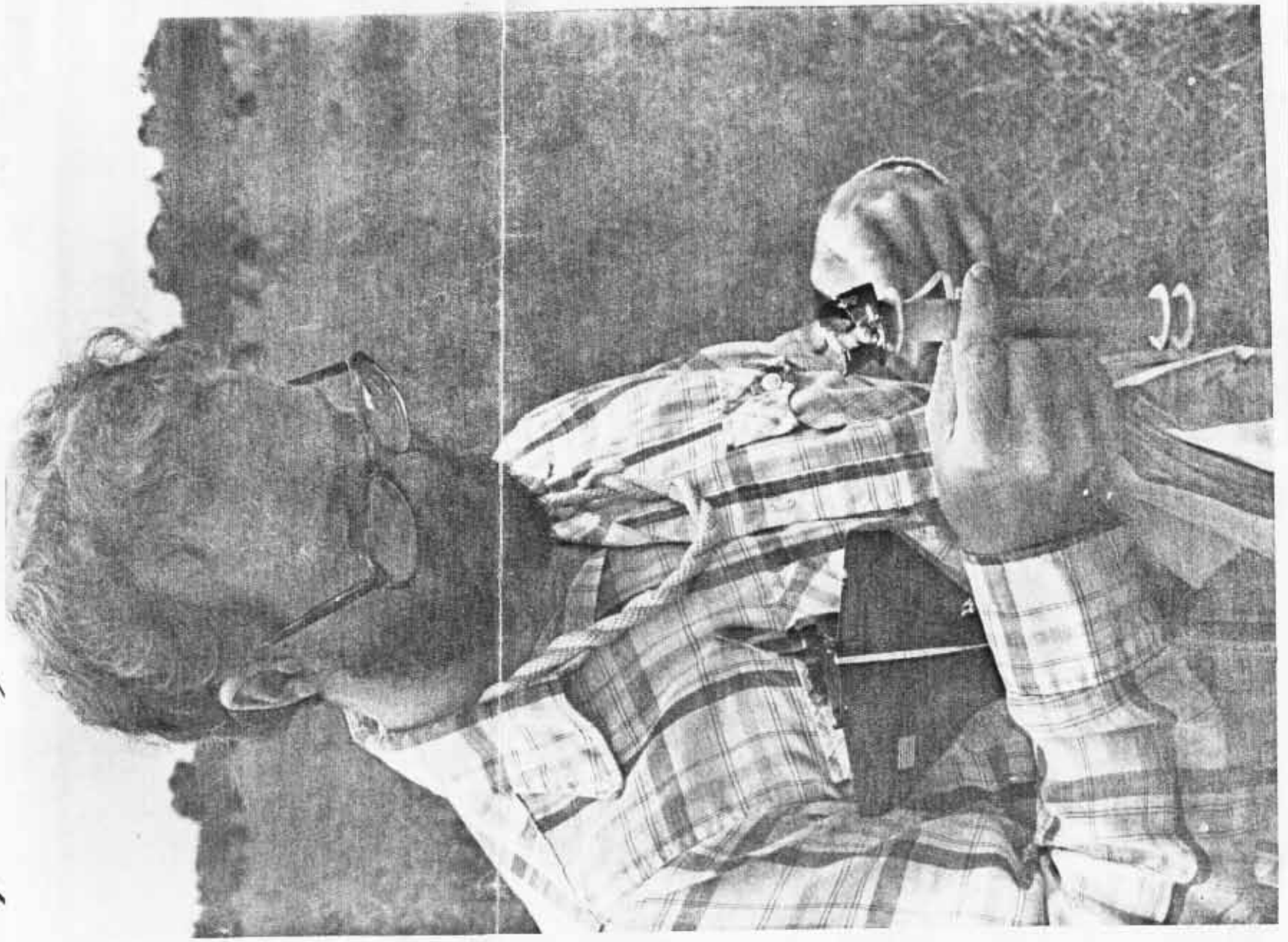
VOL.6 NO.1 JAN-FEB 1983

WINNER OF THE 1982 LAC NEWSLETTER AWARD

# THE LEADING EDGE



# THE FIRST WORD

Once again, a new year has started (as it tends to do this time of year), and that means it is also time for my once-a-year editorial.

I say this every year, and I never get tired of saying it; we've got a great bunch of people working on "The Leading Edge"; Mark Bundick, Bob Kaplow, Tom Pastrick and yours truly do yeoman's work each issue to bring you one of the best (the best??? Nay, modesty forbids my saying that! Honesty, too.) newsletters in the country. Much of our material has been produced by Pat, Jedi, Larry, Henry and Ben, for which your editor is truly grateful. I'm sure we can continue to do as well, if not better, in 1983.

You've no doubt noticed that the "Leading Edge" has changed in appearance just a bit. We've gone to a three column format with reduced typeface. This allows us to stuff a little more material into each issue without an increase in cost to either our members or subscribers. I'd very much like to know what you think of the new format. Is it readable? Do you like it? Do you hate it? Are you indifferent? We aren't married to this, or any other format. If it doesn't work out for you, the reader, we can drop it. I do intend to use it for a while, so let me know what your opinions are.

Happy flying and reading in 1983!

COVER PHOTO: Tom Beach examines his battle weary Space Shuttle.

# T MINUS 1

MONTHLY NIRA MEETING — Feb. 4

Glen Ellyn Civic Center — 7:30 PM

Patches, T-Shirt purchases; planning for mall displays; set up for workshops.

MONTHLY NIRA MEETING — Mar. 4

Glen Ellyn Civic Center — 7:30 PM

WISCON-4 trip planning.

WISCON-4 — Mar. 26-27

Lacrosse, WI.

A model rocket convention sure to be fun for all. Sponsored by WWAR. Convention features workshops, movies, contests and world famous auction. Contact Ric or Bunny for details.

# FOR SALE

FOR SALE: Used Canon Micro RC system. Complete with transmitter, receiver, two servos, 100 MAH battery. All Ni-cad cells and charger included. Contact:

George Riebesehl, Jr.
Mertz Hall, #1409
1125 W. Loyola
Chicago, IL 60626
312-973-7850

# CONTEST CALENDAR

NOMID-83 — May 7-8, 1983

Events: Sp. Scale, D EL Dur., DR, ½A PD, A HD, A BG, B BG, ½A RG, ½A ISD

Contact: Mike Zienkiewicz
28811 Sutherland
Warren, MI 48096

MWRC-83 — May 28-29, 1983

Events: Sp. Sys., B HG, D RG, ½A RG, ½A HD, C SR Alt., B Alt.

Contact: Mark Bundick
1925 N. Hudson
Chicago, IL 60614
(312) 642-9028

ETR-83 — July 2-3, 1983

Events: to be announced

Contact: Mark Bundick

NARAM-25 — Aug. 1-5, 1983

For details, see the Model Rocketeer. Complete information will be mailed to all NAR members later this year.

MAR-83 — June 18-19, 1983

Events: PM, A HD, ½A IHG, B RG, A HG, B Pay., C El Alt, Pred. Alt.

Contact: Tom Hoelle
2009 Emma Ave.
Ft. Wayne, IN 46808

NOTE: All detail tenative!!!



# MODEL OF THE MONTH WINNERS

The Model of the Month Winner for November is Don Linders and his son Donny and their Estes Space Shuttle. Congratulations, Don!

The Model of the Month Winner for December is Henry Valdens and his "Hidden Wonder". Congratulations, Henry!


THE LEADING EDGE

is published bimonthly by and for members of the Northern Illinois Rocketry Association (NIRA), NAR Section #117, and is dedicated to the idea that Model Rocketry is FUN! Suggestions for articles and plans are welcome. Articles, plans, other newsletters and news items of interest should be sent to the editor:

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Northfield, Illinois 60093




## CONTRIBUTORS

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LARRY LONDON
RIC GAFF
"CAPTAIN VIDEO"

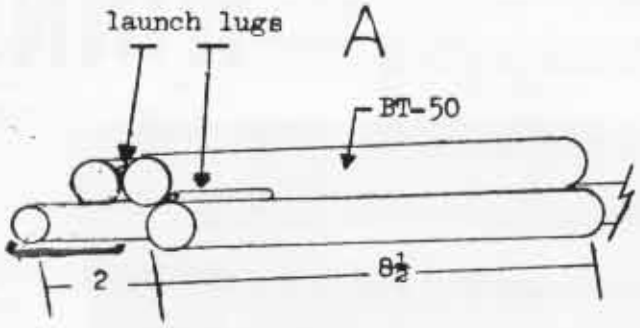
# STAR TANKER

## U.S.S. HORIZON

by Tony Lentini

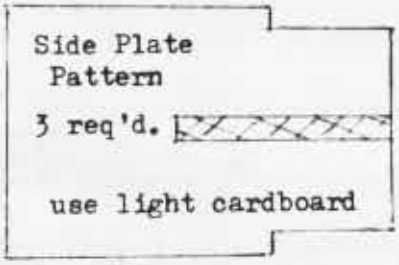
Parts List

| | |
|---|---|
| 18" BT-20 | |
| two 18" BT-50 | two launch lugs |
| 1/8" dowel 14" long | small screw eye |
| 1/8" balsa | 1/8" shock cord |
| PNC-50X | EH-2 engine hook |
| two AR-2050 rings | two PK-12 chutes |
| thin cardboard | |

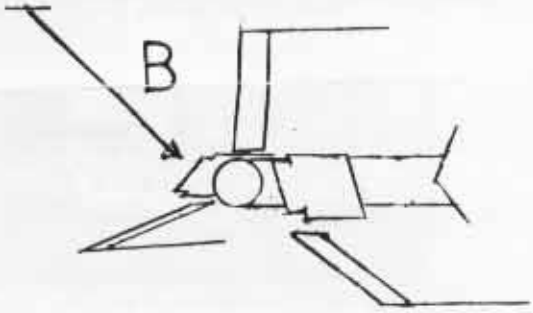



1. See Diagram A for details. Mark the BT-20 2" from one end. Cut three 8½" lengths of BT-50 and one 3" length. Glue 8½" sections to BT-20 as shown. Attach EH-2 to the bottom of the BT-20; use tape to help hold it on. Glue two lugs flush with the rear of the BT-50's. Don't use fillets between the tubes. It ruins the appearance.

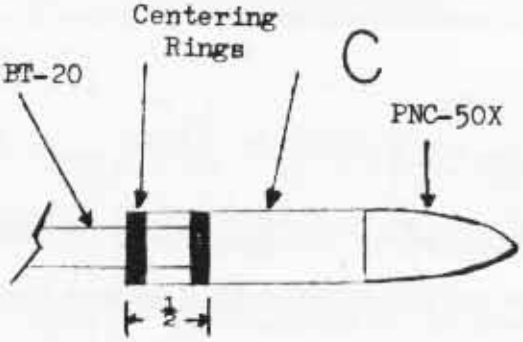
Plate attachment detail




2. Refer to Diagram B for details. Cut three fins, 5/8" x 4" from 1/8" balsa. Cut three 4" pieces of 1/8" dowel. Using the pattern provided cut out three side panels. The cardboard header in a kit works just fine. Attach the fins, then fit the side panels into place. I used Hot Stuff with Titebond fillets for strength. One panel is slotted for the engine hook. When dry, attach the 1/8" dowels to fin tips.

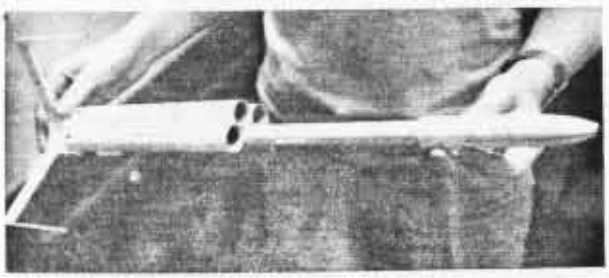


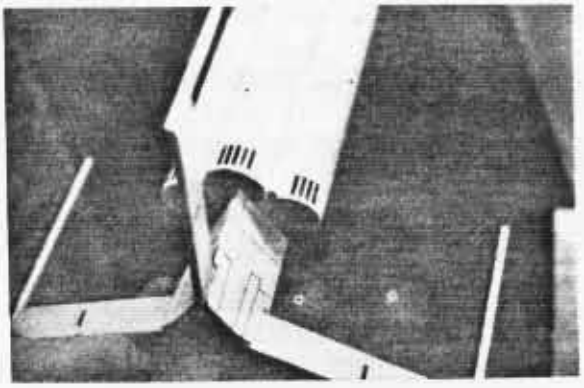

3. Refer to Diagram C. Mount one centering ring ½" from the front of the BT-20, and mount the other ring flush with the end of the tube. Attach the 3" section of BT-50. Install a shock cord, put in the screw eye, and build the chutes. (NIRA "experts" said one would work, but I use two to insure a soft landing for the fragile fins.)




4. My model is white overall. Before painting, you can dress up the model with dowels, balsa strips, etc. to simulate piping and details. Make sure all grain is filled in. Take your time painting, or you'll get lots of runs. Windows came from different sized rub-on letter sheets. Periods, dashes, dots and lines can look as good as expensive kit decals. I named my Star Tanker "U.S.S. Horizon" with rub-on letters. When finished, spray the entire model with a coat or two of clear to protect everything.

5. Recommended engine: B4-2





# SHOOTING STAR 7

Jedi George and his RC HG gave everyone a thrill with his aerobatic flights.

IMPRESSIONS OF SHOOTING STAR SEVEN

Shooting Star 7 was one of the most unusual meets I have attended. There were many interesting and unbelievable models there. A majority of these came from the Beach Boys, Tom and John. They included a Mirage fighter made to look like the Bat Plane, a camouflaged Space Shuttle that had "battle damage", and a Holy Hand Grenade that took a baby chick as a passenger. The Bat Plane Mirage had a very unusual ejection system, the cockpit and jets ejecting off the top of the wings. (See plans in the last L.E. - RG) The Space Shuttle had holes melted into it and burn marks painted on. And don't worry about the chick; it wasn't a real one, just a toy.

Other weird models included Tony Lentini's "flying" roll of toilet paper, his "fan" helicoptor and my monster model powered by four E5's. (none of them cato'ed!). Lastly, there was the HG team's C Egglofter. It was a Big Bertha, an egg capsule for a nose cone and a nine foot cleaner bag chute.

WWAR's new field was of good size, but had some hazards. Walking through tall grass made me think of prairie schooners. The entire site was covered with dead, black, tall, thin trees. (The field was a stand of timber that had partially burned about 3 years ago, and has since been partially cleared of the remains. - RG) Some people kicked over these trees after their duration models landed in them. The trees retaliated. Tom Beach had a good eggloft duration flight go for naught when he tripped over a tree and broke the egg.

The weather was great on Saturday morning, but winds came up in the afternoon. Sunday brought rain, rain and more rain. People flew Plastic Model in between the raindrops. Better prangs were Jim Zingler's F15 and my MARAM F-111. Jim took the meet's prang trophy.

I had a lot of fun at this meet, and am looking forward to Shooting Star Eight and some better weather!

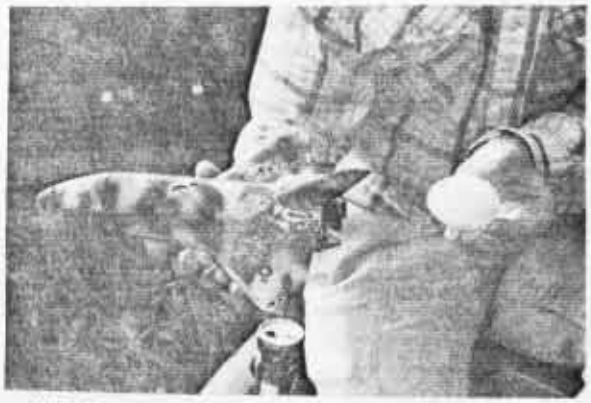
Larry London

Pat Peterson's flexie booster has no nose. How does it smell? Just awful!

Tony Lentini's flying toilet paper model using streamer recovery (what else?).

Tom Beach prepares to fly his D boost glider.

Dave Enos and his F-104.



WAR IN SPACE! Tom Beach's battle damaged Shuttle.

Jim Z. with his plastic model before rekitting.

Larry London poses with his four E5 cluster model.

Mark Schmitt and his color cooridnated Plastic Model and shirt.

# SHOOTING STAR 7 STANDINGS

| A DIVISION | PTS. | ½A IPD | ½A BG | C EL D | D BG | DE | ½A SD | A HD | PM | B PAY |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Mark Schmitt | -603 | DNF | 17/ * -1 | DNF | PRG/30 -1 | 81/99 -3 | 51/52 -1 | 22/ND -3 | SP-* | 172/179-1 |
| 2. Steve Sangerman | -243 | 12/NDP/ * -2 | DNF | 23/ * -1 | DNF | 102/ * -2 | DNF | DNF | DNF | 101/ * -2 |
| 3. Howard Olson | -225 | NDP/SAF/21 -1 | SEP/ * -* | NR/ -* | DNF | 124/ * -1 | 20/24 -2 | DNF | NDP | DNF |
| B DIVISION | | | | | | | | | | |
| 1. Pat Peterson | -702 | 27/ 24/ * -1 | 24/49 -1 | 60/ * -3 | NG/NR -* | 126/ * -1 | 42/SEP-2 | 47/31 -2 | 805-1 | DQ/75 -4 |
| 2. Dave Enos | -666 | 30/NDP/NDP -2 | NG/14 -2 | CAT/107-1 | 23/NG -2 | UNS/61 -3 | 39/50 -1 | 61/63 -1 | SP-* | 180/SP -2 |
| 3. Tony Lentini | -201 | DNF | DNF | 71/ * -2 | DNF | DQ/ * -* | DNF | 4/ * -4 | 555-2 | NC/97 -3 |
| 4. Larry London | -159 | 10/NDP/ * -3 | NG/ * -* | PRG/ * -* | DNF | 102/ * -2 | DNF | DNF | SAF-* | 214/ * -1 |
| C DIVISION | | | | | | | | | | |
| 1. Al Neinast | -672 | 42/ 60/NDP-3 | 32/30 -3 | 82/57-1 | 76/353-1 | 109/ * -2 | 24/20 -1 | 55/47 -1 | DNF | 137/ * -3 |
| 2. Tom Beach | -543 | 53/ 38/ 16-1 | 15/ * -4 | CHU/BRK-* | 106/206-2 | DNF | DNF | 70/ 5 -2 | 775-1 | CAT/142-2 |
| 3. HG Team | -462 | 57/NDP/ 36-4 | 34/44 -1 | SEP/NDP-* | 186/80 -3 | NC/84 -4 | 21/ * -4 | 18/20 -3 | 680-2 | NDP/ * -* |
| 4. Jim Zingler | -369 | 25/ 52/ 28-2 | 27/28 -2 | BRK/ * -* | 39/51 -4 | NC/107-3 | 17/22 -2 | NR/NR -* | UNS-* | 173/NDP-1 |
| 5. Tim Vaccaro | - 99 | 9/ 11/ 28-5 | SAF/SAF-* | 49/42 -2 | DNF | NC/52 -5 | 14/11 -3 | DNF | DNF | 105/95 -4 |
| 6. John Beach | - 60 | DNF | DNF | DNF | DNF | DNF | DNF | DNF | 570-3 | DNF |
| Bob Kaplow | - 60 | DNF | DNF | DNF | DNF | UNS/114-1 | SEP/NR -* | DNF | DNF | UNS/ * -* |
| 8. Ric Gaff | - 0 | 27/ * / * -6 | DNF | DNF | DNF | DNF | DNF | DNF | DNF | DNF |

NOTE: A and B Division combined for D BG and A HD.

KEY:

BRK - Broken egg
CAT - Cato
CHU - No chute
DNF - Did not fly
HNG - Hung on pad
NR - No return
NVB - Non-vertical boost
PRG - Power prang
RB - Red Baron
ROT - No rotation
LST - Lost by timers
MIS - Three misfires
NC - No close
NDP - No deployment
NG - No glide
SAF - Unsafe flight
SEP - Separation
SHR - Shread
SP - Spit engine
TL - Track lost
UNS - Unstable flight

# SETTING UP THE TRACKERS

A couple of years ago, I did a lot of research into the then new geodesic altitude equations. Lots of competitors and sections flew altitude events for the first time after these equations were put into use. They quickly discovered that new equations didn't mean easier times in altitude events. Slow ranges, no closes and track losts still persisted. Partly from my research and partly from observation, I concluded the majority of the problems encountered during tracking events could be solved with a bit of pre-contest planning. Before you tackle any tracking events you need to consider three areas; set-up, zeroing, and operation.

Set-up involves locating and measuring the baseline, that imaginary line connecting the two trackers. Before you do anything, consider where in the sky the sun will be during the time you'll be tracking. Even the best trackers can't see rockets that fly directly into the sun. The best baseline to avoid problems here is a line running east to west, set slightly south of the launch site. This ideal situation gets modified by other factors.

If one tracker on that perfect east-west line is on a hill, and the other in a valley, the altitudes you get won't be accurate. All equations assume rockets being flown from perfectly flat land. There are adjustments that can be made in the equations for this condition, but they aren't widely known and they aren't approved by the Contest Board. If the elevations of your tracker locations differ by a couple of meters or more, relocate them.

Finally, consider wind. Rockets weathercock into the wind. When using standard NAR equations, if the models arc towards the baseline, and generate low azimuth angles, look out. You'll be posting lots of no closes. Geodesic equations don't have this problem. Regardless of the equation used, when a tracker has to follow a model through a large azimuth change, he stands a higher chance of losing it, so make it easier for them be picking the right baseline if you can.

Lastly, remember the minimum baseline length is 300 meters, 984 feet. Make sure your site can hold such a baseline. Ackerman Park is marginal in this regard.

Physically laying out the baseline shouldn't take more than 15 minutes. Get a couple of stakes, a hammer, 100' tape measure and some masking tape. Go to one end of the baseline, pound in the stake, and unreel the tape to measure out the first 100 feet. Have the guy holding the tape measure at the stake keep you walking in a straight line by picking a spot on the horizon and keeping you lined up with that spot. Use a strip of masking tape to mark the 100 foot spot, and keep walking out. Repeat process 9 times. Measure 84' more, pound in the stake, and you're done.

Careful set-up eliminates most problems with tracking systems.

Now you're ready for part two of our exercise, zeroing. Zeroing the trackers involves getting both the azimuth and elevation pointers to read 0 degrees when sighted on the other tracker. The tracking "theodolite" must also be leveled. Everyone I've seen track has their own individual method for getting all this done, so don't be afraid to experiment with my method.

I start be getting azimuth zeroed first. I assemble the theodolite and fix the scope so that it reads zero degrees azimuth. Now I move the whole theodolite around until I have the other tracker right in the crosshairs. I also try to adjust my legs so that the theodolite is reasonably level.

After azimuth is zeroed, I level the tracker. Gross adjustment can be done by changing leg length. Tripods are particularly good for this. Fine adjustments are easy on Centuri Sky-Traks or Trip Barber's "Triple Track" theodolites. If you can't find those neet little 360° bubble levels, two regular levels positioned at right angles to each other will do the job just fine.

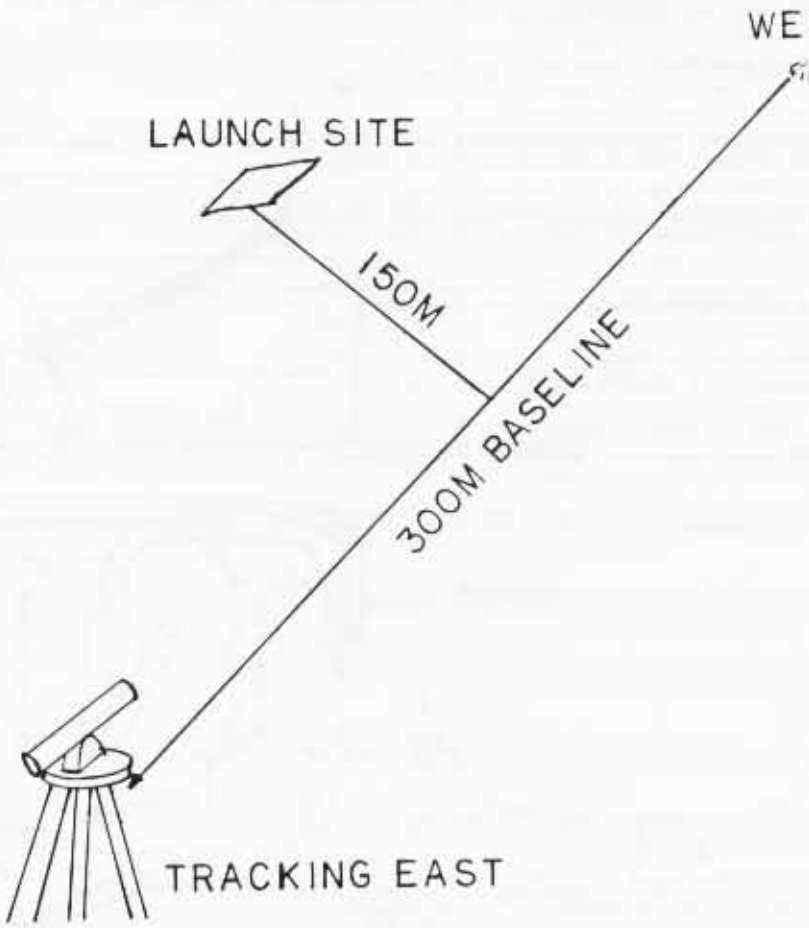
Lastly, I zero out elevation. If your tracker has a movable elevation scale, this is easy to do. You can also move the pointers if they're made of thin wire.

In reality, the process of zeroing may take several iterations, since each individual adjustment throws the others off just a bit. The best teacher is experience, so go out and try it. I'm sure you'll learn your own tricks on zeroing.

Operation of the tracking system depends on two living human beings trying to make out an object about a foot long and 3/4" in diameter when said object is 100 to 400 meters away from him and moving at an average speed of 200 MPH. With those conditions it's a wonder anything is tracked at all! Don't worry, though; trackers can learn what to expect, and will get better and better at their job.

With that in mind, the first rule of operations is "Fly as many rockets as possible in the shortest time span possible." Trackers get a general idea of where in the sky to look for models, particularly if the rockets are all for the same event.

**Continued on Page Eight**



# TRACKING...

Rule Number Two: get reliable communications! Hard-line phone systems are the best. Everyone can talk at once. Confusing at time, but an asset when the launch officer says "5-4-3..." and Tracking East wants to yell "Hold!". Try it with a walkie-talkie sometime. Whatever the device, work out a system for reporting. Tracking East usually reports first. I prefer the following reporting language; "This is Tracking East. Azimuth 37 degrees, 3-7; Elevation 28 degrees, 2-8." There's little chance for confusion with that sort of organized reporting.

Miscellaneous chatter between the trackers and launch site is OK during lulls, but once the flying starts, everybody should get down to business. The launch officer should get a confirmation from both trackers that they are ready, and give a brief description of the model, i.e. engine class, color, etc. If the model is coming off a piston launcher, let them know. Tip-offs are harder to track, and any advance warning is appreciated.

Rule Three: get the trackers to agree on a "mark". A mark is the point at which the scopes will be locked. These days, most folks track the ejection cloud of tracking powder, and the old habit of someone saying "Mark!" over the phone has quietly died. I still prefer having someone, usually a tracker, call the mark. If the conditions are fairly decent, an average crew should be able to track many models to peak without having to rely on the tracking powder.

The final rule for operations is "Train for tomorrow". It's easy to believe that Bill and Phil, your two best trackers, will always be around, but give the guys a break. They want to fly some, too. And if your trackers disappear, your closure rate is bound to suffer some until the new guys learn the tricks of the trade. Why not send Bill and Phil some company and let the rookies learn the easy way from the club experts?

This year marks my tenth as a tracker. I've done it at everything from section meets to the World Championships, and I've always gotten at least one "Thank you!" after each meet. I hope some of these simple principles will make your next tracking experience as pleasant as mine have been.

Bunny

# BUILD A RELIABLE LAUNCH SYSTEM

Every rocketeer should have a sturdy, reliable launch system. Many commercially available systems are OK, but they tend to be expensive and cheaply made. For only an hour of work and about $8-10, you can build your own system that is far better.

Most of the parts can be picked up at Radio Shack. All you need are:

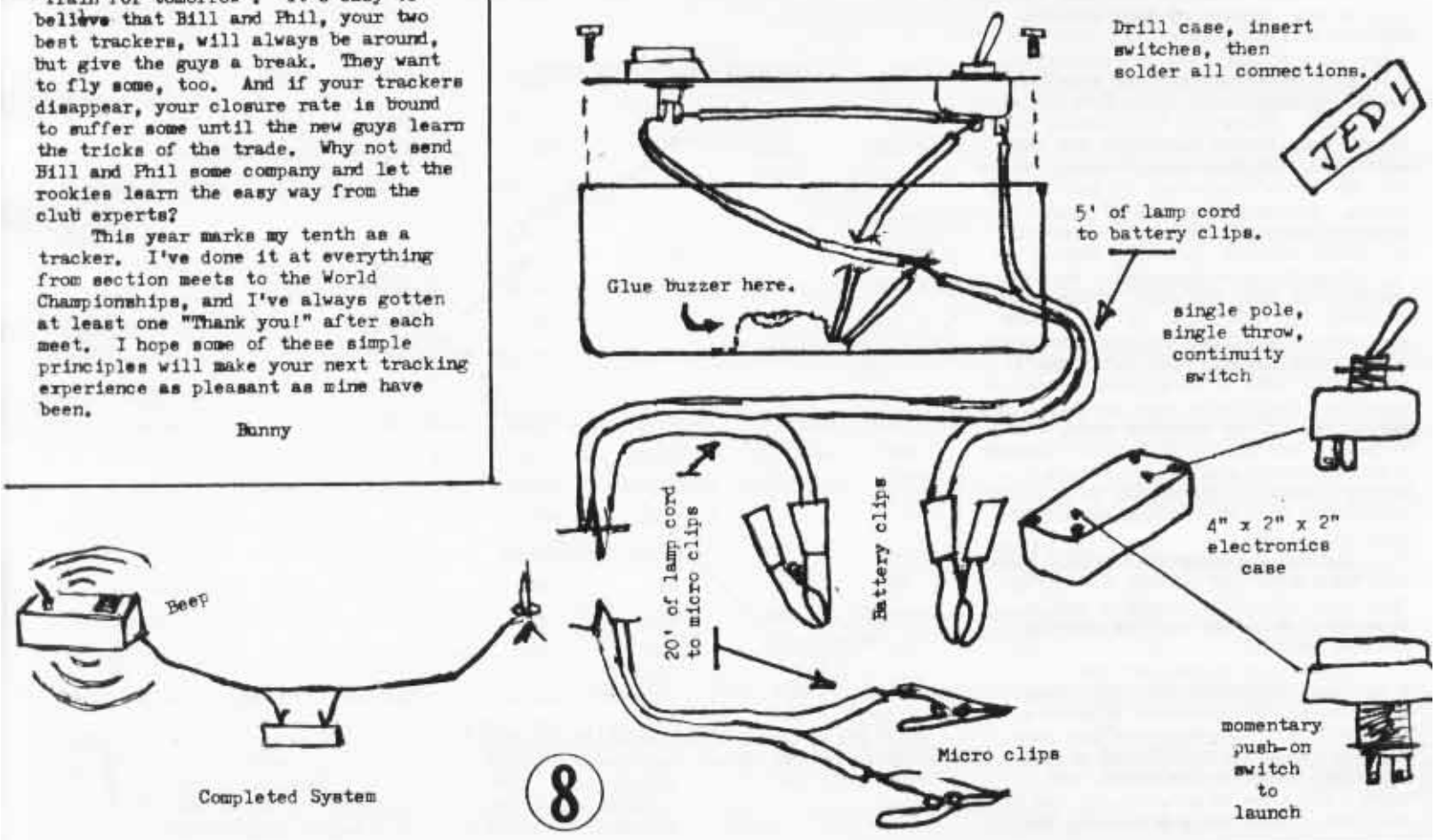
- one single throw, single pole toggle switch (for continuity check)
- one momentary push on, release off switch (for launch button)
- one 6 or 12 volt buzzer (depending on your battery size), and
- one small electronic kit case (to mount all the parts in).

Drill holes in the case to accept your switches, and glue the buzzer to the inside of the case. The only tough part during construction is soldering all the parts together. If you don't have a soldering iron, ask a friend, neighbor or brother-in-law if you can borrow their's. If you still can't find one, consider buying one of your own. A 25 watt model should be sufficent, and they are fairly inexpensive. Soldering irons are useful for fixing broken micro-clip connections, and fixing electrical connections around the house. Your friend, neighbor and brother-in-law can benefit from the use of this invaluable tool.

Commercial launchers usually have very cheap wire in them. But not your system! Go to your nearby Ace or True Value hardware store and buy 25 feet of 18 guage lamp cord. At only 13¢ per foot, it makes a cheap but indestructable launch cable. The clerk that cuts the wire off the spool will probably look at you strangely, buying such long lengths of lamp cord, but keep him guessing as to what you'll use it for

To complete the system, get two micro clips and two larger battery clips. Solder everything together as shown in the diagrams. Your buzzer is polarized. You will have to correctly connect the battery for the buzzer to work properly.

You can use a variety of power with this system. The large six volt lantern batteries are OK for 50+ launches, but a 12 volt motorcycle or "Gel-cell" battery is much better since you can recharge them. With this launch system and a good battery, no NIRA member has any excuse for having misfires anymore.



# THIS OLD ROCKET

## BRING NEW LIFE TO JUNKY OLD ROCKETS

One of the most common items used in model rocket construction, adapter shrouds, is also fairly simple to make. In this issue, we show you some methods to make shrouds; you'll be able to use them for new rockets as well as rehabbing old models.

There are two really good methods for designing adapter shrouds. The first method, summarized in Figure One, requires a certain amount of drafting skill. I've made good adapters this way using nothing more than a straightedge and a cheap compass. The second method, shown in Figure Two, requires no drawing at all. Get your dimensions and a good calculator and have at it! Don't let the equations throw you. They're not that difficult; after all, I did them. The nice thing about the second method is that a computer can be used to handle all the groty math. I've included a short BASIC program for you computer owners; those who don't run BASIC (doesn't everyone have a computer with BASIC?) can translate the program or write your own.

Now that you know what your adapter looks like, you need some thin, stiff cardboard or paper to make it. I've found that index cards work great for small adapters and manila folders, poster board or construction paper are OK for larger ones. Several people have also used .010 sheet plastic for scale models.

If you're really lazy, you can use nosecones for your adapters and boattails. You find one that has the right taper, and cut off the excess length. While using nose cones is easy, they are more expensive and less versitle that custom made adapters.

Ric Gaff

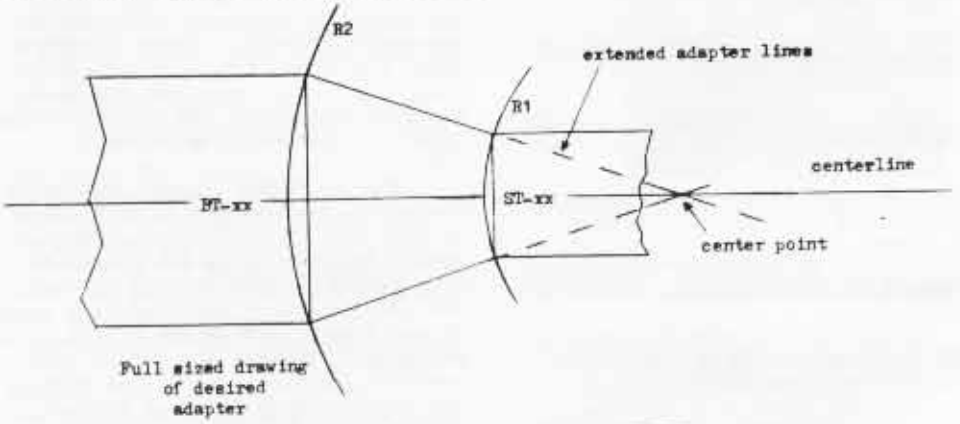
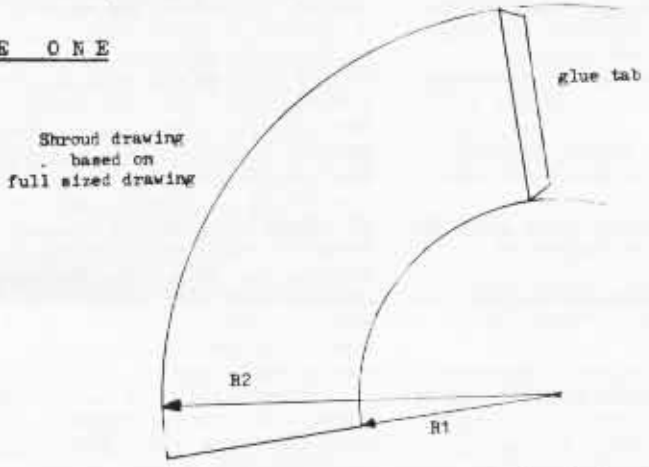



FIGURE ONE




INSTRUCTIONS:

1. Draw a full sized drawing of the adapter you need. Dimensions for any tube can be found in manufacturers' catalogues.
2. Extend the sloping lines of the adapter out until they intersect. They should do so at the centerline of the drawing. Their intersection is the center point.
3. Measure the two arcs, R1 and R2, and draw them on your cardstock. Continue the arcs for at least $\frac{1}{4}$ circle. Cut out your adapter, fit it to the model, and cut off the excess. Don't forget to leave a glue tab!

FIGURE TWO

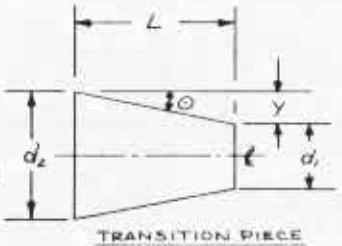



Figure Two was lifted directly from G. Harry Stine's The Handbook of Model Rocketry.

EQUATIONS

$$Y = \frac{d_2 - d_1}{2}$$

$$\sin\Theta = \frac{1}{\sqrt{\left(\frac{L}{Y}\right)^2 + 1}}$$

$$\phi = 360 \sin\Theta$$

$$r_1 = \frac{d_1}{2\sin\Theta}$$

$$r_2 = \frac{d_2}{2\sin\Theta}$$

```
10 PRINT"WHAT IS THE LENGHT ?"
20 INPUT L
30 PRINT "WHAT IS DIAMETER ONE ?"
40 INPUT D1
50 PRINT"WHAT IS DIAMETER TWO ?"
60 INPUT D2
70 Y=(D2-D1)/2
80 S=1/SQR((L/Y)↑2+1)
90 PRINT "R1="D1/(2*S)
100 PRINT "R2="D2/(2*S)
110 PRINT "PHI="360*S
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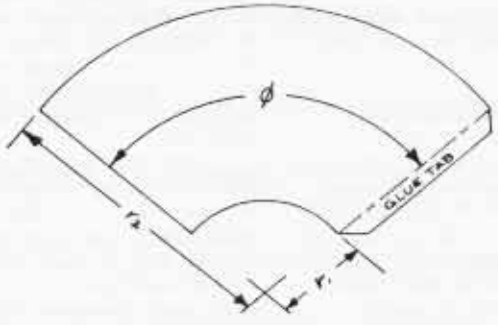



BOOK REVIEW: Space Technology

by Kenneth Gatland, Harmony Books

One word to describe this book would be stunning. It has 289 pages of rocket and space technology, all lavishly illustrated with numerous color photos and drawings. The twenty-two chapters examine the most important events of the manned and unmanned space programs and use colorful cutaway drawings, photos, maps and charts to great effect. Since a book this size could never cover the entire history of space exploration in any great depth, this art work becomes even more important. Only by using these graphics could all the necessary topics be covered.

The organization of the book is about what you'd expect. There is a chapter on early manned programs: Vostok, Mercury and Gemini. Chapters are devoted to the Apollo program, early lunar probes (Ranger, Surveyor), probes to other planets (Mariner, Pioneer), military space systems, Skylab, the Space Shuttle, the Apollo-Soyuz project, commercial satellites. Each chapter has individual cut-away drawings of the major hardware components.

Of particular note, on top of the numerous individual drawings, the book features two large (four pages each) foldouts. One has scale, full color drawings of practically every launch vehicle in current use or of historical interest. Not only is it fasinating to look at, it's good enough for Sport Scale data, too! Foldout #2 has a three page drawing of Skylab on one side and drawings of the Russian Salyut space stations on the other.

History is not the only thing covered. Future possibilities for space exploration and industry are covered in the final six chapters. Space factories, orbital power stations, lunar bases, space cities, manned Mars missions and starships are all discussed.

I liked this book tremendously. It doesn't cover any subject to a great depth. Its broad range brings the subject of space exploration down to earth (sorry, I couldn't resist!) and does it beautifully. If the $24.95 price is too steep for you, take heart. NIRA plans to add a copy to the club library. I'm sure it will be very popular.

Ric Gaff

REUSABLE IGNITERS REVISITED

The idea for the reusable igniter came from our newsletter editor, Ric Gaff. In an earlier Leading Edge article, Ric suggested using two stainless steel wires acting as a spark plug to ignite the engine propellent. Stainless steel is prefered over other metals because it can withstand the flame and corrosive chemicals released by the engine exhaust. Since it uses a spark and doesn't burn in two, this igniter could be used over and over for many launches. The only attention it would need would be periodic cleaning.

Ric noted the biggest problem facing the development of such an igniter was a power source. Ten to twenty thousand volts are needed to make electrons jump the gap between the two electrodes and produce a spark. My dad once showed me how a coil in an automobile enhances the twelve volt power of the car's battery to produce the ten to twenty thousand volts needed to operate the spark plugs. I decided to apply this principle to build my igniter.

I used an old coil to rig up a test unit. Two pins served as the igniter. This system did indeed produce a spark. I tried another test prototype using paper clips instead of stainless steel wires. My attempts to ignite an engine failed. There are probably two reasons for this. (a) The spark did not last long enough for the motor to start. (b) The spark tended to jump away from the end of the wires.

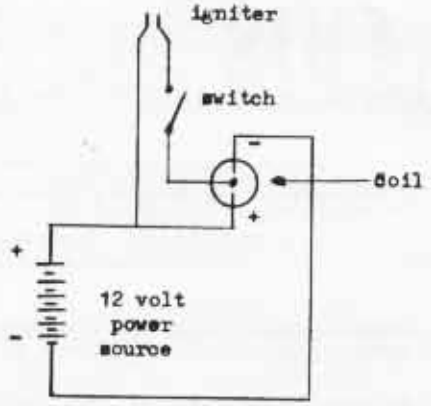
Construction is really simple. Consult the wiring diagram. A coil will cost about $17. Additional supplies, like wires, clips, etc. could run you $5 more. Since igniters cost about 17¢ each, the system could pay for itself in about 100 launches. One other construction note: you must insulate the two electrodes from each other, leaving only the tips exposed. I did this by stripping the plastic insulation off some copper wire and slipping it over the paper clips.

I'm planning improvements in my next version. The electrodes will have sharp tips and a wide base tapering up to the tips. I would also like to experiment with a serie of rapid sparks instead of a single spark. This would allow the propellant to heat up and ignite.

The coil can easily be attached to a car battery like the Estes Astron Launch Controller. A switch is needed to control the power going to the coil. When that switch is turned off and the circuit broken, the spark occurs. Nothing will happen when the circuit is complete.

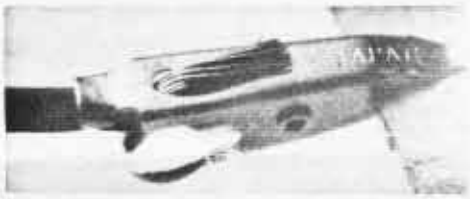
For the moment, the reusable igniter does not seem to be a very reliable way to start a rocket motor. I think it will result in slow ignition and many misfires. If such an igniter does become available, I feel it will be used only in sport flying.

Tony Lentini




WIRING DIAGRAM

EDITOR'S NOTE: This article is a revised version of Tony's NARAM-24 R&D report summary. The report took a fourth place in B Division R&D.



The photo shows what I found to be the best way to attach micro clips. The wire is soldered to the bottom side of the clip. On the top of the clip, at the wire location, are two small metal tabs. These are bent over the insulation using pliers. This acts as a strain relief for longer life.

Speaking of clean launch equipment, keeping your micro-clips clean is so important that you should do it regularly and often. A small piece of folded sandpaper is a cheap and easy way to do this. A long lasting alternative is a auto ignition points file, about $1.50 at auto parts stores.

Eventually, no matter how often you clean them, you'll have to replace the clips. Inexpensive replacements are available from electronics distributers. Radio Shack sells a pack of ten micro-clips for $1.09, a much improved price over "two for $.50"!

# ROSE-A-ROC

A HELICOPTOR DURATION MODEL
FOR STANDARD ENGINES

Designed by Art Rose
Plans by "Captain Video"

Eastern competitors have been terrorized by Art Rose's HD model for a couple of years now, but no plans have appeared until now. Our spy, "Captain Video", took some measurements and notes at MARAM-24. Our design is for 18mm engines, but like the famous Rotaroc, can be scaled up or down 50% for higher and lower power events.

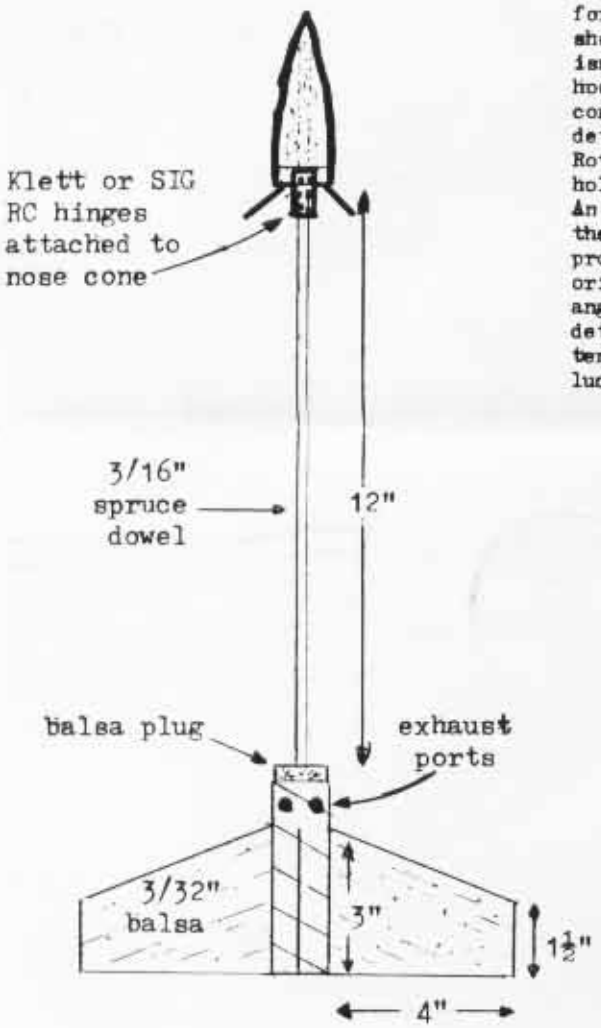
The "Rose-a-roc" improves on the Rotaroc by cutting drag. Rotor blades are cut in half, hinged with adhesive mylar and opened by shock cord rubber Hot Stuffed to the rotor. By folding the rotors completely under the nose cone, drag is cut, and the model boosts higher. Additionally, the rotors are attached to a free-wheeling nose cone. A hole is drilled completely through the nose cone, and lined with a lug. By trapping the nose cone with two pieces of launch lug glued to the 3/16" supporting dowel, the nose cone can spin, the fins stay non-spinning, and RPM goes up. NIRA members at MARAM reported the Rose-a-roc spun faster than any model on the field.

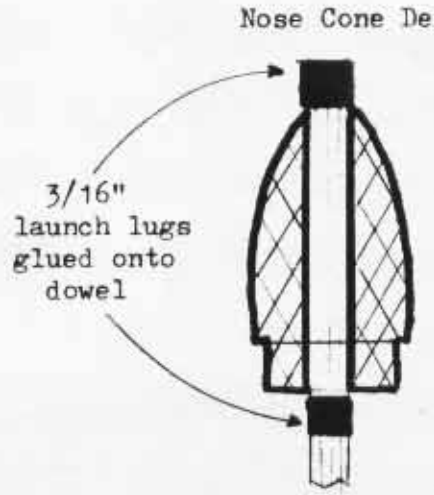
Some of the details on the model are missing. While one hook for the activation rubber band is shown on the rotor, the other hook isn't. I suspect there's a second hook on the nosecone, but can't confirm this. Also missing are the details of the dihedral stop. The Rotaroc uses part of the rubber band holder to adjust the dihedral. Here, An 1/8" sq. spruce stop attached to the root edge of the rotor would probably work here. Finally, the original plans say the pitch, or angle of attack, on the rotors is determined by the location and tension of the rubber band. Good luck adjusting this, guys!

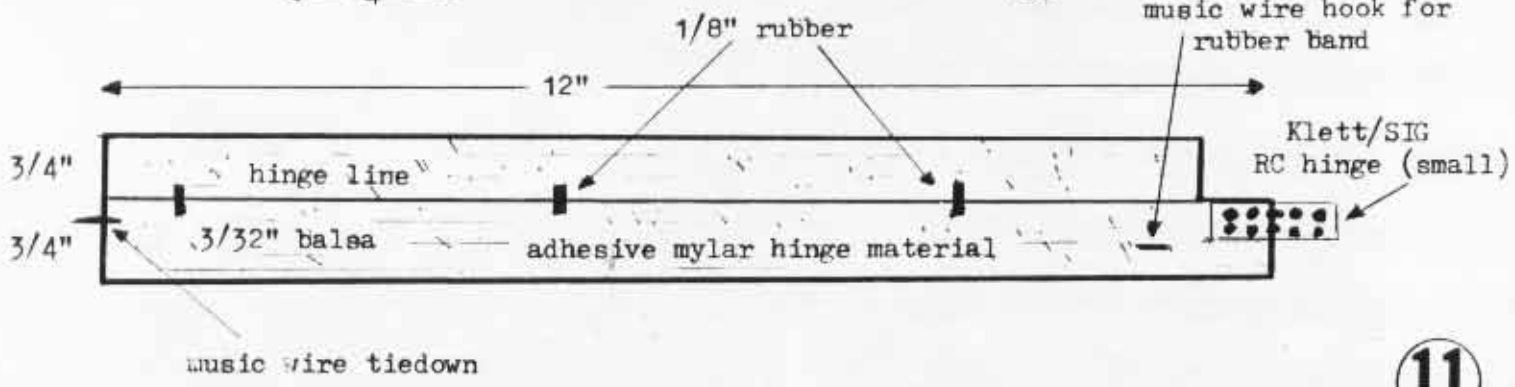
Materials used are pretty standard. You'll need some small nylon RC hinges, and a 3/16" spruce dowel. Make sure it's straight! Make sure you drill the hole through the nose cone straight; a crooked hole means RPM reducing friction.

While we're missing some of the construction details, you hard-core competitors should be able to fill those in, and start giving Art some competition in HD events. The model is as reliable as a Rotaroc, but its performance potential is higher. The construction is a bit more complicated, but the performance is worth the effort. Give Art's little bird a whirl. It's sure to turn heads on the range!

Bunny



Hi,
my name is F. Scott Godron,
Do you know me? Probably not,
but for several years you've been
reading silly Ads for the Glen Ellyn
Toy + Card Shop 476 Main St.
Funny Right? Right! Well I
<u>own</u> the Toy + Card Shop and
I decided to appear and do
this Ad since Gaff couldn't think
of anything funny, well maybe
next issue

RIC GAFF
331 THIRD ST.
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60093