

# NOVAAR FREE PRESS

THE OFFICIAL NEWSLETTER OF THE NORTHERN VIRGINIA ASSOCIATION OF ROCKETRY (NOVAAR)®

## Just six little points...

by Steve Hudson

For the past nine months, NOVAAR has strived and fought to take the lead from the South Seattle Rocket Society in Section standings. Well, 7113 points later, we did. In the closest battle I've ever known in the NAR's history, we are separated from the SSRS by just six little points...

The obvious attribute to NOVAAR's sudden overtaking of SSRS was the area meet between NARHAMS, held on June 18. Evenly matched, we stomped the opposition by a score of 1540 to 464. If not for a poor showing at the area meet of June 4 against MARS, NOVAAR undoubtedly would have been a few hundred points ahead of the SSRS. But that is just the breaks. Last year, NOVAAR had no idea that it might go as far as the Reserve Championship section, yet still did without this year's obvious struggle for points. It's just that everyone in NOVAAR competed regularly last year. As for this year, only six members competed in all six meets flown by the club; all six of those members are also competing at NARAM-14. The average club member only used up seven out of the allowed twelve competition factors. Oddly enough, those six who competed at every meet were undoubtedly NOVAAR's best, compiling 3884 points out of the club's 7113.

The little people, as we will call those who didn't fly every meet, still picked up lots of points, as you might have figured. The two members who did not fly at the MARS-6 regional still accumulated 347 and 427 points each, respectively. Our top A Division competitor only flew seven out of the twelve factors and still got 348 points. Think what he could have gotten flying all twelve.

NARAM-14 may or may not be a close meet between NOVAAR and SSRS. It has been reputed that SSRS will have 43 competitors vs. NOVAAR's nine. The SSRS newsletter, The MODROC FLYER, incorrectly stated that NOVAAR would have over a dozen competitors. There is a difference, you know! the difference of 3-1 odds over the real 5-1 odds. Yet, as the MF also stated, NOVAAR has a reputation for placing well at the Nats, and SSRS doesn't. ("Yet", as the author of the article in MF hinted).

NOVAAR will have a strong showing in every event, especially scale and the altitude events. NOVAAR is known as a good B/G section in the East, but if it's the gliders and not the weather conditions in Seattle that makes the SSRS B/G's stay up for as long as ten minutes, I'm not about to make that statement.

Will SSRS choke at the Nats? Will they be too preoccupied with running the meet? We will know in a week. This one will be too close to call. I don't give a damn if SSRS has fifty members competing at the Nats. I think that NOVAAR's experience in flying at large meets will overcome any deficit in manpower.

If by chance SSRS does show up with 50 competitors and does beat NOVAAR, I don't think that anyone will look down on NOVAAR and say, "Ha-ha, they beat you." This should be understandable, outnumbered five to one. But if we do pull it off, there's gonna be quite a comotion about who the best section undoubtedly is. So we'll see at NARAM who really is NUMBER ONE!



# NFP SCALE:

NIKE-TOMAHAWK  
SOUNDING ROCKET  
FLIGHT #18.26IA

by Steve Hudson

The Nike Tomahawk is a two-stage, solid propellant sounding rocket used by NASA primarily for upper-atmospheric studies. The first stage is a standard Nike M5 rocket motor with a nominal 3.5 second burning time. The upper stage is a Thiokol Tomahawk (TE416) rocket motor with a zero delay pyrogen igniter and a nominal burning time of nine seconds.

NASA Flight #18.26 IA, with which this article is concerned, had a gross weight of 2,023.5 lbs. at launch, with a payload of 168 lbs. Flight #18.26 IA was launched at Wallops Island, Va., from a Wallops boom launcher at an angle of 80 degrees. The rocket attained an altitude of 175.4 statute miles at 262 seconds into the flight.

The Nike booster uses Aerolab - type fins canted to produce a 1.2 RPS roll rate at burnout. The Tomahawk employed Astro-met type fins canted to produce a roll rate of 6 to 7 RPS at burnout.

The payload carried by Flight #18.26 IA was five sealed containers, each filled with a mixture of barium chips and copper oxide powder which is ignited at an altitude by pyrotechnic squibs.

## COLOR SCHEME

Nike M5 Motor- Dull White  
Nike Fins- 3 Fluorescent Orange-Red  
          1 Fluorescent Yellow  
Cradle Marks- Dull Olive

M5E1 to TE416 Adapter- Dull White

Tomahawk TE416 motor- Silver  
Tomahawk Fins- Same as Nike Fins

Payload- Gloss Red; Top two sections  
          are (from nose down) Tan and  
          Phenolic Brown

Ogive- Dull White

Markings: UNITED STATES on Nike-Black  
          MPE insignia an "25" on  
          Payload section - White

## CONSTRUCTING A SCALE MODEL OF NIKE TOMAHAWK FLIGHT #18.26IA

It is no easy task to build any good scale model, and the Nike Tomahawk is no exception. The best scale to build a model of a Nike Tomahawk is 1/10 because the body tube diameters and nose cone for such a model are readily available on the market.

The ideal tube for the Nike M5 booster is a Centuri ST-16 body tube cut to the needed length. The Tomahawk motor can be built with a CMR RB90 tube and the nose cone is a CMR NC90 specially cut to scale for the CMR customers who wish to build a Tomahawk.

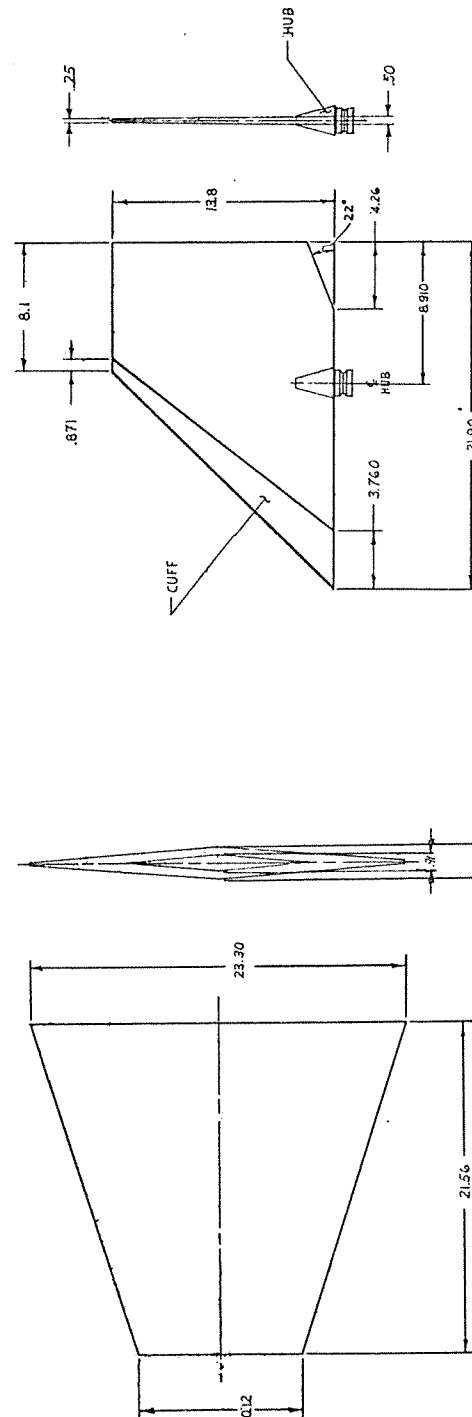
The adapter is somewhat difficult to turn on a drill, so try to find someone with a lathe. Roughly shape the adapter with a razor saw and an X-Acto knife, then do the final shaping on the lathe with a file and sandpaper.

The payload section is simply covered with bolts and screws, so to build a good scale model, you must include these on your model. In next month's NFP, Don Larson will have a scale drawing of the payload section to show exactly where they all go. Basically, the things to use are #8 modeling pins, available at some hobby shops. Five larger bolts found on the payload section can be duplicated with 1/8" tacks or nails.

The "UNITED STATES" marking found on the Nike are available from Centuri for 50¢. Centuri uses them on their Nike-Snake models.

Next month, NFP SCALE will continue with its data on the Nike Tomahawk, with detail drawings of the bolt detail on the payload section and fin shrouds, and adapter/fin views.

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3617 COLONY RD.  
FAIRFAX, VA. 22030



TOMAHAWK FIN SCALE: 1/4  
DETAIL 2

CDSX-7-2038

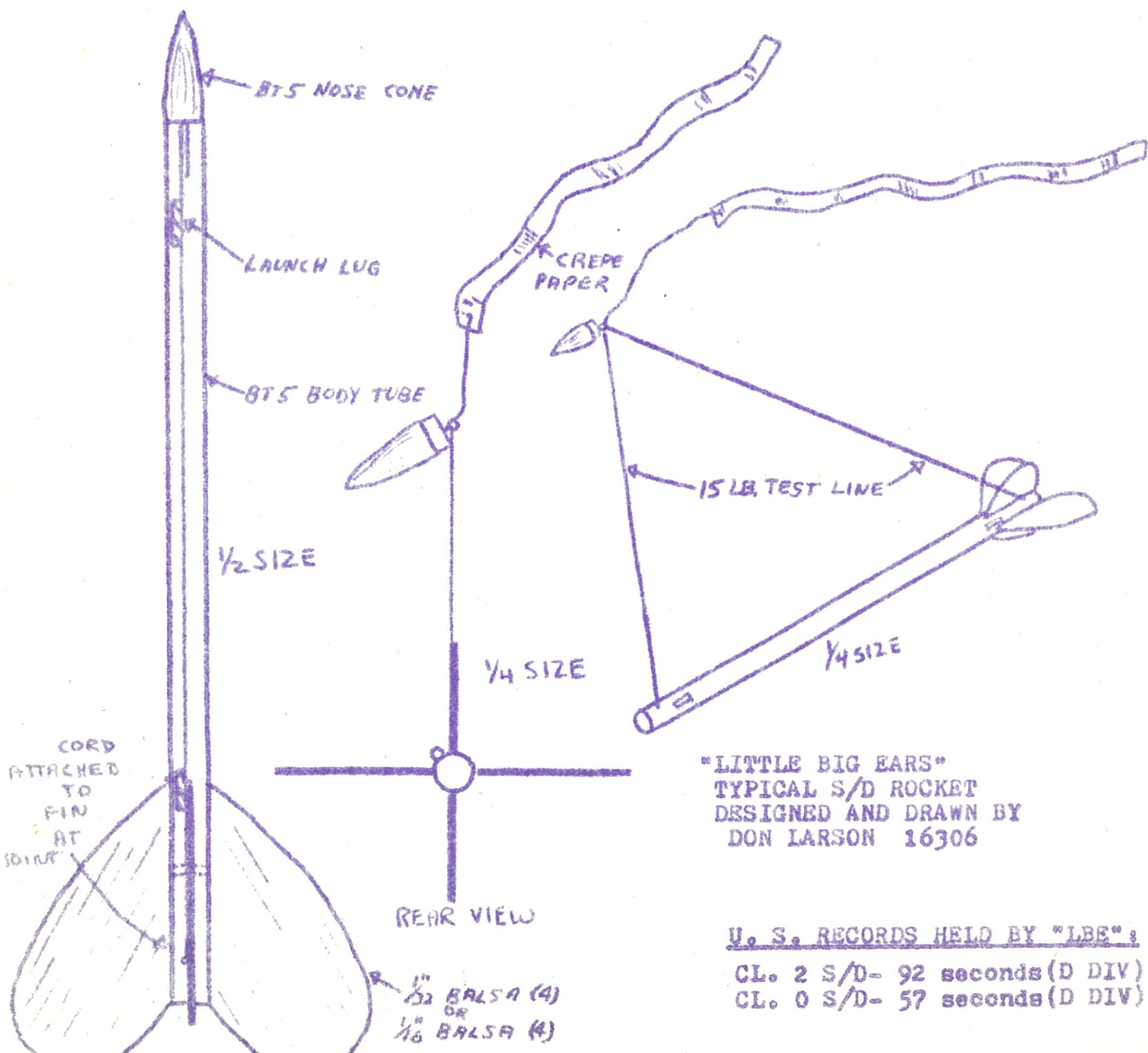


# "Little Big Ears"

RECORD-HOLDING STREAMER DURATION DESIGN BY  
DON LARSON

"Little Big Ears" is a record-holding streamer duration model designed by Don Larson. Its success lies in its horizontal suspension system and its unusually large fins. At NOVAAR section and area meets, this impressive model has been winning constantly with very good times, including two U.S. records for D Division (Class 0 with 57 seconds and Class 2 with 92 seconds).

The line which holds the model in a horizontal mode while descending is attached to a fin at one end and at the front of the model at the other, with the streamer, a 2"x36" length of crepe paper, is attached at the middle of it. Normal construction techniques apply to the rest of the model. Fly it with either a minijet 1/2A3-5, A3-6, or B3-7 for best results.



## U. S. RECORDS HELD BY "LBE":

CL. 2 S/D- 92 seconds (D DIV)  
CL. 0 S/D- 57 seconds (D DIV)



# Building Contest-Winning Competition Altitude Rockets

by Randy Thompson

This article will dwell mainly on two altitude events; Robin Eggloft and Design Efficiency. This is because these are the events which I have done the most work in. It should be noted that construction of models for the lower classes of the Altitude Event should follow closely to the procedures for building Design Efficiency models.

The first step towards building a contest-winning altitude model is the finishing of the body tube. Proper finishing is the key to winning. I have found that the easiest tubes to finish are CMR body tubes. Select an RB50 for a Design Efficiency model or an RB77 for a Robin Egg Lofter. Sand the tube by hand with #600 grit sandpaper. After a smooth surface has been obtained, sand the tube again with #600 grit sandpaper on an electric drill. This is done by using a wooden dowel in the drill over which the body tube can fit. Now give the entire body tube a coat of balsa fillercoat. After the tube has dried completely, sand the tube on the drill until smooth using #600 grit sandpaper once more. Usually one coat of fillercoat is sufficient to obtain a smooth finish. No more than two coats should be applied because of the weight involved. Now the body tube should be marked for three fins. After this has been done, remove a small area of the fillercoat where the fins are to be glued. The fillercoat is easily peeled with an X-Acto knife. This step is done so that the fins can be glued directly to the body tube.

The next step is selecting the proper fin size for your model. Elliptical fins are the most efficient for altitude events. A fin similar to the design shown in Figure One is good for a Design Efficiency model, while the fin shape and size shown in Figure Two is ideal for the Robin Egg Lofter. The fins for the D/E model are made of 0.02" sheet plastic, available from CMR or at most hobby stores. The fins for the Egg Lofter are made of 3/32" balsa. Both types should be sanded to a symmetrical airfoil. The balsa fins must, of course, be finished to a much greater extent to that of the plastic fins. Sand the plastic fins with extra fine sandpaper to remove any irregularities. Sand the balsa fins as well. Then take the balsa fins and sand each side smooth with #600 grit sandpaper. It is important that the balsa fins are smooth before any sanding sealer is applied. When the fins are smooth apply at least three coats of sanding sealer to each fin, letting them dry and sanding smooth after every coat. More coats may be applied if necessary. I have used up to seven coats on some of my egglofters. Now glue the fins onto the body tube with epoxy. Carefully align the fins so they are 120 degrees apart. The engine mount should also be glued in at this time. The rear of the engine should be flush with the rear of the body tube on the D/E model and should stick out about 1/4" from the tube on the egglofting model.

A plastic parabolic nose cone should be selected for the Design Efficiency model. This nose cone should be sanded with #600 grit sandpaper to remove any irregularities. A CMR ENC77 egg capsule should be used for the egglofter. The shock cord must now be secured by some means to the inside of the body tube.

The completed Robin Egglofter should be flown with a C6-5 engine. It is best to launch it from a 3/16" rod using a pop launch lug. The larger rod is a must for a straight flight, and a straight flight means more altitude. My last three Robin Egglofters, built and launched as described in this article, have been tracked to altitudes of 246 meters, 230 meters, and 255 meters respectfully. These have been good enough for first places in C Division at a Regional, an Section, and an Area meet, respectfully.

The Design Efficiency model should be flown with a minijet 1/2A3-5m. This is the best all-round engine for this event. A 1/4A hasn't got enough wallop for a good flight and a 6-second delay on an A engine isn't enough for this model. The 1/2A3-5m is perfect in both respects. The model should be flown from a 12" tower constructed of 1/2" wooden dowels. (continued.....)



## BUILDING CONTEST-WINNING ALTITUDE ROCKETS (continued)

This special tower must be coated with several coats of sanding sealer, sanded well ~~xxxxx~~ between each coat. The model must fit exactly in the tower but also must ~~xx~~ not create much drag or friction on the way up in the tower. My last three Design Efficiency models, built as described in this article and launched from the same kind of tower, achieved 126.4 m/nt-sec., 126.8 m/nt-sec., and ~~126.8~~ 163 m/nt-sec. These three flights were enough for a first place at a section meet, an area meet, and a regional meet, respectively.

An important thing to remember when flying in any altitude event is to include tracking powder in your models. I have seen that magehta or red Tempa paint powder is the best all-round tracking powder.

Remember these three things when building and flying altitude models: FINISH IS EVERYTHING; Take a little extra time sanding the finish on your models. SELECT THE PROPER DELAY TIME; Either too little or too much delay ~~x~~ causes a loss of altitude, so test your rocket to see what delay is ideal. USE A PROPER LAUNCHING DEVICE; If you think your bird's too heavy for a standard 1/8" rod, go to a 3/16" rod or a C-rail. Either one is a must for eggloft and payload.

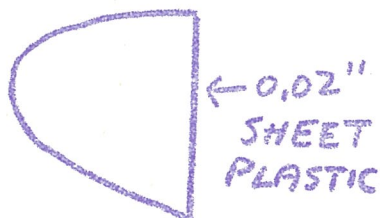


FIGURE ONE.  
Design Efficiency Fin Shape.

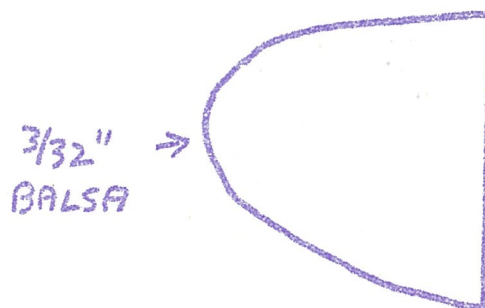


FIGURE TWO.  
Robin Egglofting Fin Shape.

### CLUB RECORDS (as of 7/16/72)

<u>EVENT</u>	<u>1st PLACE RECORD</u>	<u>2nd PLACE RECORD</u>	<u>3rd PLACE RECORD</u>
HORNET B/G	306 sec.	123 sec.	110 sec.
HORNET R/G	38 sec.	33 sec.	30 sec.
SPARROW B/G	238 sec.	187 sec.	185 sec.
SPARROW R/G	119 sec.	89 sec.	59 sec.
SWIFT B/G	221 sec.	166 sec.	104 sec.
SWIFT R/G	98 sec.	86 sec.	59 sec.
HAWK B/G	179 sec.	174 sec.	142 sec.
HAWK R/G	60 sec.	51 sec.	33 sec.
EAGLE B/G	180 sec.	163 sec.	162 sec.
CONDOR B/G	97 sec.	none	none
CLASS 0 P/D	203 sec.	173 sec.	132 sec.
CLASS 1 P/D	1242 sec.	1130 sec.	661 sec.
CLASS 3 P/D	429 sec.	220 sec.	152 sec.
CLASS 0 S/D	58 sec.	47 sec.	40 sec.
CLASS 1 S/D	54 sec.	48 sec.	47 sec.
CLASS 2 SD	109 sec.	102 sec.	99 sec.
CLASS 3 S/D	72 sec.	67 sec.	49 sec.
ROBIN EGGLOFT	256 meters	255 meters	246 meters
PIGEON EGGLOFT	469 m. ters	396 meters	388 meters
DESIGN EFFICIENCY	176 m/nt-sec.	163 m/nt-sec.	140.8 m/nt-sec.
PEEWEE PAYLOAD	198 meters	192 meters	179 meters

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# NOVAAR'S 1971-72 PRE-NARAM POINT TOTALS BY DIVISION

DIV/NAME	POINTS	WF.
A/MIKE TURTORA	348	7
A/ROY MUNSON	107	2
A/DUKE MURPHY	80	4
A/ERNIE LUTHER	72	1
B/JIM LECROY	347	9
B/JEFF NELSON	238	11
B/TIM KENT	218	5
B/BOBBY THORPE	162	2
B/BILL DILLON	125	4
B/STEVE CHAMBERS	26	3
B/DANNY DUCHARME	16	1
C/RANDY THOMPSON	1301	12
C/MIKE BURZYSKI	427	9
C/ROSS IWAMOTO	383	12
C/JIM HOWARD	235	7
C/JESS FEEBACK	210	12
C/DAN MEYER	138	12
C/THOMPSON-MEYER TEAM	126	3
SCOTT DEANE	113	4
C/BILL CLUGSTON	90	7
C/MARK BACHRACH	59	7
C/STEVE HUDSON	48	8
C/BOB HOFFMAN	12	3
C/HUDSON-CHANDLER TEAM	4	2
D/HOWARD KUHN	937	12
D/DONALD LARSON	915	12
D/PAUL SHELTON	326	4
D/WILLIAM DILLON, SR.	18	3
NOVAAR	7113*	12

## \*NOVAAR NOTES\*NOVAAR NOTES\*NOVAAR NOTES

### HUDSON ELECTED SECRETARY TO REPLACE MEYER.....

Steve Hudson, editor of the club's two newsletters, was voted NOVAAR's secretary in a 14-6 decision over Mike Burzynski. Steve will also be in charge of the club's annual demonstration launch, planned for the end of August.

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### NOVAAR WELCOMES NEW MEMBERS FROM VIENNA, VA.

NOVAAR would like to welcome three new members to the club. They are John and Wayne Piatt, and Mr. Albert W. Harell III. We wish the best of success in the coming years in the club to these three fine people.

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EDITOR: STEVE HUDSON; ASST.: D. DUCHARME  
WRITERS: STEVE HUDSON, DON LARSON  
RANDY THOMPSON, PAUL SHELTON, JF WUNHUN.  
JESS FEEBACK AND MIKE BURZYSKI.  
CENSORED BY JAKE BURFEE, AANC.

\*this total does not consist of the sum of all of the above points; some of the individual points were aquired at meets other than those flown as a club.

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# JAKE BURFEE SAYS:

JAKE BURFEE



When you think about it, you realize that CMR, the NAR's favorite modroc manufacturer, is really quite a pacesetter. After all, doesn't everybody fly egg-loft with a CMR Kuhn Capsule? And wasn't it the Manta that kept winning and winning and still wins today? Well, it just goes to prove that all CMR products are contest proven. Winners at section meets and NARAMs alike. Take the new Paratrooper, a sleek, boattailed P/D model. It beat out all of the competition at MMRR '72 this year. In Design Efficiency! And the new CMR Pen, designed for your altitude events, has flown to 141 m/nt-sec. in D/Eff. An Uprated Pen set a new U.S. record in D/Eff. with 176 m/nt-sec. Convinced? Why not join the Kuhn Krowd and move over to CMR!

P.O. Box 7022, Alexandria, Va. 22030



# THE RANGE SARE

by  
Jack F.  
Wunhuner

I don't really have any new product notes this month, so I thought I'd give you some construction tips from the guy who gave Orville Carlisle the idea to invent the model rocket - namely ME!

As far as fin stock goes, the best stuff has always been SIG Balsa. Not just any balsa, mind you, but SIG Balsa. The stuff can be found in so many different textures and thicknesses, it's got to be the best stuff I've seen in fifteen years. Of course, when I lived in Ecuador I used to chop down my own balsa trees and make my own fin stock.

SIG balsa is also the best boost-glider balsa. The stuff Pactra makes is like mahogany compared to SIG's contest quality.

I'll give you a professional tip as far as adhesives go. Everyone knows that epoxy is the strongest adhesive known to man. Well don't believe them. Epoxy alone won't do half the job of the stuff I've been using for twenty-three years. You mix five parts epoxy with one part Bisquick and two parts Brer Rabbit Molasses. IT's not only the world's strongest adhesive, but it makes great butterscotch brownies!

If you've got a lathe, the best stuff to turn nose cones from is cherry or walnut. Otherwise you'd better stick to balsa. With that adhesive stuff I just described you do nothing but stick with whatever you happen to touch!

The most valuable tools a modrocker can have are an X-Acto knife and a Dremel Moto-Tool. Why? Well, the X-Acto knife cuts your perfect drag-free fins and the Moto-Tool ports your Mini-Brutes so they'll make your bird look drag-free!

I wish I could give some tips on what engines to fly but I'd have to say YOUR OWN. The manufacturers don't make engines for NAR members- there's only 5500 of us and 55,000,000 of the others. We don't get the delays we want and never get the right average thrust so we end up either pranging or shredding in mid-air. Sometimes.

Now that CMR is selling phenolic launch lugs I'd have to recommend them as the best. But since everyone is being converted to either towers, breech launchers, or "boom-tubes" (piston launchers) I suppose Col. Kuhn will go broke.

As far as shock cords, better known as "vulcanized retro-shock tethers", I'll have to say that you can't compare any of them made by the various manufacturers, since no two use the same kind of stuff. Estes uses long rubber bands, Centuri uses elastic cords, FSI uses asbestos-coated cord, CMR uses Pirelli Tire Stock (joke-they use FSI-style cords now), and MPC makes the best darned yarn shock cords I've ever seen!

I recommend Krylon as the best spray paint available. It goes on smoother than anything I've ever seen. And on the subject of finishing materials, Aero-Gloss makes the best dope, especially the fillercoat. Use fillercoat, not sanding sealer, and use clear dope on B/G's instead of either one!

Everyone says that he has designed the most drag-free fin shape. Harry Stine has his, Issak and Feskens have theirs, and Gerry Gregorek has judged ellipticals as the best. But Jon Randolph wins with trapezoidals- maybe he knows about how to make "Drag-free" fins look drag-free (remember?).

There is a great battle over the mill parachutes. "What should I use, a clear plastic or mylar?" They all say the same thing. I recommend mylar. Why? Well, you can see it for one thing. And what use is an invisible parachute when the timers have a hard enough time trying to see the bird itself!

Don't believe most of the stuff I've said in this article, but at least try my butterscotch brownies. They really stick to the roof of your mouth, to your ribs, to your intestinal tract, and to anything else they come in contact with, so STICK WITH IT!

-Jack F. Wunhuner



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Wunhunerd

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