



## TECHNICAL NOTE: Rocket Launched Gliders

by Jon Rains NAR #13911 NAR: Trustee, Manufacturer Liason, and Northeastern Contest Board Chairman

—Courtesy Rockwell International Space Division

In the early 1980's America's Space Shuttle will rocket skywards carrying space freight destined for Earth orbit. Mission completed, the shuttle orbiter makes a fiery re-entry, transitions to a steep glide, and lands.

While the first Shuttle mission is many months away, model rocketeers have been performing similar tasks for over a decade. Like the Estes kit (#1284, see page 8), the Shuttle is a boost/glider!

The first model rocket boost/glider (or B/G for short) was built by Vern Estes and John Schutz in 1960. To blast straight up (boost) into the blue and then return in a gentle glide are the traits of the boost/glider.



Front-engine Boost/Glider

There are hundreds of different types of boost/gliders, but the four main types are conventional front-engine, conventional rear-engine, pop-pod, and parasite.

To achieve a straight boost a B/G must have its Center of Gravity (CG) ahead of its Center of Pressure (CP). Keeping the CG forward of the wing's leading edge usually allows for an adequate stability margin, and the boost will be true.



NASA's Space Shuttle Enterprise

The transition from boost to glide phase involves moving the CG slightly behind the CP in the conventional front-engine and pop-pod types, while conventional rear-engine B/Gs rely on shifting the CP as well as the model's CG. By moving an elevator or flap in the rear of the wing or stabilizer upwards, a B/G's CP can be shifted forward.

Ejecting an internal engine pod, the used engine casing, or the pop-pod will move a B/G's CG forward, as well as lighten the glider.

Parasite B/Gs such as the Estes Space Shuttle and Condor rely on the built-in stability of a larger rocket, to which a glider is attached for stability during launch. It is important that the rocket be stable without the glider, which is placed towards the rear of the rocket booster.

A boost/glider must be "trimmed" before it is flown. This calls for balancing the glider to obtain a good glide (in glide con-

figuration). To accomplish this, select a large grassy area. Holding the glider level, throw it gently into the wind. It is best to wait for a calm evening for trimming. If the glider climbs sharply, then dives (stalls), add a small amount of weight (as clay or a lead strip) to the nose and give the glider another toss. Keep adding small amounts of weight until the climb disappears and a flat, slow glide remains.



Estes Space Shuttle

# 1284



If your first toss results in the glider diving rapidly into the ground, add weight to the rear until a good glide is obtained. If your glider turns excessively, add weight to the wing which is on the outside of the turn.



Trimming A Glider

Some conventional rear-engine B/Gs have elevon adjustments that may be used instead of adding or removing weight.

When flying B/Gs be sure to select an engine with a short delay. This allows for ejection to occur on the way up, instead of well after apogee (which usually results in the famous "death dive" which can demolish a boost/glider that "forgot" to glide).

Part of the fun of launching boost/giders is seeing how long the glider can stay in the air. A stop watch is perfect for this purpose. Boost/glide duration contests are common throughout the United States and the world. Try changes in glide trim and see how these affect glide time. The list of experiments is endless.

High performance B/Gs can stay aloft for a minute or more. A new problem arises when your gliders are too good. They may glide out of sight! Rising air currents, known as thermals, play a good part in this disappearing act, but good design coupled with careful construction are important as well. To keep a glider visible against the sky, paint the glider a contrasting color. However, painting your glider adds weight. Some competitors prefer to sand the glider's balsa surfaces smooth with fine sandpaper and then use felt tip markers to add color for an ultra-light finish. Black marker works well, as does dark red.

While there are four main types of boost/giders, others exist. The Estes Scissor-Wing Transport is unique in that its wings are held close to the Transport's body during boost while at ejection they swing into glide position. Another glider type which is showing promise is the Rogallo wing, initially considered by NASA for recovering



Scissors Wing Transport # 1265

Gemini capsules, put to work by hang-glider enthusiasts, and now in the hands of dedicated rocketeers. Consisting of an ejectable flex-wing constructed of plastic held between wood spars, this glider can get fantastic durations!



Condor # 0807

The world of model rocket boost/giders may seem complex, but above all, it's a challenge that leads to fun.

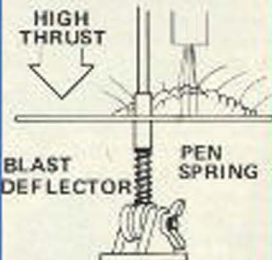


Ralph Cossaboom  
Rhinebeck, NY

## THE IDEA BOX

HIGH THRUST ENGINE  
SHOCK ABSORBER.

LAUNCH ROD



Kurt Wonsack  
Tucson, AZ

USEFUL  
COTTON  
SWAB

A cotton swab can be used to put glue in a rocket tube. You can put the measurement on it for fast and accurate gluing.  
Celo Balmoria  
Defiance, OH



Karen Fung  
Stoneham, MA



# SIDEWINDER II

HONORABLE MENTION MARCH 1978  
DESIGN OF THE MONTH CONTEST  
BY LE CONG DANH Norcross, GA

**SKILL LEVEL 3**

## PARTS LIST

A	1	Nose Cone (type PNC-55AD)	71075
B	1	Body Tube (type BT-55)	3074
C	1	Stage Coupler (type JT-55C)	3053
D	1	Parachute (type PK-18)	2267
E	1	Shock Cord 1/8" wide	2276
F	1	Screw Eye - 3/4" long	2283
G	2	Engine Mount (type EH-2055)	3151
H	1	Fin Stock (type BFS-30)	32108
I	1	Fin Stock (type BFS-30L)	32110
J	1	Launch Lug	2321

## ADDITIONAL MATERIALS

Hobby knife, white glue, plastic glue, sanding sealer, sandpaper, ruler, and spray paint.

## RECOMMENDED ENGINES

### TOP STAGE

1/2A6-4 A8-5 (First Flight)

B4-6 B6-6 C6-7

### LOWER STAGE

A8-0 (First flight) B6-0

C6-0

15-1/4"

### FIRST STAGE

CUT FROM

18" BT-55

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

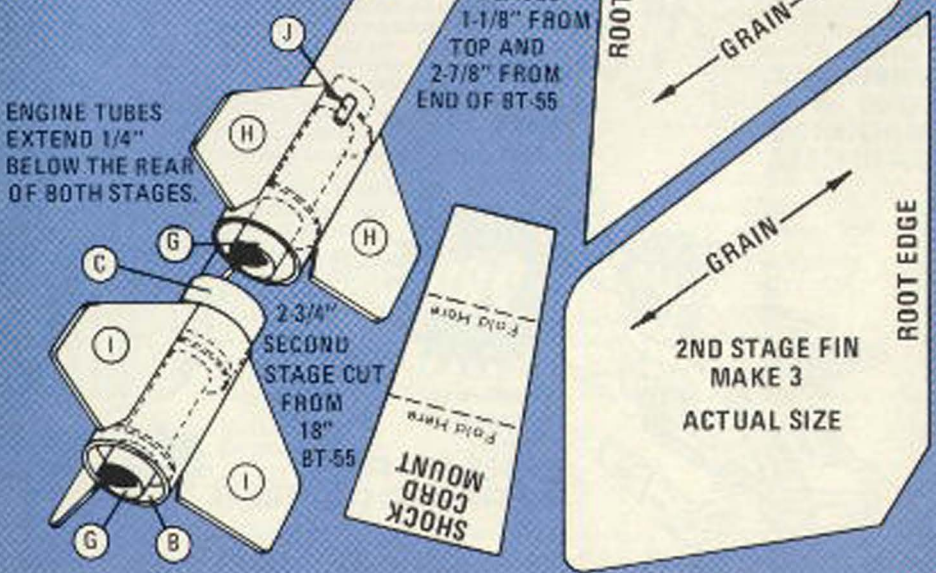
ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.

ENGINE TUBES  
EXTEND 1/4"  
BELOW THE REAR  
OF BOTH STAGES.





# R2-D2 C3-PO Contest Winners



MY COUNTERPART  
AND I WERE VERY  
HAPPY WITH  
ALL THE ENTRIES!  
WISH ALL OF YOU  
COULD HAVE  
WON!

BEEP  
CHIRP  
WIZZZ

**GRAND  
PRIZE**

John R. Schuerfranz  
Hamilton, OH  
ICU R2-D4  
**WINNER OF  
A \$100.00  
MERCHANDISE  
CERTIFICATE**

**1st**

John Connell  
Pittsburgh, PA  
Vulcan  
**WINNER OF A  
\$50.00  
MERCHANDISE  
CERTIFICATE**

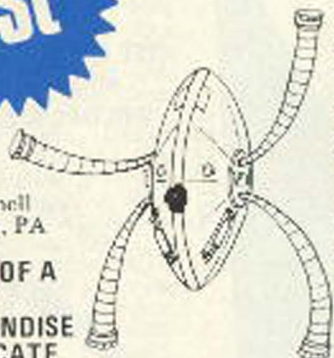
This is the latest version of the Interplanetary Computer United series. This particular model is the R2-D4, which is the 3rd generation of the famous "R2-D2". The "R2-D4" has four main sections.

The first section contains all the components required for audio, visual and radio communications.

The top portion of the main frame contains all the necessary paraphernalia to interface all internal and external peripheral equipment.

The middle portion of the main frame contains the actual memory circuits.

The lower portion has a complete scientific laboratory incorporated into the main frame.



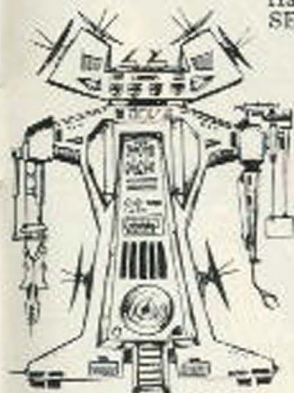
**2nd**

Chris Pericak  
Hammond, IN  
CIR-V  
**WINNER OF A \$25.00  
MERCHANDISE CERTIFICATE**

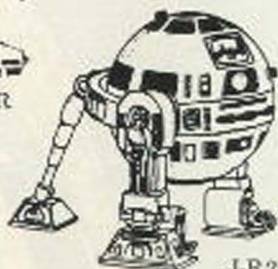


**2nd****WINNERS OF A \$25.00  
MERCHANDISE CERTIFICATE**Philip Johnson  
Portland, CT  
R2-D2 Model IISteve Goodrich  
Hallstead, PA  
SEN-33R

N4-S



SEN-33R



J-R2

**3rd****WINNERS OF  
A \$10.00  
MERCHANDISE  
CERTIFICATE**Stephen Weakley  
Elk Grove  
Village, IL  
N4-SRon Taylor  
Alexandria, VA  
J-R2Robert San Luis  
Kingsville, TX  
TUTDavid Johnston  
Mercer Island, WA  
R-2 UnitStan D. Ewert  
Colgate, WI  
S-15Maynard Hammond  
Logan, UT  
CJ7P.H. Hartley  
Bisbee, AZ  
M.A.R.S.Keith Curtis  
Atwater, CA  
R2-D2Kevin Wood  
Flagstaff, AZ  
SAPD-1000Todd M. Eaves  
Frisco, TX  
TCF-3

TCF-3

**4th****WINNERS OF A "NEW" WIZARD KIT (#1292)**Mark McFerron  
Mt. Vernon, KYPatrick Repper  
Pahokee, FLDavid Miller  
Menasha, WIJohn O'Connor  
Kenosha, WIWilliam Anderson  
Southwick, MAEric Bakke  
Lakewood, WIDavid Sheldon  
Silver Spring, MDJeffrey Foster  
Oakland, CAEric Benson  
Rochester, MNPaul Harmon  
Durham, NCRobert Leftwich  
Kaufman, TXMike Batchelor  
Bedford, TXJames Beihold  
Tipton, INTommy Smeltzer  
Columbia, SCBobby Huff  
Adrian, MOCharles Anderson  
Texhoma, OKY. Ben Dung  
San Antonio, TXNick Kielhold  
Aberdeen, SDMelvin Fong  
Los Angeles, CAEric Pivnik  
Miami, FLRobby Venarge  
Tallmadge, OHMark W. Lanz  
Anchorage, AKMickey Chrin  
Cuyahoga Falls, OHMark McCarty  
Omaha, NEMike LaBarge  
Damar, KSMichael D. Perry  
Berger, TXTim Norman  
Belleville, MIJames Theiler  
Albuquerque, NMDanny Duexter  
Massapequa Park, NYLeonard Rice III  
Arlington, VAFrank Russo  
Sepulveda, CAMike Hudson  
Waco, GAJim Hougham  
Lovell, WYScott Gillman  
Olympia Fields, ILLawrence Crane  
Rough & Ready, CAMark Bredemeier  
Cincinnati, OHBruce Temple  
Chicago, ILBen Mixson  
Camden, SCJoe Pritchard  
Honesdale, PABrian Perry  
Hart, MIMark Suszko  
Hanover Park, ILGary LaPointe  
Berkley, MIGene Jozens  
Rialto, CATom Holmes  
Ozark, ALRus Sever  
Alvin, TXMike Diehl  
Georgetown, MAGuy Springfield  
Lake Havasu City, AZMichael Parks  
Danvers, MATodd Hayden  
Ladson, SCRobert Arnold  
Massillon, OH



# THE EAGLE

HONORABLE MENTION APRIL 1978  
 DESIGN OF THE MONTH CONTEST  
 BY LUIS FAMATIGA Los Angeles, CA

**SKILL LEVEL 3**

## PARTS LIST

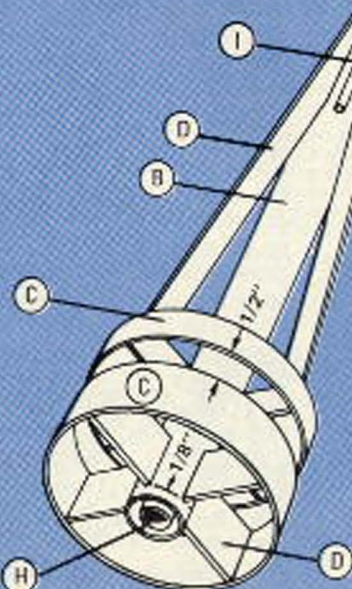
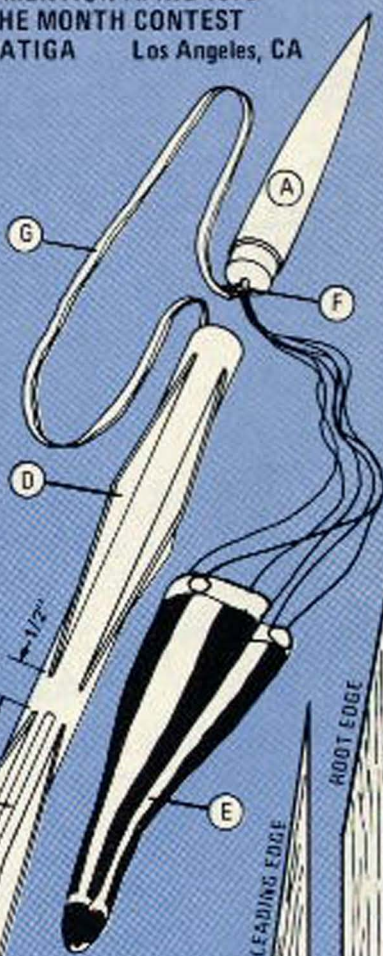
A	1	Nose Cone (type PNC-60Y)	71009
B	1	Body Tube (type BT-50)	3073
C	1	Body Tube (type BT-101)	30438
D	2	Fin Stock (type BFS-30)	32108
E	1	Parachute (type PK-18)	2267
F	1	Screw Eye	2283
G	1	Shock Cord	2276
H	1	Engine Mount (type EH 2050)	3150
I	1	Launch Lug	2321

## ADDITIONAL MATERIALS

Hobby knife, white glue, plastic glue, sanding sealer, sandpaper, ruler, and spray paint.

## RECOMMENDED ENGINES

A8-3 (First flight) B6-4 C6-5



FIN PATTERNS SHOWN ONE HALF ACTUAL SIZE



GLUE ENGINE MOUNT FLUSH WITH END OF BODY TUBE.



# DESIGN OF THE MONTH WINNERS

Congratulations to another fine group of Estes Rocketeers for their outstanding DOM entries. First place winners will receive \$75.00 merchandise certificates and honorable mentions will be awarded \$10.00 certificates. Keep those entries coming, maybe you'll be our next winner!

**MARCH 1978** - First Place Six-Way-Tie: Charles Prince, Fairfield, OH, Dean Shiflett, Fayette, MO (Lunar Glider), Mitchell Stepuch, Hanford, CA (Buzzard Glider), David Boyd, Victoria, Australia (Countdown Control Console), Erik Johnson, Lakewood, CO (Ulcer Launch Control), John Stone, Washington, DC (Jupiter Launch Control), Honorable Mention: Le Cong Danh, Norcross, GA (Side-winder II), Christopher Surh, Manchester, CT (Butterfly), Phil Stewart, Portland, ME (Chopper), Mark Waltz, Muskego, WI (Modified Sky Raider), David Russo, East Haven, VT (Launch System), Jonathan Hanson, Chico, CA (Jonathan's Javelin), Carl E. Ruby, Westminster, CO (CER-XI), R. Sturim, Barrington, RI (Phoenix Flyer), Jeff Nejedly, Racine, WI (Legacy 1), Gregory Poteat, Tacoma, WA (Stinger), John C. Wolfmeyer, Mooresville, NC (Lance), Mark Waldrop, Northport, AL (Zeron Transport), Dan Greenfield, Sumner, IA (Silver Streak), Derrell Wolford, Falls Church, VA (Streak), Richard Ernst, Colorado Springs, CO, Steve Kelleher, Carrollton, TX (Sirius-B).

**APRIL 1978** - First Place Five-Way-Tie: Tom Ziemer, Beatty, NV (U.S.S. Saratoga), David R. Higgins, Huntington Beach, CA (Swing Wing Boost Glider), Andy Malinsky, McHenry, IL (Voyager), Mike Hardy, Paradise, CA (Silver Streak), Chuck Matz, Orland Park, IL (Tyrant Interplanetary Bomber), Honorable Mention: Luis Famariga, Los Angeles, CA (Eagle), Edward Weaverling, Hampton, VA (3-D Times 3.99), Ronald Sweet, Sequim, WA (Futura 2), David Miller, Menasha, WI (Semi-Seale Little Joe), Chris Donahue, Northport, AL (Spear), Bill Engar, Salt Lake City, UT (Space Fighter X-705), Herbert Larkins, Edmonds, WA (Firelark II), Lynn & Michael Johnson, Ann Arbor, MI (U.S.S. Andromeda II), Matt Denham, Portland, OR (Desperado), Edward Kim, Darien, IL (Para-Wing Rocket), Amir Attaran, Carmichael, CA (Apogee X), Frank Peri, Garfield Hs., OH (Verti Bird II), Scott Norwood, Pascagoula, MS (Multi-Launch System), Albert Yong, Pasadena, CA (Multi-Stage Fin Aligner).

## DON'T MISS AN ISSUE OF MODEL ROCKET NEWS

Model Rocket News is published six times yearly and inserted with return mail orders. To receive your bi-monthly copy simply place an order or request the latest issue from: Estes Industries, Att: MRN Editor, Penrose, Colo. 81240.



## IRON-ON DECALS

For Your T-Shirts, Range Jackets and Windbreakers

All orders received on odd numbered months are returned with a "FREE" iron-on decal for your t-shirt, windbreaker, or range jacket. These new Estes iron-ons feature a variety of super-heat designs. You iron it on right at home to

any surface containing 50% or more polyester. Remember these great new iron-ons are available only with your return mail orders on the odd numbered months (July, September, November, January, etc.)

### MRN PUBLICATION SCHEDULE

Vol.	No.	Month	Year
18	4	August	1978
18	5	October	1978
18	6	December	1978

Note: We regret that the MRN is not available as a subscription as we do not have the internal staff and machinery to handle such a program at this time.

**YOUR BEST BET IS TO OBTAIN MODEL ROCKET NEWS WITH YOUR NEXT ORDER!**

### Help Us Publish Model Rocket News

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

If you send us photos, please make sure that you pack them between cardboard sheets so that they

won't get creased in the mail. All contributions become the property of Estes Industries and cannot be returned. Address all material to: MRN Editor, Estes Industries, Penrose, Colorado 81240.

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

Hope to hear from you soon!