great base drag? Does this smoke really not contribute any thrust?

### Boundary Layers

Is a laminar boundary layer really more desirable than a turbulent one for maximizing model rocket altitude performance? Proof for your hypothesis must be provided. At what point should the boundary layer convert from laminar to turbulent for maximum performance?



**NEXT ISSUE:** Rocket Cars and Stability Studies.

**Does Your Room SHOW  
That You're A Rocketeer?**

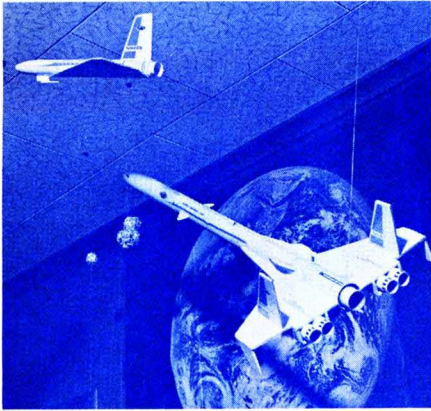


Photo Courtesy of Andy Riener  
Creating a "Cosmic Atmosphere" with a wall poster.

What do people see when they walk into your bedroom? A messy dresser? A pile of dirty clothes in the corner? Does your room need a new focal point? Then how about a rocket mobile?!

No, not a rocket-mobile. A rocket mobile. You know, the things that hang from strings. Even if the only place in your room that you can call your own is your bed, there's still all that free airspace overhead. With a little imagination mixed with ingenuity, even a drab room can have sparkle!

Now, when I speak of a rocket mobile, I don't mean a couple of rockets hanging from the ceiling. There has to be an atmosphere created that gives you a celestial viewpoint. One of the best ways to do this is to find a large space poster and put it up as a backdrop for your mobile. Maybe a picture of the Pleiades or even better, an EAC club poster.

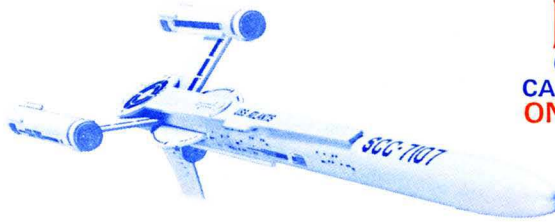
Next, is to put your rockets "out there", but still keep them inside your bedroom. First, hang a few rockets in strategic positions and at "way out" attitudes (upside-down if you like)! You can hang them by one string (so air currents can move them around), or if you want them to be stationary, by two strings.

Stand back. Take a good look at the layout and figure where in the solar system, or galaxy, the rockets might be. Then create and position stars and asteroid belts (crumpled balls of tin foil work well and catch the light), or comets or planets or novas or . . . Come on, think! There's a universe of ideas in that head of yours! And put them to use, to show that you're really a part of that hobby you enjoy, Model Rocketry!

By EAC Rocketeer Andy Riener,  
Age 15, Skill Level 3, Hayward, WI

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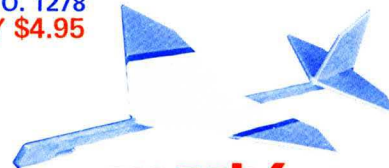
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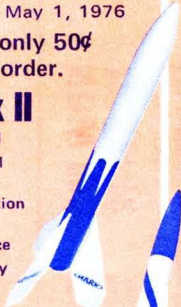
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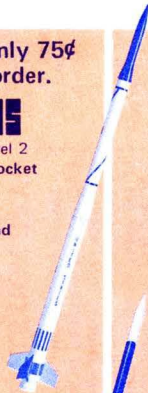
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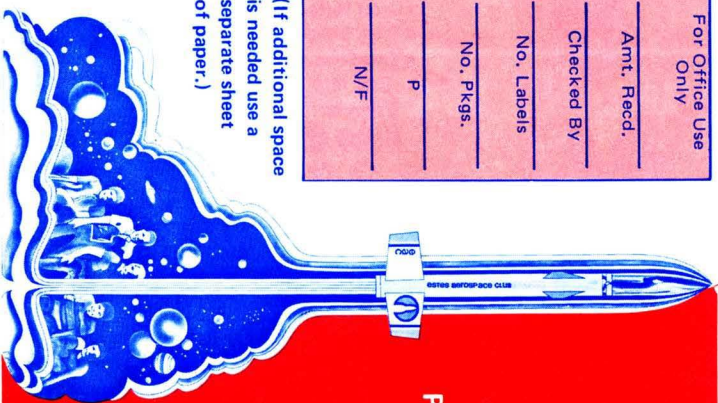
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