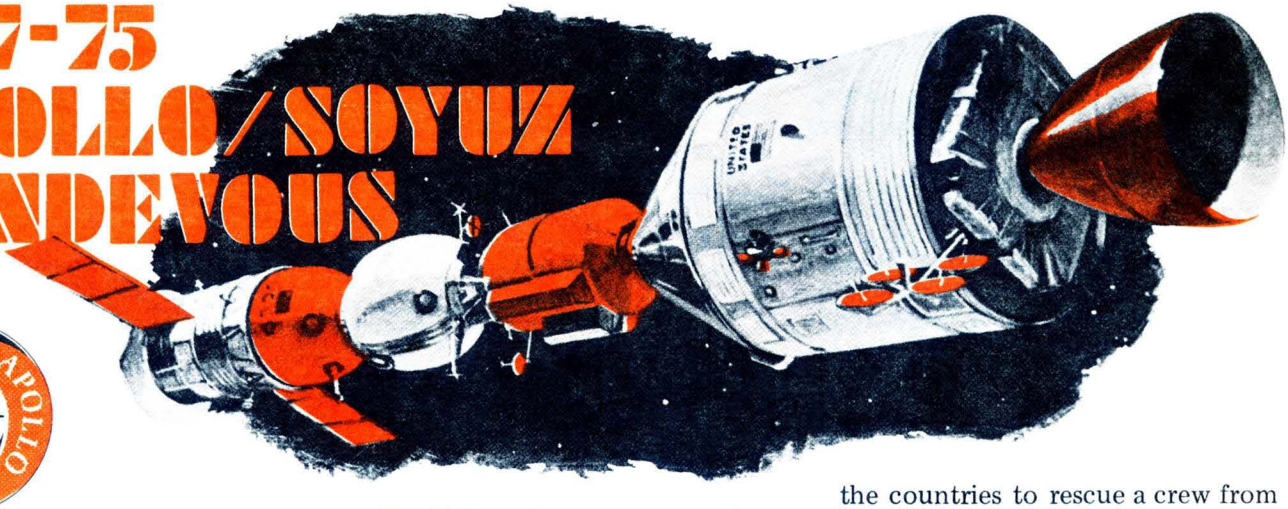
SPECTRA

OFFICIAL NEWSLETTER OF THE ESTES AEROSPACE CLUB

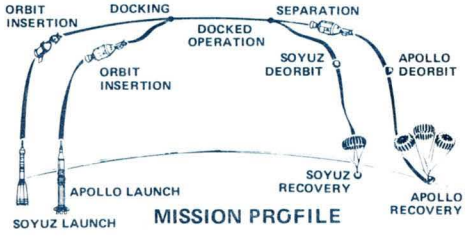
Vol. 2 No. 2
May/June 1975

7-17-75 APOLLO/SOYUZ RENDEZVOUS



On July 15, 1975, a Vostok will be launched at 1220 "Zulu" (Greenwich Mean Time) from the Baikonur, Kazakhstan launch complex. Its cargo will be a Soyuz spacecraft carrying Alexei Leonov and Valeri Kubasov.

At 1950 Greenwich Mean Time a Saturn 1B will blast off from the Kennedy Space Center with an Apollo spacecraft bearing Thomas Stafford, Vance Brand, and Donald Slayton.



MISSION PROFILE

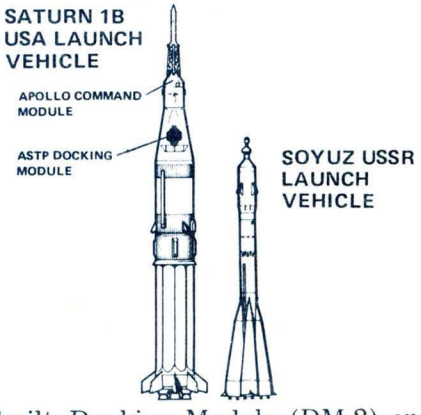
For the first time in history, spaceships from two nations will rendezvous in space. A special docking adapter carried by the Apollo will permit the two vehicles to join together after the two craft enter compatible orbits and the Apollo meets the Soyuz.

The U.S. craft uses an atmosphere of pure oxygen at five pounds per square inch. After reducing the 14.7 pounds per square inch pressure (sea level pressure) of the nitrogen-oxygen atmosphere in the Soviet craft to 10 pounds per square inch, the crews of the two vehicles may visit each other's vessels. This reduction in air pressure in the Soyuz is necessary to prevent a case of "bends" from nitrogen bubbles in the blood if an acclimatization period in the airlock of the docking adapter is not to be required.

This joint US-USSR project, the most ambitious joint space effort so far undertaken by the two countries, is the result of over three years of cooperation. The ASTP (Apollo Soyuz Test Project) was officially adopted to perform a number of specific missions in addition to furthering cooperation in space activities between the two countries.

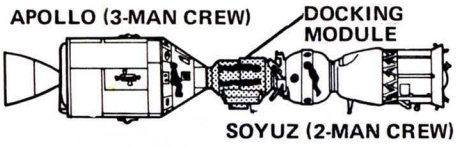
A compatible docking system is being developed and tested. A rendezvous system in orbit is being perfected. Capability for transfer of astronauts and cosmonauts is being developed, a necessity should a future emergency ever require one of the countries to rescue a crew from the other country who somehow become marooned in orbit or experience some other critical problem. Scientific experiments will be conducted separately and in cooperation to extend man's knowledge.

Modifications of the Apollo spacecraft (SLA-18) and of the Soyuz vehicle were necessary. The US-built Docking Module (DM-2) and Docking System (DS-5) will be launched with the Apollo spacecraft aboard a Saturn 1B (S-IB-210 First Stage, S-IVB-210 Second Stage, and S-IV-210 Instrument Unit).



(Continued on page 2)

Scientific experiments scheduled for the Apollo crew include astronomical observations in ultra-violet and extreme ultra-violet, new studies of the effects of our sun on atomic oxygen and nitrogen at orbital altitudes, and Earth observations which could indicate the presence of oil and mineral deposits. Electrophoresis (movement of particles in a fluid in response to an electric current) processing of biological materials which, if successful, could lead to further use of this techique in Space Shuttle missions in immunology and cancer research is scheduled. Additional experiments by the Apollo crew, by the Soyuz crew, and as joint efforts are planned.



Docking will occur during the 36th Soyuz orbit (the 29th Apollo orbit) at about 51 hours 55 minutes Soyuz GET (Ground Elapsed Time). Docking will be maintained for about two days. After undocking, the Apollo will perform a 1 m.p.s. (miles per second) posigrade (going faster) maneuver to avoid recontact with the Soyuz. Approximately 43 hours after separation Soyuz will leave orbit, landing in Kazakhstan at about 142 hours Soyuz GET. The Apollo craft will continue in orbit for about six days after separation with landing scheduled in the Pacific Ocean near Hawaii.

(Information contained in this article is correct as of press time. Changes may be necessary before the spacecraft are actually launched. Illustration courtesy of Rockwell International - Space Division.)

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!

EAC Advisory Board No. 2 - Comments

The response from EAC Advisory Board No. 2 was very good. We received a number of complimentary reactions like those listed below for our German V-2 and Honest John Maxi-Brutes.

Mr. Boles,

A few months ago you sent me the new V-2 Maxi-Brute to build and fly and requested my comments on it. The kit is easily constructed and I like the detailing available on the plastic fins. The instructions are excellent and easy to follow. The pictures and brief history included add much to the models appeal.

The only problem I had was in finishing the model, as (brand name) military flats were very hard to find locally and I usually like to use what the manufacturers recommend when available.....

The finished kit looks very nice and would make a fine addition to any rocketeers collection. I believe this would be an excellent demonstration model.

Thank you for allowing me to participate as an E.A.C. member in advisory board two.

Thank you,
Roy A. Metz
Rockester, NY

Dear Sirs,

Here is my report on your new Pershing 1-A. There are very few things to comment on about this rocket.

The only hard part in assembly is cutting and attaching the fins. Everything else is fairly simple.

The flight performance of this model is good considering its large size and weight.

The paint scheme is fairly simple except for the nose cone.

Once again there are very few items I found wrong or hard about this model. All in all, it is a good rocket not to mention a scale model.

Thank you again for selecting me as an Advisory Board Member.

Sincerely,
Mike Carraway
Vienna, WA

In addition to these comments we also received many helpful suggestions, constructive criticisms, and recommended improvements which we will certainly take into consideration. Of major concern was the importance of following the instructions for these kits, the degree of difficulty involved with the construction of the fins and tail sections, and the lack of super high performance due to the models large size and weight. With the assistance of the EAC Advisory Board we will be able to continue to bring you the best performing, highest quality products possible.

See Page 4 For Details:

THE NATIONAL ASSOCIATION OF ROCKETRY..... YOUR NEXT STEP!

Now that you're an active EAC rocketeer we would like to recommend membership in the National Association of Rocketry to further enhance your model rocketry interests. The NAR features a variety of valuable services and exciting activities for the model rocketry enthusiast.

Sanctioned model rocketry competition at the local, regional, and national levels, a personal liability protection plan, subscription to "Model Rocketeer", the NAR's official journal, and eligibility to set a national or international model rocketry record are just a few of the NAR's membership benefits. The NAR is the official United States representative at International meets, like the first world championships held in Dubnica, Czechoslovakia in September of 1974, and hosts the annual national model rocketry championship (NARAM) to be held this August in Orlando, Florida. The sponsorship of model rocketry symposiums, technical literature, special patches and decals, scale plans, and the Model Rocketry Sporting Code are all a part of the NAR's effort to support the hobby. For further information on how to join, write to: NAR Headquarters, Department E-5, P. O. Box 725, New Providence, NJ 07974.

SPACE SHUTTLE UP DATE

The Space Shuttle will be heavily equipped with backup equipment, so a disaster is even less likely to occur than during our successful Apollo flights. Nevertheless, three abort modes have been planned for launch phase. If a main engine fails early in the launch, the flight will continue until solid booster burnout. After the booster casings are jettisoned, the crew will head back to the launch site, dropping the Orbiter's external tank and shutting off the engines when a gliding descent becomes possible. Both OMS engines can then be used for flight path corrections.

If trouble develops later during the ascent, the Orbiter will be flown around the earth once at suborbital speed before landing. A third abort mode, to be used when there is no immediate safety threat, would postpone investigation of the problem until arrival in orbit. NASA decided, after careful analysis, that a launch-pad escape capability will not be needed.

Reprinted courtesy of Popular Science, ©1974 Times Mirror Magazines, Inc., November 1974 issue from their article, "Reusable SPACE SHUTTLE..Our Biggest Bargain In Out-Of-This-World Research," By Wernher VonBraun.

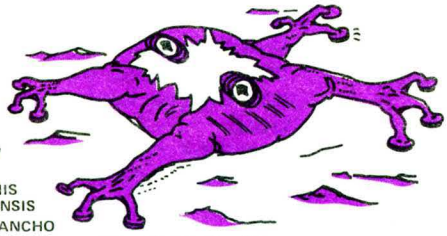
CREATURE CONTEST WINNERS

From the terrific response we received for our EAC Creature Contest it appears that many of you either believe in strange beings from outer space or have really fantastic imaginations. More than 6,000 excellent entries were received, which of course, made the judging extremely difficult. As a matter of fact, we increased the number of runners-up from six to sixteen just to handle the great number of potential winners. Pictured is Hesperonis Xanthrolensis our first place winner created by Steven Hayes of Lancaster, OH who will be awarded a $50 merchandise certificate. Also featured are the entries of our runners-up who will each receive a $10 certificate. Congratulations to all our winners, and thanks again to all those who entered for their overwhelming response.

Renowned panel of judges for the EAC Creature Contest. Seated left to right is Wayne Kellner, Estes R & D Department, Dane Boles, EAC Spectra Editor, special guest judge, "The Creature", and Bob Cannon, Education Director.

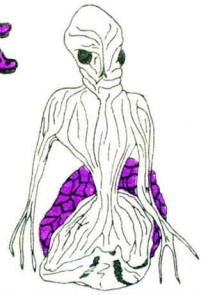
ARTICULOUS X. TELECONDIOSES from the planet Zatos
By Robert B. Dye of Huntington Beach, CA
Skill Level 3

1st place winner

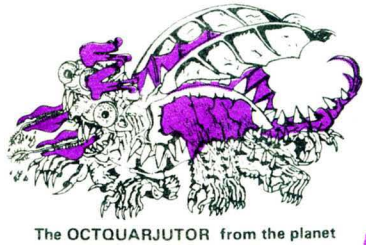


HESPERONIS XANTHROLENSIS
from the STAR ANCHO
By Steven Hayes of Lancaster, OH EAC Skill Level 3

This creature is formed from liquidated singular mitotic cells which give it a jelly like shape. Its arms and suction cup hands appear more solid and muscular as they are made of occularis fibers. The creatures has two central eyes made of cornea and breathes a mixture of hydrogen, helium, methane, and carbon dioxide. The Hesperonis Xanthrolensis, or Hesp for short, devours its food whole and mainly feeds on cactus-like star vegetation. Amazingly it has a top speed of about 15 m.p.h. and is able to slide over rocks without leaving a trace. Although normally grey in appearance it can change its color to match its surroundings. Its breeding habits are by mitosis or cellular joining and splitting. The star Ancho is located in the Orion Nebula at a star magnitude of -1.7 to +1.6 and has only one major form of life, the Hesps.

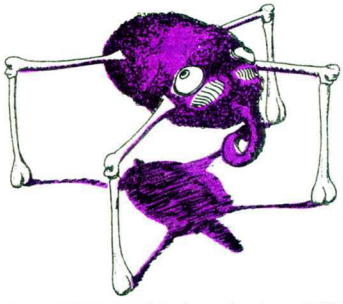


The STRAPILTON from the planet STRAPIL
By Bill Norton of Pleasanton, CA
Skill Level 5

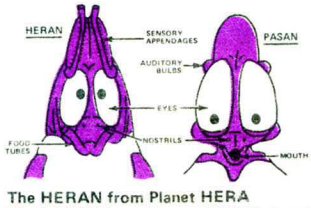


The OCTQUARJUTOR from the planet JUPITER
By Michael Jagielo of Almond, WI
Skill Level 4

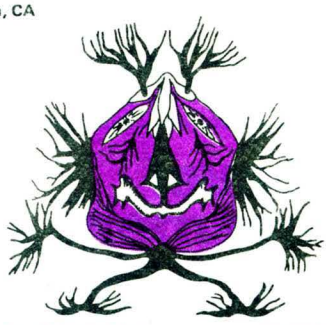
The IGERON from planet VOLNASIA
By James Wadowsky, McKeesport, PA
Skill Level 3



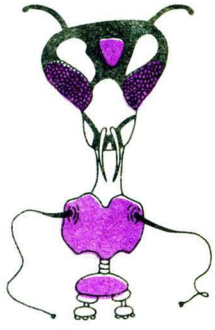
The ARMHARGRINK from the planet BORUM FINDE in the star system R-80 in sector 12.
By Kurt Faasse of Long Eddy, NY
Skill Level 1



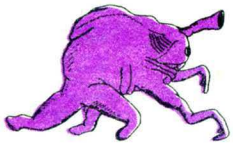
The HERAN from Planet HERA
The PASAN from Planet HERA'S closest moon, PASA
By Buford Taylor of Xenia, OH
Skill Level 1



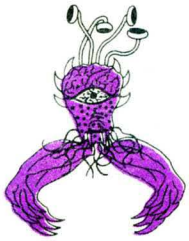
The DEANDEOP from the planet TEKCOR
By Jim Hammerquist of Rapid City, SD
Skill Level 3



The SLARANIAN from the 35th planet- TEROS in the Galaxy ANDROMEDA
By Marcus Witter of North Platte, NE

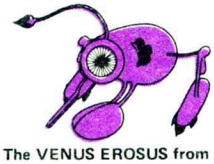


The HOMOEOSTASIS EPISTEMIC from the planet ARCHANEANUS
By Scott Halberg of St. Cloud, MN
Skill Level 1

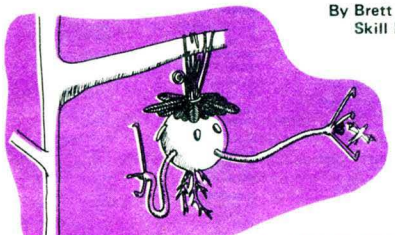


The TTERBLLOTS from the planet LLOTS
By Brett Stoll of Lakewood, CO
Skill Level 1

ZORNIX from the planet Vortin
By Brian Finnsson of Long Beach, CA
Skill Level 1

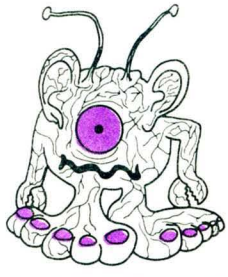


The VENUS EROSUS from the planet VENUS
By Jeff Walters Anderson, IN
Skill Level 1



The Carnivorous Plant VESICULAR LIZARD TRAP of EPSILON AURIGAE IV
By Steven Schiff Port Jefferson Station, NY
Skill Level 1

The GOLANGA from planet TERRIA 3
By Richard Johnson, Mobile, AL



The GREEN EYED STOMPER from the planet JUPITER
By Dave Longey of McCulley Barracks APO New York, NY Skill Level 2

VUSE from the planet of NECTRON
By Scott Wilkinson of Clovis, NM
Skill Level 1

If you enjoyed the "Creature Contest" you will love this one. Just imagine the type of spaceship your entry to the "Creature Contest" would need to explore the far reaches of the universe or travel to nearby planets. Then send us a sketch or illustration of the most exotically alien, futuristically designed, far-out interplanetary exploration vehicle you can think of. You will need to combine both your imagination and designing skills to enter. As your entry is not a plan and does not have to fly, the possibilities for incredibly weird designs are practically endless. This is another fun contest to really let your imagination go.

Be sure to send only a drawing (not a plan) plus the information requested in the rules below. First place will receive a $75.00 gift certificate and the first ten runners up will be awarded $15.00 certificates. Winning entries will be featured in a future issue of SPECTRA.

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 the "EAC Creature Contest" is NOT required.
5. In addition to a sketch of your alien spaceship, tell us where it comes from, what it is made of, method of propulsion, size and weight, potential speed, number of crewmembers or if it is unmanned, and its designated function. Is it a friendly exploration vehicle or an aggressive warship, or something else? Briefly explain its defenses and weaponry if it has such equipment. How does it land and take-off, and what is it like inside? What kind of living environment is created by its life support system? How far can it travel, and why does it look the way it does? This additional information should be brief and to the point.
6. Entries will be judged for creativity, completeness, design originality, degree of exotic styling, and unique background information.
7. Deadline for receipt of entries is midnight July 15, 1975.
8. Decision of the judges is final.
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.
10. Mail entries to:

    Estes Industries
    EAC Alien Spaceship Contest
    Penrose, Colorado 81240

GOOD LUCK

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

Ray Andraka
Laurel, MD

Ray Banegas
Las Cruces, NM

Phillip Bostwick
Los Altos Hills, CA

Jerry Calway
Fredericksburg, VA

Dave Chapman
Hacienda Heights, CA

Jerry Davis
Manlius, NY

Kevin Dolan
Cerritos, CA

Jon Eismann
Brooklyn, NY

Kelley Ford
York, PA

Joe Fox
Altomonte Springs, Fla.

Craig Frank
Frankfort, NY

Tim Gilbert
Luray, VA

Glade Gordon
Colorado Springs, CO

Lilliam Gordon
Colorado Springs, CO

Terry Gordon
Owings Mills, MD

Dan Guenst
Valhalla, NY

Marc Haar
Fair Lawn, NJ

John Hackney
Manlius, NY

Carson Hardacre
Alameda, CA

Creg Harter
Belvidere, IL

Brian Helmuth
Aurora, CO

Scott Helmuth
Aurora, CO

Craig Hilton
Los Angeles, CA

David Johnson
Temple City, CA

Jim Kerr
Ridgefield, CT

Kevin Knepper
Oxnard, CA

K. Koezynski
Wyckoff, NJ

Jeffrey Kottmyer
York, PA

Eric Kowalik
Ridgefield, CT

Jimmy Kwong
Jackson Heights, NY

Keven Lewis
Pontiac, MI

Adam Luckenbach
Houston, TX

Mike Luthy
Peoria, IL

Lockwood Lyon
Ann Arbor, MI

Bill Malkoulzis
Mount Waverly,
Victoria, Australia

Dan March
Denver, CO

Randy Miller
Canton, OH

Mike McAllister
Staten Island, NY

Mark McMinn
Jackson, MI

Hank MacDonald
Westport, CN

Robert Nebens
Millwood, NY

Tom Neuser
Manitowac, WI

Robert Nicholson
Crofton, MD

Brad Packard
Orlando, FL

Bryan Palaszewski
Brooklyn, NY

Jimmy Pattee
Colorado Springs, CO

Dean Pilato
Warren, MI

Jon Randolph
Cleveland, OH

Doug Rischbieter
Arnold, CA

Bruce Sager
Anaconda, MT

Michael Sherman
Staten Island, NY

John Strisower
Orinda, CA

Mike Tomcsak
Youngstown, OH

William Walkourak
Bellingham, MA

Greg Weis
Maders, CA

John Wingfield
Orlando, FL

Jon Wriedt
Pittsburgh, PA

Joe Zastawniak
Greensburg, PA

ADVANCED ROCKETEER Skill Level 4

Doug Acker
Oakland, NJ

Wade Allen
Dallas, TX

Frank Appleton
Homestead, FL

John Arceneauy
Cerritos, CA

Bobby Atkins
Wyckoff, NJ

Alfred Baker
Wheaton, IL

Bryan Barbalace
Baltimore, MD

Steve Bassett
Lima, OH

Roy Bauer
Hecker, IL

Arnold Bein
New York, NY

Fedor Bilyk
Brooklyn, NY

Randy Boadway
Capac, MI

Dale Bowers
Huntington, IN

Gordon Brandenburg
Beattyville, KY

Mark Brinkman
Westchester, IL

Mark Brooks
Ewing, VA

Mike Buckingham
Solana Beach, CA

Michael Buonpane
Brooklyn, NY

Wilson Burgess
Warron, MI

Jack Byrne
DeGraff, MN

John Cadella
Bridgeport, CA

Lester Caldwell
Erie, PA

Brad Carlson
Jamestown, NY

Christopher Chaia
Barrington, IL

John S. Chwatal
Wilmette, IL

Chris Clandensen
Boulder, CO

Andrew Conders
Fort Worth, TX

Greg Crawford
Clearwater, FL

Gilbert Davis
Gaithersburg, MD

Kevin Delan
Cerritos, CA

Darrel DeMarco
Waite, Hill, OH

Mike Diem
Racine, WI

Wallace Killon
Laurel, MS

Eric Duran
Norfolk, VA

Steve Durolf
Allentown, PA

Lee Dzuik
Shafer, MN

Billy Echols
Lewisburg, WV

Jeff Eder
Valparaiso, IN

Steve Ederose
Racine, WI

Frank Elsner
Hanover, PA

Brian Engel
Rome, NY

Bruce Ensign
Salt Lake City, UT

Kevin Esparza
San Antonio, TX

Joe Fox
Orlando, FL

Howie Friedenberg
La Crescenta, CA

E. S. Frye
Eightmile, AL

Dan Gabble
Elgin, IL

Bruce Gager
Anaconda, MT

Gary Garletts
Brownsville, PA

Dennis Gebhart
Hanover, PA

David Glatt
Washington, DC

Clifford Godiner
Chesterfield, MO

John Goin
Champaign, IL

Kelly Goldsbury
Woodbridge, VA

Gary Haneberg
Bloomingdale, IL

Lance Hanson
Littleton, CO

Mike Harris
Huntington, WV

Dave K. Hausknecht
Long Island City, NY

Herbert Headwell
Valley Falls, NY

Alan Hecker
Rochester, NY

Robert Hewar
Houston, TX

Jeff Heymann
Highland Park, IL

David Hobbs
Nashua, NH

Bruce Hoffman
Mankato, MN

Jerry Hook
Mt. Vernon IL

Matt Hopkins
Boston, MA

Ken Horton
Spring Valley, CA

Don Houck
Pequot Lakes, MN

Duane Huddleston
Hidalgo, IL

Curtis Hughes
Aurora, CO

Alan Hunt
Cayce, SC

Bob Hyland
Kirkwood, MO

Ronald Jacobson
Willmar, MN

Robert Jacub
North Versailles, PA

Dennis E. Jaques
Coldwater, MI

Michael Job
Claremont, CA

Richard Johnson
Schaghticoke, NY

Mario Jones
Mission Viego, CA

Michael Kanzitha
Winter Park, FL

Jay Karpowich
Mahwah, NJ

Mark Kemp
Henderson, NV

Ted Kenny
Bartlett, OH

Bill Keyes
Boise, Idaho

James Kimmey
Cincinnati, OH

Gordon King
Hudson, NH

Sheldon Klein
Philadelphia, PA

Ronald Klinge
Westchester, IL

Tim Knapp
Saginaw, MI

Chris Knickler
Phoenix, AZ

Jeff Krizay
Clinton, OH

Glenn Lavoire
Littleton, NH

Kevin Lee
Modesto, CA

Lloyd Leichentritt
Deerfield, IL

Peter Leppih
Willowdale, Toronto
Ontario, Canada

Aaron Levenson
Baltimore, MD

Tony Lewis
Compton, CA

Joel Locker
Colorado Springs, CO

Miller Lowe
Breckenridge, CO

Jeff Lucas
Littleton, NH

Russell Luckenbaugh
Springgrove, PA

Gerald Lusnuki
Mt. Iron, MN

Jason Machan
Detroit, MI

Phillip Malore
Thoreau, NM

Jack Martin
Rantoul, IL

Jay Martin
Irvine, CA

James Masiclat
San Jose, CA

Ron Mast
Orange, CA

Rodney Mathews
Salisbury Center, NY

Scott Matus
Kenosha, WI

Wally Meerchaert
Troy, MI

Rusty Megargle
Bronson, MI

Chris Meissner
Bedford, IN

Jerry Miller Jr.
Cary, NC

Jared Mitchell
Elsberry, MO

Scott Moe
St. Pete, FL

Duwayne Morris
Salt Lake City, UT

Carter Morrison
Englewood, CO

Vincent Morse
Magnolia, NJ

Donald Murphy
Auburn, ME

Chuck Musciano
Malvern, PA

Steven Myers
Norfolk, VA

David McFarren
Potomac, MD

Kevin McGlinchey
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EAC SPECIAL PROJECTS
PART 3
recovery systems & telemetry

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.

RECOVERY SYSTEMS

Descent Rates for Parachute-Recovered Rockets

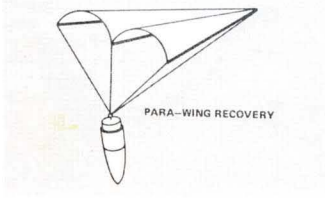
A number of possibilities exist for quite valid research involving recovery systems. Research could be conducted to establish standards for descent rates for a given rocket weight using a standard sized parachute. To "standardize" results, very careful measurements must be made. In addition to altitude at parachute ejection, time to touch down in seconds, horizontal wind drift, air temperature at the surface, air pressure at the surface, the exact size of the parachute, and the exact weight of the rocket as it descends must be determined and recorded.

Parasitic Boost Gliders

Designing, building, and optimizing a parasitic boost glider is a very practical and challenging project. Use of the Cineroc for inflight analysis of the boost and separation phases is logical.

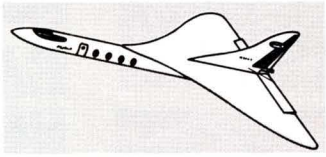
Designing the Most Efficient Parachute

Attempt to design a parachute for maximum efficiency. Triangular, square, pentagonal, hexagonal (our standard type), septagonal, octagonal, etc. types may be tried. Different ways of rigging a standard parachute may be tried. Different materials may be tried, as different thicknesses of plastic, cotton cloth, nylon cloth, mylar film, aluminum foil, etc. Elaborate new designs may be tested. Flight testing or hand-tossing with weights may be used. Rate of descent (distance fallen per second) is a good method of evaluation.



Glide Rates for Boost Gliders
Optimizing Boost Glider Design
Booster Stage Recovery by Gliding

Glide ratios for different types of boost gliders may be determined. Research on variations in design (changing dihedral of wings, changing angle of attack, etc.) for gliders provides unlimited opportunities for new discoveries. Designing booster stages for recovery via gliding rather than tumbling offers research potential, both to develop such stages and to measure their performances.

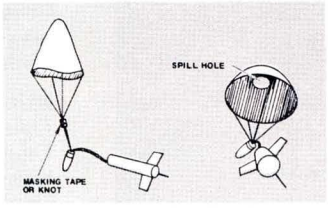


The new scissor-wing concept in boost gliders may be investigated. Drag produced by gliders of this design, glide ratios, etc. may be studied.

Parachute Modification Studies

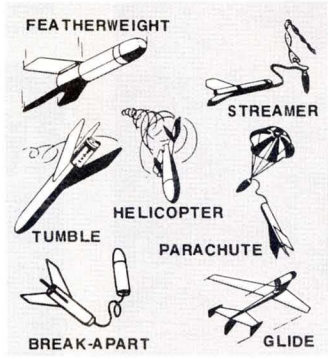
The effects of spill holes in parachutes is worthy of further research. Allowing air to spill out of the 'chute through one central hole or a series of smaller holes (as made by a paper punch) can affect the descent rate. However, there appears to be some question as to what the effect is and how pronounced is the effect.

"Reefing in" the parachute by taping the shroud line together a specified distance down from their points of attachment can be a good topic as this technique is frequently employed to minimize lateral drift.



Recovery System Comparisons

Comparing the effectiveness of different recovery systems for the same rocket or different rockets of the same weight can be interesting.



Helicopter Recovery Systems

Is the helicopter recovery system really a practical, efficient recovery system for high performance rockets? If so, what is the best design?

Streamers for Rocket Recovery

Tests using a specified size of streamer, then doubling its surface area by an extra streamer, tripling its length, tripling its surface area by extra streamers, etc. can be an inexpensive yet valid research project to learn the effects on descent rates. Be sure to adjust the rocket's weight for each test to provide identical weights.

Effects on Descent Rate of Different Sized Parachutes

Varying parachute size for a rocket whose total lift-off weight is held constant could yield some valuable standards for descent rate as a function of parachute surface area and total weight during recovery.

Launch Angles, Wind Speeds, and Rocket Recovery

Using the standards established by tests as suggested in the previous paragraph, estimation of the launch angle into the wind could be simplified to assure recovery of the models in the planned recovery area on windy days.

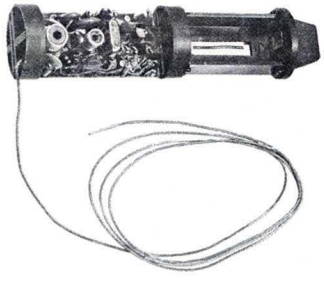
Techniques to Improve Durability of Model Rockets

Developing special techniques such as reinforcing the leading and tip edges of fins, heat-resistance treating of nose cone bottom surfaces, etc. are practical projects.

TELEMETRY

Radio-Homing Devices to Assist Rocket Recovery
Audio Devices to Assist Rocket Recovery

Use of a signal generating device as payload for a rocket is one method for increasing the ease with which a rocket may be recovered, especially in bushy or uneven terrain. However, the use of such a device is not a good project unless the device itself is actually the product of the project. In this case, the development of a simple, inexpensive device with high reliability to continue emitting a tracking signal of sufficient strength can be a very valid and practical project. The device developed may use radio waves, sound waves, light waves or perhaps other means of making itself evident for tracking purposes.



Miniaturization of A Transmitter

True telemetry is the sending of information over a distance. The most commonly used form of telemetry in model rocketry is the small, light-weight radio transmitter (as the Estes Transroc). The project may be the development of a new transmitter. This project, however, requires some knowledge of electronics, miniaturization, radio building fundamentals, radio laws, access to the proper parts, and a suitable receiver.

Air Temperature Profiles

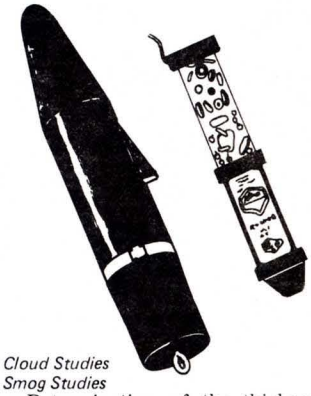
Most telemetry projects are concerned with the collection of data, usually data which cannot be conveniently secured in any other way. Accurate data on air temperatures through a vertical segment of space from ground level to several thousand feet can be secured by using thermistors or similar temperature sensing devices as the input for suitable transmitters. Care must be taken to calibrate the device before the launch. Perhaps tape recording the signal from the receiver and then playing this signal through a suitable recorder to generate a graph is easiest. The recording can also generally be analyzed by carefully counting the number of "signals" recorded on a one second segment of the tape by slowly playing the proper length of tape. Most such systems use a frequency change to denote temperature changes. If your system uses instead an amplitude-modulated signal — a more elaborate system is necessary. Perhaps playing the signal through an oscilloscope will permit data retrieval.

Causes and Cures for Spin

The performance of the rocket itself may be measured by use of a light-sensing element to determine spin rate for the rocket. Different fin configurations, fin attachment angles, fin shapes, wing angles, etc. can be compared using this system.

Audio Profile of A Rocket Flight
Rocket Flight Log from Viewpoint of A Passenger

Analysis of the sounds in and around the rocket is fun, but of questionable scientific value. Using an aerial movie camera and a transmitter in the microphone mode can produce a spectacular sound record of your flight. However, several mechanical problems such as proper insulation of the microphone from the sounds of the motor in the camera make this a difficult project.



Cloud Studies
Smog Studies

Determination of the thickness of cloud or smoke layers by use of telemetry apparatus can be a very valid project. Perhaps the light-sensing mode or the temperature-sensing mode for operation of the transmitter would be best for this. The "density" (optical) of the cloud, smoke, or smog layer can also be determined. Be sure to conduct experiments of this nature in which the rocket goes into areas of the sky not visible to you very carefully and with FAA approval to be certain you do not come near any airplanes. Pollution studies can be very valuable as well as interesting projects. Use of the temperature-sensing mode of the transmitter in clear air can detect temperature inversions to en-

(Continued on page 6)

(Continued)

able you to predict pollution build-ups before they occur. Repeated launches to establish "norms" for the area under study are necessary to determine what are "normal" conditions for that area at different times of day

Micro-environmental Studies

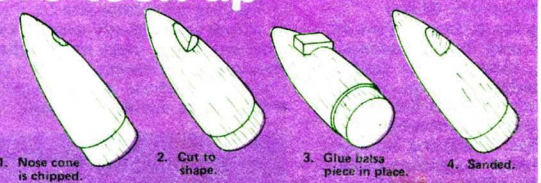
A unique use of telemetry might be to study micro-environments by sending back temperature and/or light intensity information from such micro-habitats as under a bush, in a grassy area, up in the branches of a tree, under the bark of a dead tree, in a burrow, etc. Use of the microphone mode in such studies could produce interesting results on animal activity patterns, movements, and sounds. In fact, such projects could be great biological studies as well as model rocketry projects.

(NOTE: Due to space requirements our section on Aerial Photography has been held for the next installment.)

NEXT ISSUE: AERIAL PHOTOGRAPHY and WIND RESEARCH.

eac tech tip

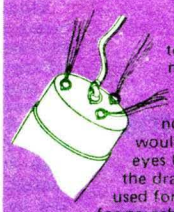
Jeff Kooistra
Wyoming, MI



If a nose cone on one of your sport rockets chips or nicks, you can repair it yourself. All you need is a knife, glue, sandpaper, and some 3/32" balsa wood. With the knife, cut the nick into a more regular shape like a triangle or square. Next, cut a piece of balsa wood roughly the same size and glue it into place. After it dries, you can sand it to conform to your nose cone. This method will also work with balsa fins.

eac tech tip

Richard A. Pomeroy
Kalamazoo, MI



Here's an idea for your multi-chute rockets. This was designed to reduce chute tangling to almost nothing for rockets with body tubes of BT-60 or larger. Place a screw eye in the center of the nose cone base as you normally would. Next, place three or four screw eyes (SC-3) in the positions shown in the drawings. The one in the center is used for the shock cord and the others for parachutes. An additional 'chute can be attached to the center screw eye.

EAC lunartoon

Bill Softky
Menlo Park, CA

"It's probably just some marsh gas."

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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 third group of EAC Advisory Board members, listed below, are currently evaluating our new Nike-X, Renegade, Russian Vostok, and Andromeda kits.

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