THE LEADING EDGE

Newsletter of the Northern Illinois Rocketry Association, NAR Section #117

Volume 22, Number 5 September/October 1999

Club News

Change in Meeting Dates – Please remember that due Glen Ellyn Civic Center cleaning and repairs, the October meeting date has been moved to the second Friday, October 8th!

CHAOS-2

Okay, everybody!
Dust off those models today!
CHAOS-2 is coming your way.

CHAOS-2 will be held at the regular club launch on October 17, 1999.

It will be a Local Meet.

There are only **two** events, but we've still got all the points!

They are as follows:

Event:	WF
1/4A * 2 Cluster Altitude	12
C Dual EggLoft Duration	28

That's 40 points to come and grab.
Fly high, but be sure to recover!

Your Friendly Contest Director,
Adam Elliott

Adam Elliot, our friendly contest director, at NARAM with a boost glider (Rick Gaff photo)

Hobby Show "Make It/Take It"
by Mike Ugorek

One of the most important non-launch events that NIRA does is about to take place, The National Model and Hobby Show at the Rosemont Convention Center.

As you all know we have just changed membership rates. This show is responsible for the largest piece of income we get except for dues! If this goes well, the treasury is happy. If the treasury is happy, we keep the same level of services and the same low dues. I am a member of 3 other organizations and I used to be a member of 4 others besides. NIRA has the lowest dues of all of them and by a big margin.

Any of you who worked the show before knows what happens, and how much fun it is. But for the new members here is a thumb nail description. The National Model and Hobby Show is designed for manufacturers to show and sell their new wares to wholesalers, distributors, and even larger hobby shops and chains of hobby shops. Generally the Show is open *only* to the trade people, but in the last several years, they have opened the last two days of the Show to the general public. That's where NIRA comes in. There is a small set of booths that are open only during the last two (public) days. They are called the "Make and Take" booths. NIRA actually *runs* one of these booths. We run the booth for Estes Corp. who supplies us with about 1200 model rocket kits for us to help people build. This sounds impossible but it isn't. We have engineered a process that gets us great throughput. If you volunteer, you get trained in advance, get a model to experiment with, and learn the "production line" procedure we use to build them.

What's in it for you? Good question, and one that you will like the answer to. First, it gets you in for both days without paying a red cent. Second, you get the coveted "Exhibitor's Badge". This gets you favored treatment by the other exhibitors in many cases. I have gotten so many things for free that I just can't believe it. And all because I was polite and helped at the show. Third, you get to see all the newest cool stuff before it gets to the hobby shop shelves. Once I got to see the latest Enterprise before it debuted in the latest movie. Fourth, hay it's just fun. I especially like meeting all the influential people that you see and read about. It's neet to promote NIRA among them too.

What's in it for your Club? Great question. NIRA actually gets paid by Estes and the Show. This is why it is so important in keeping your dues down. One of the reasons that we have such great club equipment is that we are financially stable. We can afford new rods, P.A. systems, and launch controls for our various events because we do things to make money for the Club. This is one very lucrative fund raiser, and we must keep this kind of thing going to keep expenses down. Also, to paraphrase John F. Kennedy: Ask not what your club can do for you, ask what you can do for your club. OK, so I got corny. So sue me (but do it after you help out at the Show).

How do you get into this great endeavor? Well you can e-mail me at "mugorek@wallace.com" or you could come to the meetings to sign up, or (best yet) you could call Cheri Chaney who is running the event this year. That's right, our Past- President is the Big Enchilada for this Show. She has the final say on everything in her project, so if you want the most accurate info on this, call the Head Honcho, Cheri Chaney at (630) 462-0260. We are looking for people to sign up for a morning or afternoon on Saturday or Sunday. So far we only have about 10 people (as of this writing). We need about 20 more. The more people who sign up, the easier the work gets.

Sign up soon to get the best choice of shifts!

THE LEADING EDGE

Volume 22, Number 5
September/October 1999

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 Sport Rocketry is FUN!

Articles, plans, photos, other newsletters, and news items of interest should be sent to:
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Bartlett, IL 60103-2029
or emailed to jap@interaccess.com.
Photos will be returned, other material returned upon requested.

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Send membership applications (dues: $6 per youth, $8 per adult, $12 per family, including a six issue subscription to the Leading Edge), non-member subscriptions ($10 per six issues), and change of address notification to:
Ken Hutchinson
82 Talcott Avenue
Crystal Lake, IL 60014-4541

The NIRA web site is at:
http://nira.chicago.il.us/

CLUB MEETING DATES

All meetings start at 7:30 PM, with the pre-meeting lecture starting at 7:00 PM. Bring a model for 'Model of the Month.' We always need volunteers for the pre-meeting lecture, contact Rick Gaff if you want to schedule a date. The location is the Glen Ellyn Civic Center, 535 Duane Street (usually the 3rd floor, but check the board in the lobby).

September 17 **Third Friday!**

October 8 **Second Friday!**

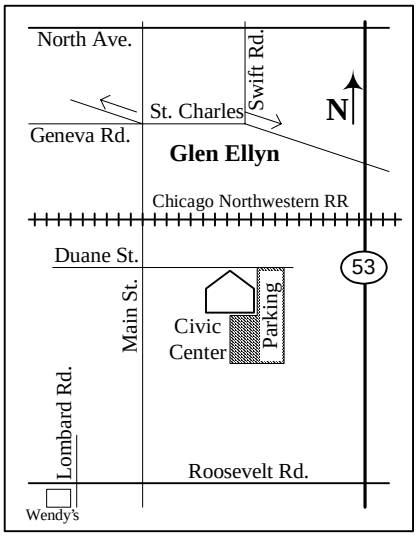
November 5

December 3

January 7

February 20

March 3



CLUB LAUNCH DATES

Launches are BYOL (bring your own launcher). The location for our launches is the Greene Valley Forest Preserve (see map at right). Call the NIRA hotline for pre-launch information: 630-483-2468.

September 19 – Regular club launch.

October 17 – Regular club launch.

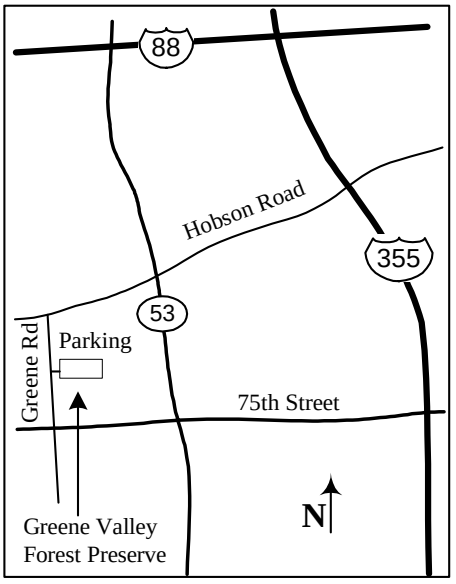
November 7 – **Hobby Show** launch.

November 21 – Regular club launch.

December ?? – Holiday Party

January 16 – Building Session? (location TBD)

February 20 – Building Session? (location TBD)



Model of the Month Winners! (photo by Jeff Pleimling)

August – Even though the August turnout was low due to NARAM, the 'Eagle Challenge' by John Kouns would have won in almost any month. This excellent rocket was based on a rocket from an Estes decal pack and was constructed using BT-80 tubing and the nose cone from a Silver Comet. John built the rocket to commemorate his son Andrew making Eagle Scout (hence the name). There were no youth entries...

September – Look for the September winner(s) in the next Leading Edge!

August 'Youth Launch'
by Mike Ugorek

The second NIRA Youth Launch was by some measures a rousing success; and by other measures, problematic.

The only youth we seemed to get were Cub Scouts and Boy Scouts. This is not too surprising since the Boy Scouts Of America is by far the largest "youth group" in the Nation. However, it shows that we are not reaching the other youth groups throughout the area. Given the fact that NIRA set the dates at a time that made it tough to get the message to the youth, it is not a big surprise. Of course the best place to get the message out is at the International Hobby Show in October. Basically; they advertise the show, and we advertise to people who are specifically interested in rockets (the show goers who come to our booth). If we want to unload the regular launches, and still get the youth, we need to have the dates set before the show, and pass out a hard to loose flyer at the show to advertise the Youth Launches (fluorescent orange comes to mind). We used to have problems with over a hundred youth (who found NIRA at the Show) coming to the launches. When we advertise elsewhere, we only get about 30 youth. This is what happened at this launch. We got about 30 youth and about that many adults, about 60 people total. Not too many of the adults were flyers. We certainly had ZERO PROBLEMS with discipline. I have to work out better time management. Since we had less youth than expected, we needed less time to teach about group safety.

On the good side, the launch went splendidly. All the youth that showed up got all the help they needed, and they had a BALL. We had just enough adults show up to help the youth, and give some great demos. The youth got all the access they wanted with NO waiting lines. They had a big bunch of fun while learning to fly safely in a big group. While most youth rockets were fairly simple, Tom Pasterick's gliders enthused the youth to more complexity. I heard several asking their parents for gliders. The mid-power stuff simply put the Scouts in awe. They wanted to learn more about the hobby. They wanted our flyers to learn more about NIRA. Only time will tell weather we get more members out of this, but we got something more. A hobby does not survive without new, young, members. If all new members were adults, we would go the way of many other hobbies. The youth are our future. This launch helped secure that future.

If this club is as sharp as I think we are, there will be a brightly colored Youth Group Launch Flyer at the International Hobby Show next month. And a bunch of enthusiastic flyers telling everyone just how great this is. 30 Scouts at a Youth Group Launch is not enough. But we made those 30 very happy. I am sure that we will see many of them again.

Holverson Designs Wicked Winnie
Review by Norman Heyen (NAR 12755)

If you are one of the many 'born again rocketeers' (BARs), this line of kits will surely bring back an onslaught of memories. On a recent trip to a local hobby store (the Hobby Town in Machesney Park), my eye was attracted to a group of 5 or 6 new kits, attractively packaged, from a new manufacturer, Holverson Designs. There were two gliders and a couple of single stage kits hinted at a memory long past. After fondling the packages, I chose one and made a mental note to come back for the rest.

So, what brings out these emotions from a forty-something HPR guy? To begin with, balsa, lots of balsa. Nothing vaguely reminiscent of the dreaded 'Ready to Fly' trend. The *Wicked Winnie* I picked is about a *Big Bertha* sized rocket with 3 laser cut elliptical fins, a nose cone, a tail cone and even a balsa nose block. (When was the last time you saw one of those?) The fins easily came out of the balsa sheet and matched the curve of the tail cone exactly. For a long moment, I thought about a kit bashed V-2, but the fit was too good to spoil. So, what else to you get? The Holverson's are fliers, 'cause they included about 3 feet of shock cord, rather than the 10" you get from that 'other' establishment. A pre-built plastic parachute the shroud lines are attached, good quality. And a wonderful 6-page set of instructions, with all the marking guides clearly shown. Just make a copy, line everything up and mark from the paper, no rulers needed. Every step is clearly described and the technique needed illustrated. And they are in a style that looks hand drawn, rather than the CAD style that you usually see, when there are instructions at all. Oh yeah, there is a decal sheet that just begs of a 'slight' name change modification.

I almost didn't spoil the smooth contour of the boat tail by cutting out the engine clip, but decided that a little ease of use wouldn't hurt. I airfoiled the fins and added a root to tip taper for good measure. I followed the instructions almost without incident. I had a little trouble getting the motor mount tube installed in the boat tail. Dry fitting was a tight fit, which is good. But it seems the tolerance was a little close for the Titebond glue I use. The glue would dry and seize before I could get everything seated correctly. I sanded a larger hole and cut a new section of BT-20 and tried again. Better luck this time, everything fit together this time. Use the fin alignment patterns and mark where on the tube the fins go. I used the Estes fin alignment guide - the ruler looking thing with a slot cut in one end. Now for the hard, err, I mean fun, part, lots of balsa to fill. The fins are larger than I would expect on a rocket this size and added to the 'enjoyment'. The extra cone to fill made me wonder if the good old days were really that good. But a couple of coats of Fill-n-Finish and a sheet of fine sandpaper later, I was ready for paint. A light coat of primer and a base coat of flat white prepared it for the (planned) final red and blue paint.

Schedules prevented more final paint, but hey, they fly just as well in flat white. I loaded up a B6-4, stuffed in some wadding, prepped the chute and off to the pads. Nice flight, the header card says about 260 feet; that looked about right. But I usually fly a *Big Bertha* on a C6, so a little comparison is in order. Visual estimates clearly gave the *Wicked Winnie* the edge, between the three streamlined fins and the boat tail, I'd guess this kit gets higher over the similar size and weight *Big Bertha*. The streamlining is apparent. Time for some final paint and apply the pressure sensitive decal. There is a 6" long BT-60 sized payload section is just looking for some sort of payload.

In short, great kit, high quality parts, everything fits well and a reasonable price ($13.95). The biggest puzzle is why this is a level 3 kit. At least compared to what you would have assembled 25 years ago, there isn't anything difficult about it. A little care and patience will yield an excellent flier. I recommend this to someone that has built a few Estes or Quest kits before or is looking to sand balsa again. The only hard part is waiting for the glue to dry enough to keep the fins on. No tricky parts or steps required, other than some light sanding and using an X-Acto knife to slit the slot for the engine hook. Now to test the speed of balsa on an Aerotech D21…

Holverson Designs, Inc.
25075 Co Hwy L20
Soldier, IA 51572

Email: holvrson@pionet.net

Web: http://pionet.net/~holvrson/
(The web site has product information and a printable form for ordering directly from Holverson Designs if you can't find the rockets locally)

Holverson Designs 'Wicked Winnie' Specifications:
Length: 23.75" (60.3 cm)
Diameter: 1.64" (42 mm)
Net weight: 2.5oz (70g)
Launch weight: 3.4oz (96g)
Motor Mount: 18 mm
Number of Fins: 3
recommended engines:
without payload: A8-3 (first flight), B4-4, B6-4, C6-5
with payload: B6-2, C6-3, C5-3
Retail List Price: $13.95

Rocket Math 2: Cones & Transitions

by Norm Dziedzic (NAR 72426)

Introduction

One of the easiest ways to spice up a rocket design is to add a transition. This is done by starting with one size body tube at the top of the rocket body and then switching to one or more different sizes as you move down the body. The area where one body size changes to another is called a *transition*.

Most of the time, this transition occurs between two circular tubes and thus has a *conical* shape (see Fig. 1). When the transition goes from a larger diameter to a smaller diameter, it is sometimes called a *boat-tail* and is often found at the bottom of a rocket to transition from the lower body tube diameter to the motor diameter to reduce drag.

Full Cones

A conical transition is a Cone (See Fig. 1) which has its top cut off. This is known as a *truncated cone*. We'll start by investigating a full cone and then move on to the truncated cone. The cone is called a *right* cone because if you drop a line down from the tip of the cone, it will make a right angle (90°) to the base. As usual, before delving into the math, we need to define some variables to represent the values we know or want to calculate (See Fig. 1):

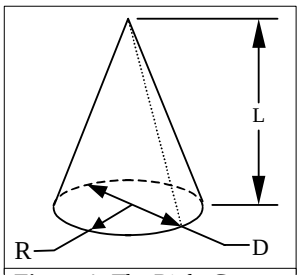


Figure 1: The Right Cone

D:	Cone Base Diameter
R:	Cone Base Radius
L:	Cone Length

What we are trying to find here is the dimensions of a *flat pattern* that when rolled, will create the desired conical shape. To get an idea of the general shape of this flat pattern, envision cutting down the dashed line in Fig. 1 and 'unwrapping' the form until it is flat. Notice how the distance from the point of the cone to any point at the base of the cone is always the same. This lets us know that when we unwrap the cone, the line which wraps around the base will be circular and the distance from the cone point to the base will be the radius of this curve. In fact, this is the definition of a circular arc: a continuous series of points all *equidistant* from a single (center) point. What results when the unwrapped form is laid flat is a pie shape which requires only its radius and included angle to be defined (See Fig. 3):

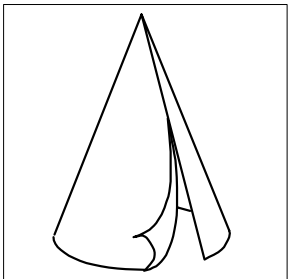


Figure 2: Unwrapping the Cone

Rp:	Pattern Radius
ϕ:	Pattern Angle

Finding Rp, the pattern Radius is a snap using the Pythagorean Theorem where the two sides of the right triangle are the Cone Base Radius: R and Cone Length: L and the hypotenuse is the Pattern Radius: Rp as shown in Fig. 4.

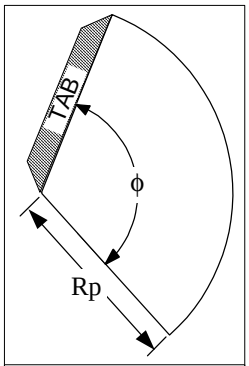


Figure 3: Clone Flat Pattern

Using this approach we start with the equation:

$$L^2 + R^2 = Rp^2$$

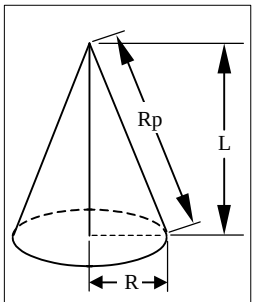


Figure 4: Determining the Pattern Radius: Rp

Then taking the square- root of both sides to solve for Rp gives:

$$Rp = \sqrt{L^2 + R^2}$$

To find the included angle ϕ, we start by using the formula for the circumference of a circle to find the **length** of the arc in our pie shaped flat pattern *(Remember, when we wrap the pattern back up, the arc must lie along the body tube diameter, so we are finding the circumference of the circle at the base of the cone)*:

$$C = 2\pi \cdot R$$

Then we find the total circumference of the flat pattern if the pie were extended to a complete circle:

$$Cp = 2\pi \cdot Rp$$

This flat pattern extended circumference corresponds to 360° of a circle while the arc length, C, given above is a fraction of that circle. Therefore, the ratio of C to Cp gives the fraction of a full circle and we can find the pattern included angle (in degrees) as follows:

$$\phi = \frac{C}{Cp} \cdot 360° = \frac{2\pi \cdot R}{2\pi \cdot Rp} \cdot 360° = \frac{R}{Rp} \cdot 360°$$

So, using a compass and protractor (or any basic CAD software package), a flat pattern for a full cone is easily drawn using the above equations to find the Pattern Radius (Rp) and included angle (ϕ). The section of the flat pattern marked "Tab" is an area of overlap designed to aid in gluing the pattern together.

Conical Transitions

Now that we know the basics of the full cone, we can extend these ideas to the conical transition which, as mentioned above, bridges the area between two body sections of different diameter. Think of the transition as a full cone with its top cut off or *truncated* (See Fig. 5). Then the flat pattern becomes a large pie piece with a smaller pie piece removed at the center (See Fig. 6).

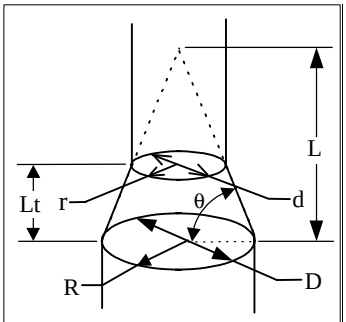


Figure 5: Conical Transition

The new variables in Fig. 5 are:

r:	Transition Top Radius
d:	Transition Top Diameter
Lt:	Transition Height
θ:	Transition Angle

At this point, we need to determine which variables of the transition we want specify and which ones we need to calculate. Most of the time we are dealing with standard body tubes so the radius and diameter values will be known.

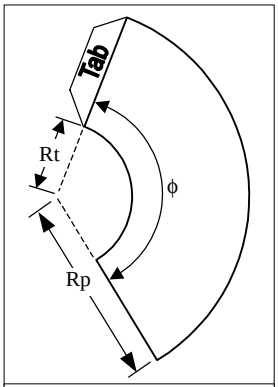


Figure 6: Transition Flat

The decision usually is whether to specify (Lt), the transition length or (θ), the transition angle.

We will address both situations taking on the first using the property of *Similar Triangles* and the second with a little basic trigonometry. In each case, we need to calculate the values shown in Fig. 6.

Looking at Fig. 7, we first will calculate a couple intermediate values. The difference between the small and large body radii, x is given by:

$$x = R - r$$

The length of the transition along the angle, h can be found using the Pythagorean Theorem in the same manner used above to find Rp for the full cone:

$$h = \sqrt{x^2 + Lt^2}$$

Now take a look at the triangle formed by the points ***ABC*** and the smaller triangle formed by the points ***DFC*** (Fig. 7). Notice how they both have a right angle (90°) in the lower left hand corner. We can also observe that the other angles are identical between the two triangles. Because of this, these two triangles are called *similar* and we can exploit this fact to determine the overall cone length, L. The relationship between corresponding sides of similar figures is proportional. So, what does this mean? It means that the ratio

*(**Rocket Math** continued on page 6)*

Aerospace Speciality Products Announces "Bigger Things"

Gibsonton, Florida USA (ROL Newswire) - The first two of Aerospace Speciality Products Mid/ High Power kits are ready to ship! These initial offerings are straight forward Sounding Rocket models - a 1/6.74 scale model of the Japanese Kappa 7 - 1 and a 1/1.12 scale Indian Rohini RH - 75. Both kits are 2.65" in diameter and are over 4' tall. Designed primarily for F and G motors, the kits feature 29mm motor mounts, laser cut thru the wall plywood fins and centering rings, nylon parachute and custom turned nose cones. Both also come with one-piece body tubes (no need for couplers to join the body!), extra long motor tubes, braided steel cable shock cord mounts, and our usual detailed instructions!

These models make a great introduction to larger motors and are great fun fliers for the modeler already experienced with Mid Power rocketry. The Kappa 7 -1 will sell for $45.00 and the item code is KK71 - 29. The Rohini is $43.50, item code KRRH - 29.

For more info on Aerospace Speciality Products, visit our web site at:

http://www.asp-rocketry.com

or write to:

Aerospace Speciality Products
P.O. Box 1408
Gibsonton, FL 33534

Remember that for your shopping convenience, Aerospace Speciality Products accepts VISA, Master Card and American Express!

New Saturn Press Publications from Peter Alway

Saturn Press has introduced the "Rockets of the World 1999 Supplement." After finishing the 3rd Edition of "Rockets of the World," there was a long list of new rockets I wished I could have included in the new book. I decided the best way to get these out would be to produce a photocopied booklet. As time was short before NARAM (my best opportunity to earn back my investment), I chose those rockets that were closest to finished entries, and that had not been published nationally (either by Saturn Press or in Sport Rocketry).

"Rockets of the World 1999 Supplement" includes the Soviet V-1-Ye; American Private A, Aerobee 300A, Super Chief, and Titan II Satellite launch vehicle; French Centaure and Eridan; Japanese Pencil (incuding the 230, 300, and 2-stage) and Baby; Australian Long Tom and Aeolus; Canadian Black Brant VC and Black Brant IX; and Spanish INTA 300 Flamenco.

The booklet is a 32-page photocopied, plastic-bound document with a color cover (protected by acetate) and a plastic back cover.

Price is $15 plus 10% shipping.

Available from:
Saturn Press
PO Box 3709
Ann Arbor, MI 48106-3709

Phone/Fax 734-677-2321

We accept cash, check, money order, VISA/ Mastercard.

For those of you who attended NARAM, the package deal was at NARAM only, and, 35 + 15 = 50 again

I introduced 2 other products at NARAM. "Fourteen US Army Rockets of The Cold War" is an exlcusive NARTS product--check the NARTS site to order--go to www.nar.org for a link. They will go for $14 to NAR members. A master for "Peter's Little Book of Goofy Rocket Plans" is in the hands of NARTS. I still have a few lying around to sell in person, but again, go to NARTS to order them. They will go for $5 a copy.

NARAM-2000 Returns to Colorado for a Sixth Time!
By Tim Van Milligan, NARAM-2000 Publicity Chairman

It is official, the 42nd annual NARAM will be held in Colorado. The NAR Board of Directors has voted to award the event to the two Colorado clubs of C.R.A.S.H. (Denver) and C.O.S.R.O.C.S. (Colorado Springs). The dates are July 29 through August 4, 2000.

The primary purpose of NARAM is to host a rocketry competition championship to select the best modelers in different age brackets, as well as the best teams and NAR Sections. The events in this contest are:

Research and Development
Giant Sport Scale
D Engine Superroc Altitude
4XA Engine Cluster Altitude (no airstarts and no boosted darts allowed)
C Engine Eggloft Duration
1/4A Engine Parachute Duration (Multi-round)
A Engine Boost Glider Duration
B Engine Streamer Duration
1/2A Engine Helicopter Duration
D Engine Rocket Glider Duration

The rules to these contest events can be found on the NAR's web site at: www.nar.org. The Contest Director is Ken Mizoi. He can be reached at (303)-368-5209 or email: kenmizoi@rmi.net.

The site for NARAM-2000 is a 400 acre field that is owned by Vern Estes, the original founder of Estes Industries. In honor of Vern, the site has been named ³Estesland² by the two host clubs. Estesland is located between the two Colorado cities of Canon City, and Penrose. It is about 38 miles southwest of Colorado Springs.

On rocket range number two at Estesland will be the sport and high power field. The sport launch starts the weekend before the contest and runs the entire seven days of the event. The large field can handle most any size models, and a waiver to 10,000 feet AGL will be in place throughout the week, with windows to even higher altitudes available.

In cooperation with the US Space Foundation and the Civil Air Patrol, NARAM-2000 will also play host to a educational rocketry convention. At this special convention, teachers from all over the US will come in and be taught how model rocketry can be used to motivate students to learn. The will be taught the finer points of rocketry like: how to track a rocket to measure its altitude, using a computer to design a rocket, and how to perform a launch with large groups of students. If you wish to help out with this event, please contact Tim Van Milligan at email address: tvm@apogeerockets.com. If you know a teacher that would like to attend and who needs some extra college credit, please let them to visit the NARAM-2000 web site.

At this time, the two clubs are setting up a variety of special events to coincide with the NARAM launches. This will include tours of the factories where the real space launch vehicles are assembled. More information on these activities and other exciting events will be forthcoming, and will be posted on the special web site: www.naram2000.org

The web site also contains information on how to register for the event, as well as hotel information and info on local attractions. We urge people that are interested to make hotel reservations by early fall, as summer in Colorado is peak tourist season, and hotel rooms become filled quickly.

This event is open to all modelers, teachers, students, and space enthusiasts. It is not necessary to participate in the contest or even to be a NAR member to enjoy all the activities surrounding this big event. Just be ready to have a lot of fun!

(*Rocket Math continued from page 4)*

or fraction of any two side lengths from one triangle is equal to the corresponding ratio from

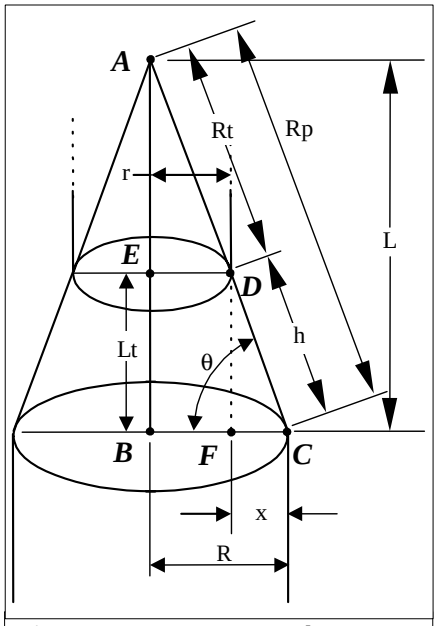


Figure 7: Transition Based on Transition Height: Lt

the other triangle. Thus, we can write the following equation which contains only one unknown (L):

$$\frac{L}{R} = \frac{Lt}{x}$$

Multiplying both sides by R, gives us the equation for L:

$$L = R \cdot \frac{Lt}{x}$$

Then Rp can be calculated as above for the case of the full cone and Rt may be found by subtracting h from Rp:

$$Rp = \sqrt{L^2 + R^2} \qquad Rt = Rp - h$$

The pattern included angle ϕ is found the same way it was in the case of the full cone (See previous section of this article).

Addressing the case where the transition angle (θ) is specified we need to turn to trigonometry to find Rp and Rt. For a right triangle, the basic trigonometric functions of sine (sin) cosine (cos) and tangent (tan) can be used to relate the corner angles of the triangle to ratios of the lengths of sides of the triangle.

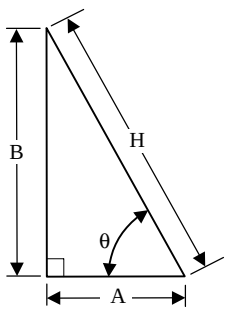


Figure 8: The Right Triangle

Referring to Fig. 8, the following relationships exist between the angle (θ) and the lengths of the sides:

$$\sin\theta = \frac{B}{H}$$

$$\cos\theta = \frac{A}{H}$$

$$\tan\theta = \frac{B}{A}$$

Figure 9: Basic Right Triangle Trig Relationships

Looking at the triangle *ABC* in Fig. 7 we can apply the cos equation to find Rp as follows:

$$\cos\theta = \frac{R}{Rp}$$

Then multiplying both sides of the equation by Rp, dividing both sides by cos θ and rearranging gives an equation for Rp:

$$Rp = \frac{R}{\cos\theta}$$

where Rp is the only unknown. You can use any basic scientific calculator to find the cos of the angle[1].

We can then find the inside pattern radius, Rt by applying the same method to triangle *AED*:

$$Rt = \frac{r}{\cos\theta}$$

And again, the included angle is found as above:

$$\phi = \frac{R}{Rp} \cdot 360°$$

Conclusion

Using a few simple techniques, we have generated the equations for developing cone and transition flat patterns. Since we have kept all aspects of the equations variable, they will work for any size of transition we want to create. So, with a compass and protractor or any basic CAD package, you should now be able to design any transition or cone you desire.

[1] Spreadsheet packages traditionally expect angle values to be in radian format. If you program this equation into a spreadsheet, you must convert the angle θ from degrees to radians. In Microsoft's Excel you use the RADIANS() function to accomplish this.

Rocket Vision Releases Online Cusom Decal Suite

On Monday, September 13, Rocket Vision will add a Custom Decal Suite to its website (www.rocketvision.com). Users will be able to upload a graphic and adjust its size, then submit it to be printed on waterslide decal paper. The system recognizes thousands of colors, including gold and silver metallics, and users have the option of designating one color as "transparent" if desired. The custom decal will be shipped to the customer on the next business day.

The Decal Suite is the product of collaborative work by Rocket Vision Webmaster Anthony Zimmerman and company President Bill Maness. It is one of two custom suites which the company has been planned to take advantage of online technology. (The custom rocket suite, which will give users feedback as they create their designs, will be released next year.) "The World Wide Web allows us to interact with our customers in ways which were not possible previously," said Maness. "Now, they can send a design directly from their computer to our web site, use our tools to fine tune it, then submit it to our printers."

Pricing for the custom decals will be according to the size of the sheet used: a full 8.5"x11" sheet will cost $7.50, half a sheet – cut either horizontally or vertically will be $7.00, and a quarter sheet will cost $6.50. The user can put as many graphics as he wants on the sheet. Shipping is free inside the continental United States, $3.00 outside.

At this time, only PC users running Internet Explorer 4 or 5 will be able to use the Decal Suite. Macintosh and Netscape compatible versions will be released as the browser makers release javascript compliant versions. According to Webmaster Anthony Zimmerman, "Microsoft is supposed to release Internet Explorer 5 for Macintosh this fall, and it should be compatible with the decal technology."

For further information, please contact Rocket Vision Marketing Lead Janet Hendrickson at 800-568-2785 or jsabrina@rocketvision.com or visit www.rocketvision.com.

Tom Pastrick and Steve Piette inspect a boost glider on the pad at the July launch. (Jeff Pleimling photo)

Launch Report for July
by Bob Kaplow (NAR 18L)

July 18th was NIRAs monthly launch. Weather was warm and humid, but definitely not Houston category. Winds were light and variable from the north to west.

The Forest Preserve had recently mowed our flying area, and it looked really nice. We set up our flight line and started flying. Attendance seemed to be down this month. We never filled all 24 pad slots. It wasn't that hot to chase folks away. Where was everybody?

I made 7 flights. I made 3 Micro Maxx BG flights. The first seperated the pod, the second was pretty good, and the reflight of the first held together after some glue and tape, but was now poorly trimmed. As soon as I score some more motors, the flight test can continue.

I flew 2 more Micro Maxx; the Saturn-V in tribute to Apollo 11, which seems to tumble after motor burnout. I also flew the Tomahawk, which was stable, but ejected its piston. It doesn't seem to snap in. Is this fixable?

The Happy Meal made its mandatory appearance, logging flight #102 on a D11-P. I finished up with the Nike Ajax. This was "slightly unstable" at MRFF last month, but I added an ounce of lead to the nose and it flew fine this time.

Adam Elliott spent the day getting ready for Eggloft at NARAM. For the record, a B-2 will **not** lift an egg! Tom Pastrick kept busy flying Flat Kats.

For the record, we had 3 other manned space tributes. Steve Smith flew his Boyce Mercury Redstone on a G80. The NCR launch pad jumped quite a bit at ignition, but the model flew fine. Steve Piette flew his Quest Micro S-V. Just before we shut down the range, John Kouns showed up with the current Estes S-V kit, in barely dry primer, and made a textbook perfect flight with a D12-3.

I didn't get a chance to count the flight cards, but we were definitely down this month from past launches. Usually we're near 300 flights for an afternoon. I doubt we even got close to 200 for the day.

Martin Schrader hooks up his rocket (Jeff Pleimling photo)

Bob Kaplow with his Nike-Ajax (is that 'Sport Scale' or 'Insane Scale?') (Richard Wartick photo)

John Kouns prepared to launch his Saturn V for an Apollo 11 tribute flight (Jeff Pleimling photo)

John Kouns with the upper portion of the Saturn V after recovery (Jeff Pleimling photo)

Steve Smith readies his Boyce Mercury Redstone on a G80. (Jeff Pleimling photo)

Saturn V with all three parachutes deployed. (Jeff Pleimling photo)

An Aerotech Initiator is readied for launch (Richard Wartick photo)

Space Launch Report for July-August 1999
by Tim Johnson

Eleven space launchers flew during July and August. All but one, the inaugural Khrunichev Proton-K/Breeze-M, made it to orbit. Shuttle Columbia came uncomfortably close to failure, however, during its July STS-93 mission.

Proton-K/Breeze-M Failure

A three-stage Khrunichev Proton-K with the first Krunichev Breeze M upper stage and a Raduga military comsat failed on July 5, several minutes after liftoff from Area 81/Pad 24 Baikonur Cosmodrome, Kazakhstan. Breeze M, a derivative of the Breeze K flown on Rokot, had no chance to fire its engine. Like Proton, Breeze M burns toxic N2O4/UDMH.

At the 277 second mark, while Proton's four RD-210 second stage engines were burning, a stray aluminum particle from a faulty weld started a fire in the number-three engine turbopump. Debris immediately depressurized the stage's fuel and oxidizer tanks. The dead vehicle coasted for 45 seconds until, tumbling, it began to break apart. Wreckage landed 1,000 km downrange in the Karaganda region. One 220 kg piece of debris landed in the courtyard of a home.

No one was injured, but officials worried about possible contamination from tons of hypergolic propellant.

Kazakhstan banned Baikonur launches for one week until Russia agreed to pay for the cleanup and to start paying down its $300 million Baikonur rental debt. Available landing zones limit Proton trajectories. Spent first stages fall about 310 km downrange. Second stages and payload fairings fall about 1,985 km downrange. Populated regions lie between landing zones.

It was the first Proton K failure since May 27, 1993. The three-stage rocket had successfully reached orbit 53 consecutive times since then. However, three Block DM engine failures occurred in orbit during 1996-1997.

STS-93/Columbia

Space Shuttle Columbia lifted off from Kennedy Space Center LC 39B on July 23 on STS 93 with NASA's $1.5 billion Chandra X-Ray Observatory. Aboard were Commander Eileen Collins, Pilot Jeff Ashby and Mission Specialists Cady Coleman, Steve Hawley and Michel Tognini. Despite a troubled ride to orbit, the crew deployed Chandra/IUS-27 about seven hours after launch. Columbia performed a smooth night landing at KSC on July 28.

About 5 seconds after liftoff, Commander Collins called "Houston, Columbia. It's in the roll." followed quickly by "we've got a Fuel Cell PH number one." The alarm report was caused by a short circuit that shut down redundant main engine controllers on the center and right engines. Had one of the backup controllers faltered during the remainder of the ascent, the respective engine would have shut down and caused an abort. Post flight inspection found that damaged wire insulation was to blame.

Columbia's preliminary orbit was about 10 km low. The right engine leaked liquid hydrogen in three of more than 1,000 3/8th inch combustion chamber "hot wall" cooling tubes during ascent. Five pounds of hydrogen leaked per second, raising engine temperature. The engine controller compensated by increasing the liquid oxygen (LOX) flow rate. The resulting 1,700 kg LOX shortfall forced a "low level cutoff" less than one second early. Postflight inspection found that a one-inch long LOX injector port plug had blown out at ignition and damaged the tubes.

Globalstar 4 during rollout (Boeing photo)

Despite the troubles, Columbia entered a nominal 287 x 282 km x 28.45 degree orbit after performing the OMS 2 burn 41 minutes after liftoff. After deploy, the two stage IUS put Chandra in a 330 x 72,030 km x 28.45 deg. orbit, which Chandra's on-board thrusters later raised to 10,000 x 140,000 km. With its record 25,700 kg cargo, Columbia weighed 122,534 kg at liftoff, more than any previous orbiter.

Three from Plesetsk

Russia's military launched the year's first three space missions from the northern Plesetsk cosmodrome in July and August. A 3.5 stage 8K78M Molniya-M orbited a Molniya-3 milcomsat on July 8. The Block-ML upper stage boosted the satellite into a 472 x 40,813 km x 62.5 deg "Molniya" orbit. A Soyuz-U orbited Kosmos 2365, a Yantar-class military imaging satellite on August 18. The 2.5 stage rocket lifted off from LC 43/3. The satellite entered a 166 x 342 km x 67.1degree low earth orbit. A two-stage Kosmos-3M rocket successfully orbited Kosmos 2366, a Parus navigation satellite, on August 26. The satellite entered a 1,000 km x 83 deg orbit.

Delta Launch Surge

Delta 272, 273, and 274, all Boeing Delta 7420-10 models with four solid rocket boosters, successfully orbited twelve more Globalstar cellular telephone satellites on July 10, July 25, and August 17 respectively, from Cape Canaveral. Delta 272 and 274 flew from Space Launch Complex (SLC) 17B. Delta 273 lifted off from SLC 17A, northernmost of the two pads. The missions were flown as Delta Globalstar 4, 5 and 6. All were nearly identical to the Delta Globalstar 3 mission flown by Delta 270 on June 10.

Boeing claimed a record for the "greatest number of satellites (17) launched within the shortest period of time, 68 days" on five Delta 2 missions. In addition to the 16 Globalstar satellites, Delta 271 launched NASA's FUSE spacecraft from the Cape on June 24.

The flights increased the Globalstar on-orbit constellation to 36 satellites. The $2.6 billion Globalstar system will ultimately employ 48 satellites and 60 ground stations.

Progress M-42/MIR Finale

A Soyuz-U boosted the Progress M-42 Mir resupply ship on July 16 from historic LC 1 at Baikonur. Progress docked with Mir on July 18. The three-man Mir crew installed a new automatic analog navigation system before departing Mir August 27. Their departure ended almost 10 years of continuous human presence in space. Unless plans change, Mir will reenter the Earth's atmosphere and disintegrate sometime in 2000.

Zenit-2 and Ariane 4 Return to Space

A Russian/Ukrainian Zenit-2 successfully orbited the 6,500 kg Okean-O remote sensing satellite on July 17 from Baikonur LC 45. The three-stage rocket put the satellite into a 661 x 662 km x 98.0 degree sun synchronous orbit. It was the first Zenit-2 launch since one of the big rockets failed on September 9, 1998 in an accident that destroyed 12 Globalstar communication satellites.

Arianespace returned to space with the V118 [L487] launch from Kourou's ELA 2 on August 12. The Ariane 42P injected Indonesia's 2,763 kg Telkom-1 comsat to geosynchronous transfer orbit (GTO). It was the first Arianespace mission since April 2 and only the third of 1999. Payload delays were largely responsible. V118 had also been delayed several days to let technicians replace four electrovalve interface units on the vehicle's HM-7B cryogenic third stage engine. The 14,100 pound thrust LOX/LH2 engine successfully performed its standard 13 minute direct-to-GTO injection burn, an energy-saving feat available only to rockets launched from near-equatorial sites such as Kourou.

Ariane 4 waiting to put Telkom-1 satellite in orbit (Arianespace photo)

V118 was the 45th consecutive Ariane 4 success, and the 84th success overall in 87 attempts since Ariane 4 debuted in 1988.

NARAM 2000 Educational Conference

Purpose: To provide aerospace educators with in-depth knowledge of model rocketry ‹ on subjects such as: designing stable models, operating a safe launch range, rocket propulsion, payloads for model rockets, tracking a rocket's altitude, and using rocketry to excite and motivate students to learn. The participants will be totally immersed in the various subjects of rocketry, and will have the opportunity to interact with each other, and members of the National Association of Rocketry (NAR) at the NAR's annual rocketry meet.

NARAM-2000 Dates: July 29 to August 4, 2000 (actual conference dates: TBD)

Location: Cañon City, Colorado

Host Organizations: National Association of Rocketry, US Space Foundation, Civil Air Patrol, and the rocketry clubs of Colorado Springs and Denver.

Cost: To Be Determined (expect at least $400 per person). Graduate level credits from the University of Colorado will be available for an extra fee.

Description of the event:

The NARAM 2000 Educational Conference will be held in conjunction with the National Association of Rocketry's Annual Meet (NARAM). This will be the first time the NAR has hosted an educational conference to train teachers in the subject of model rocketry. The conference will be limited to 200 participants.

The NARAM event usually draws about 150 highly skilled rocketeers from around the country. The event was started 41 years ago, and has been held yearly in different cities thoughout the USA. It has been held in Colorado on five different occasions; the last time being 30 years ago. Over the years, the event has grown from a national contest, and now includes a separate launch range to allow modelers to launch rockets of nearly any size.

The special educational conference will be geared towards teachers that have already built and flown model rockets; and who are looking for more advanced coursework on rocketry; and how to integrate it into different subjects and classes. The participants will attend courses and workshops; and then will get a chance to launch and track model rockets. It will be geared toward the high school level, but with some sessions that have application to lower grades.

While the educational conference is being conducted, the NAR will be conducting its own annual meet at the launch site for its members. The educational conference participants will also have access to this launch field throughout the week, and will participate in a special launch day to try out some of the knowledge they learn during the conference. By having the educational conference coincide with the regular NARAM, the participants will be able to interact and learn even more about rocketry in an actual launch setting. They will eat, sleep, and breathe "rocketry!"

Launch Site: Located between the cities of Penrose and Cañon City, Colorado.

On U.S. Highway 50, directly north of the Freemont County airport. The 400 acre parcel of private land is great for rockets of most any size. The waiver from the FAA will allow rockets to be flown to 10,000 feet (above ground level), with authorized launch windows to even higher altitudes. The field elevation is approximately 5,000 feet above sea level. There are a variety of low growth cactus on the field, so it is recommended that participants wear hiking or cowboy boots when at the launch site. All participants will be required to follow the NAR safety code when flying model rockets at this launch site.

Required Educational Sessions:

Launch Operations – How to run a safe launch with large groups of students.

Presented by Tim Van Milligan, author of three rocketry books: "Model Rocket Design and Construction," "69 Simple Science Fair Projects with Model Rockets: Aeronautics," and "Model Rocket Propulsion."

Using Tracking Scopes to Determine a Rocket's Peak Altitude (Building session included) – Dr. Bob Kruetz.

Using and Understanding Rocketry Computer Simulations – How computers can be used to aid in the design of model rockets. – Paul Fossey.

Model Rocket Propulsion – What makes rockets go whoosh. Presented by Mike Dorfler – Senior Designer, Estes Industries.

Electronic Payloads for model Rockets. Presented by Peter Kerckhoff – Dean of Electronics, DyVry Institute of Technology, Kansas City, Missouri.

Rocket Building Session – Each participant will build a rocket to fly on "launch day." While participants will all build the same rocket, they are encouraged to bring "completed" rockets with them to also fly and gain launch experience. Any size rockets are welcome, as long as the maximum altitude remains below 10,000 feet (above ground level), and that the rockets use motors approved by the NAR.

Rocketry Recovery Techniques – While parachutes and streamers are the most popular methods for returning a rocket to the ground, other methods, such as gliders and helicopters can be used to explain the aerodynamic concepts of lift and drag. Presented by Al De Iglesia

Flying Rockets with Larger Rocket Motors – Some experiments may require larger rockets with more power. This session will explain what is involved in building bigger rockets, and what legal regulations govern their operation. Presented by Steve Lubliner.

Break-out Sessions:

Steve Bachmeyer – Dade County High School (Florida) – Speaking on Aerospace Education; "The Space Shuttle Project."

Ken Horst – Instructor, Goshen High School (Indiana) – Rocketry for High School Students.

Jim Banke – Florida Today Newspaper – A Description of the new Launch Vehicles being produced to further advance man's exploration of outer space.

Dr. Ben Millspaugh – Civil Air Patrol programs.

Richard Speck – Talking about High-speed, High-performance Rockets; Guidance, and Control.

Mark Bundick – NAR President. NAR benefits for school teachers.

Marc Lavigne – Rocket Scientist; Boeing Corporation. Speaking on how model rocketry mimics the real world of space vehicles, and what it is like to be in the blockhouse when a rocket explodes.

Steve Bachmeyer – Dade County High School (Florida) – "W.I.N.G.S." – the student organization for Aerospace Education. This sessions will tie in to all of the sessions and give teachers ACTIVITY to go with what they are learning; especially the launch procedures.

Edward LaBudde – Electronic tracking of model rockets. This session will show how to set up electronic tracking scopes to determine a models flight path. Not only does this determine the rockets peak altitude, but also the actual acceleration, velocity, and range of the model. This is a highly accurate method, and allows precision measurement of the rocket¹s flight.

Ted Mahler – After School Rocket Class for 4th Graders.

Note: The above information is still preliminary. Please check the NARAM web site weekly for updates (www.NARAM2000.org). If you'd like to help with this conference, please contact Tim Van Milligan (email: tvm@apogeerockets.com).

Telephone number: (719) 535-9335 (day).

Kids at NARAM-41 soaking up some of our 'scientific' and educational hobby. (Rick Gaff photo)

Mid Week Sport Flying At NARAM 41

by Ken Hutchinson

I arrived in the Pittsburgh area on Tuesday, too late to register for the contest really, so I registered as a sport flyer only. The first weekend is prime time for sport flying at NARAM but the sport range doesn't sit idle for the remainder of the week. The mid-week weather was pleasant and the wind was very cooperative, especially on Thursday when it decided to visit some other part of the planet entirely. As I walked onto the field on Wednesday morning the sport range announcer was extolling the virtues of the coffee and doughnut breakfast at the concession stand run by the local volunteer fire department. "Look", he said "you can get caffeine, sugar, and fat, three of your four major food groups, in one meal. And if you can find a chocolate doughnut you can get all four!" This bit of nutritional doublethink was too much for Rick Gaff who had to correct the most glaring inaccuracy by exclaiming "Hey, you forgot about carbonation!" Ah, there's no humor like NARAM humor.

I volunteered for range duty on Wednesday afternoon and witnessed a steady stream of flights with only a few occasions when the range was empty. The total number of rocket flights on the NARAM sport range had exceeded 1600 by week's end and totaled a bit over 1800 when the RCRG flights that operated off the sport range annex were included. NIRA's own Jonathan "Superman" Charbonneau worked pretty hard to achieve his goal of becoming the sport ranges' most prolific flyer. I doubt that anyone beat him and I know for a fact that he had the honor of making the 1300th flight while I was on duty at the rangehead. His Estes Mongoose and Vaughn Brothers Extreme 24 got quite a workout.

Rachel Kaplow displays her pink Big Dawg (Rick Gaff photo)

A few of the flights were more interesting than intended. While I was on duty we flew someone's Broadsword. It decided to take the launch rod along for a ride. The extra weight made for a low arcing flight. As I was frantically shouting orders over the PA to clear spectators from the impact area the parachute finally did come out at a very low altitude. The rocket did a 180 and the trailing launch rod, now pointed down, neatly planted itself into the ground and the rocket settled back in place, ready for another go. A little bit later we launched George Gassaway's beautiful upscaled and radio controlled Estes Skydart. The model hung up on the pad for a while before breaking free. George's skill and cool nerves turned a potential disaster into a lovely flight. It's a fun bird to watch and George made a second flight with it about an hour later. The second one went off without a hitch.

A farmer from near Philly named Rick Hackman flew one of the most unusual rockets. It was made from a cornstalk. It took an uncommon number of tries to get it lit and off the pad but it finally went up. I was expecting popcorn to come out with the parachute but no dice. Maybe next time; Rick seemed to like the idea. Art Nestor and another member of the Pittsburgh Space Command teamed up to fly the dual version of something they call the Saint Louis Arch. They tied one end of two rolls of crepe streamer material to two Big Berthas. The rockets were launched simultaneously and soon two big arches of streamer were floating across the sky on a gentle breeze.

Tom Stump flew a rocket listed on the flight card as "Ned's Rocket". Those of you who have enjoyed flying at the AMA facility in Muncie, Indiana, may know that Ned Blumenschine was one of the people who helped organize and run those events. Ned passed away recently and Tom wanted to make a flight with one of his rockets in his memory. Part of Ned's rocket literature collection was donated to the NAR auction earlier in the week. You left us too soon and we will miss you, Ned.

We saw the usual range of Estes Fat Boy variations. My favorite was a two stage version flown by a modeler named Greg (I can almost but not quite remember his last name). The first stage was clustered. The first attempt didn't light all the motors in the first stage but the second one did and both were crowd pleasers. I drew a round of applause myself with a flight of my Vaughn Brothers Little Wild Thing. You wouldn't think that a C6-5 and seven mini motors would draw much attention on a range where F and larger motors are going up regularly. I guess there is just something about an eight motor cluster that tickles people's fancy, no matter the total impulse involved.

There was a demonstration flight of a 4 inch Mercury Redstone kit. I don't recall the vendor's name. I do recall that they made quite a production of announcing the flight and describing the kit over the PA. Then they gave a slow, majestic countdown and launched my Estes Impulse which was loaded up on an adjacent pad instead. I guess the pad selection knob on the launch system is a bit twitchy. After the guffaws died down they did fly the Redstone. It was a lovely boost. There was no visible recovery system activity though and the model crashed into the trees ringing the field.

I didn't fly on Friday because Friday was scale day and I wanted to watch the fabulous collection of NARAM scale models in action. I did manage to catch a couple of sport flights anyway. Rob Edmonds had a large radio controlled glider. I'm not sure if it is offered as a kit or if it just his personal model. Anticipation built as it sat on the pad for quite a while. When the LCO finally called the flight it went up smoothly and glided around the field with the grace of a large soaring bird. The other Friday sport flight that sticks in my memory was made by Tom Pastrick's Bomarc. Tom had flown it several times during the week and had even gone so far as to get a reloadable motor for it. As the scale flying was winding down the competition range crew agreed to let him fly it off the competition range. It made a nominal boost and then there were a few seconds where it looked like the recovery system was a no show. It finally did operate, a little low, but the model appeared to settle into a normal glide, making a fast wide turn over the heads of the crowd. It was a beautiful flight at this point. Just as it seemed ready to clear the crowd and head for a recovery downrange the glide and the turn steepened. Before I knew it the model had made a U turn and was now headed straight at me and moving at a good clip.

In the end I didn't have to dodge it. It hit the ground and slid to a stop about 10 feet short of where I was standing. It did suffer some substantial damage. Tom says it can be rebuilt, it will fly again. As for me, I am still reviewing the contents of my pants pockets, trying to figure out exactly what that thing was homing in on!

Jonathan "Superman" Charbonneau flying on the sports range. (Rick Gaff photo)

Heard on the Street

(with apologies to the Wall Street Journal)

Welcome to the Club!
Bill Christoffel and Rachel Wickart have joined NIRA since the last newsletter. Welcome to the club!

"Calling Dr. Marcy, calling Dr. Marcy..."
Congrats to long time NIRA member and former B Division National Champion Tim Marcy, who received his Ph.D from the University of Minnesota in July. Tim's degree was in Chemical Physics. He'll be headed to Boulder, CO in October for a two year post-doctoral stint at the Joint Institute for Laboratory Astrophysics. Hey, Tim! Did we mentioned NARAM 42 will be in Colorado?

Wired In Wheaton
Congrats also to long time NIRA member Tom Price, who got a Bachelors degree from Wheaton College in May. Tom's degree is technically in Mathematics, but with a computer science bent. While studying, Tom assisted in Wheaton's project to rewire the dorms for network access.

NAR National Events for 2000

Dan Wolf, NAR National Events Chair, has announced the NAR's national events for 2000:

NARCON 2000
NARCON 2000 will be held March 10-12 in Richardson, TX (Dallas suburb). It will be hosted by the Dallas Area Rocket Society (NAR Section #308).

National Sports Launch 2000
NSL 2000 will be held May 27-29 in Geneseo, NY (30 miles south of Rochester, NY). It will be co-hosted by the Monroe Astronautical Rocket Society (NAR Section #136) and the Buffalo Rocket Society (aka NAR Western NY, NAR Section #590, aka Tripoli Western NY, Prefecture #85).

NARAM 2000 (42)
NARAM 2000 (42) will be held July 29-August 4 in Canon City, CO. It will be co-hosted by the Colorado Springs Rocket Society (NAR Section 515) and the Colorado Rocketry Association of Space Hobbyists (NAR Section 482).

Look for more information and links to each of the event web sites to appear on the NAR web site (http://www.nar.org) in the next few months.

A Joint Progress Report on ATF Matters by the Tripoli Rocketry Association and the National Association of Rocketry

A Joint Progress Report on ATF Matters by the Tripoli Rocketry Association and the National Association of Rocketry

On August 23-24, 1999, we visited Washington, DC to review the status of our effort to minimize regulation on the HPR hobby with our counsel, Egan and Associates. We also participated in a 1.5 hour meeting with ATF staff. Our thanks to Joe Egan, John Lawrence, John Kyte and Charlie Black for their kind hospitality during our visit, and to Wally Nelson of ATF for meeting arrangements.

On July 15, 1999, Egan and Associates requested via a letter to ATF General Counsel, a meeting with ATF staff, to review the status of a potential Notice of Proposed Rulemaking (NPRM), and the underlying legal basis for the proposed regulations as understood by the rocketry organizations. In addition to the requested meeting, Egan and Associates filed a Freedom of Information Request regarding a reported 442 explosive incident reports where sport rocketry materials were used. In response, ATF met with us and invited staff from the General Counsel's office, the Explosives Technology Branch, and Public Safety, and provided documentation in response to the FOIA.

At the meeting, each association outlined its membership, programs and missions; Joe Egan presented a summary of the legal basis on which we believe ATF lacks authority to regulate the HPR hobby. Joe then asked for clarification on the ATF legal positions, the methodology by which the annual explosives item list was generated, the status of the NPRM production, and the level to which any public safety or criminal activity issues were present in ATF's assessment of HPR motors and activity.

As expected, the ATF did not offer direct input regarding legal issues. They agreed to review a detailed document prepared by Egan and Associates outlining the legal issues and met separately with Joe to review that document. We expect that meeting to occur in the next 30 days.

In response to the FOIA, substantial portions of the report were redacted (i.e., blacked out), apparently due to pending cases. However, our counsel has undertaken a new FOIA to obtain more information on these incidents. Additional FOIA's were filed relative to the inclusion of ammonium perchlorate propellent's inclusion on the annual list of explosives.

As of this date, all options, administrative, judicial and legislative remain open to the associations to seek relief from further regulation of the HPR hobby. We will assess with counsel our next steps after the legal meeting with ATF and the responses to our FOIA requests.

As always, we appreciate the patience of our members, welcome further inputs and pledge to keep you fully informed as events develop.

Mark Bundick, NAR President
Bruce Kelly, TRA President

NAR Standards and Testing News

R57: NAR S&T NEW MOTOR CERTIFICATIONS
The following motors have been certified by NAR Standards & Testing for general use as model rocket motors on August 29, 1999. They are certified for contest use effective November 30, 1999 (60 days from the start of shipping by the manufacturer).

Apogee:
13mm x 83mm:
- C6-4,7,10 (10.0 Newton-seconds total impulse, 7.0 grams propellant mass)

Jim Cook, Secretary for
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Jack Kane, Chairman

R58: NAR S&T MOTOR DECERTIFICATIONS
This announcement contains two types of model rocket motor decertifications.

NAR Contest Decertifications
The following motors will lose their certification for NAR contest use effective July 1, 2000 but are certified for use at NARAM 42. They remain certified for general sport flying for a period of three years, until July 1, 2003.

Estes
1/2A6-2
A10-0T
D11-P

NAR General Use Decertifications (7/1/00)
The following motors, having been out of production for more than three years, will lose their NAR certification for general use effective July 1, 2000.

Aerotech
C6-3,7
C12-2,5,7
E25-4,7
E27-3
E45-4,8,12
F14-4,6,P
F44-5,10,15
G42-4,8,12

Apogee
1/4A3-4T
A3-2T,6T

MRC
FX
A8-3
B4-4
B6-4
C6-3,5

Jim Cook, Secretary for

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Jack Kane, Chairman

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Do you know where your moon is?

On September 13th 1999, the moon was flung out of orbit (according to the TV series)