THE LEADING EDGE

Newsletter of the Northern Illinois Rocketry Association,
NAR Section #117, TRA #36

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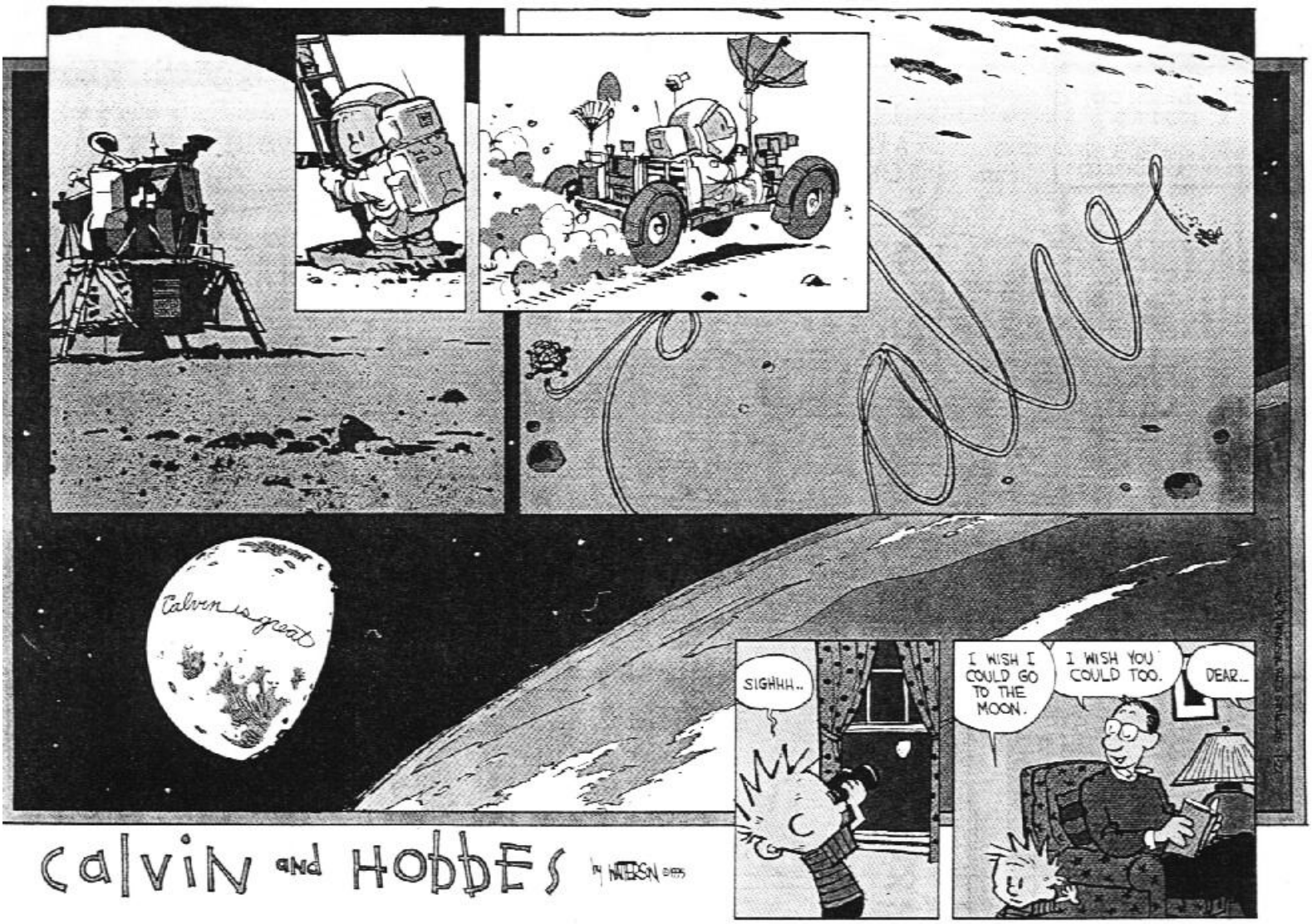


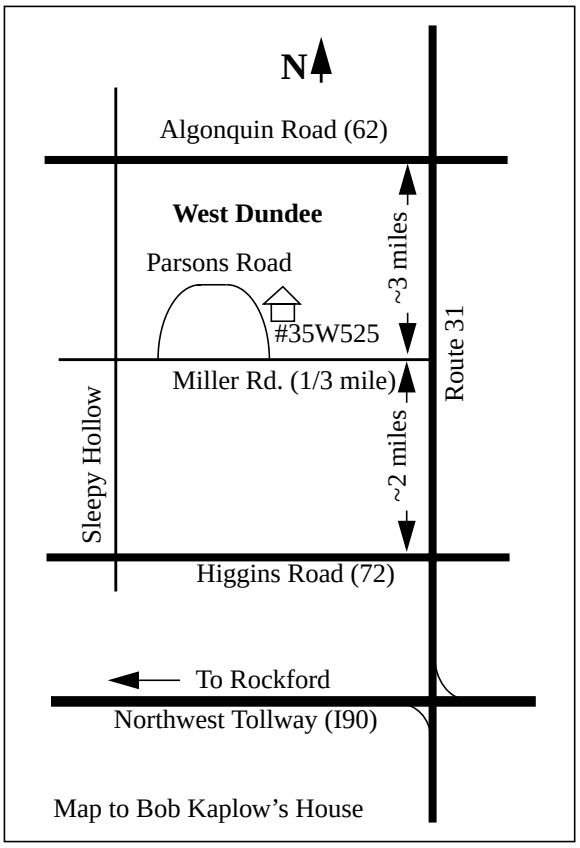
T MINUS 1 - NIRA'S CALENDAR OF UPCOMING EVENTS

STAFF

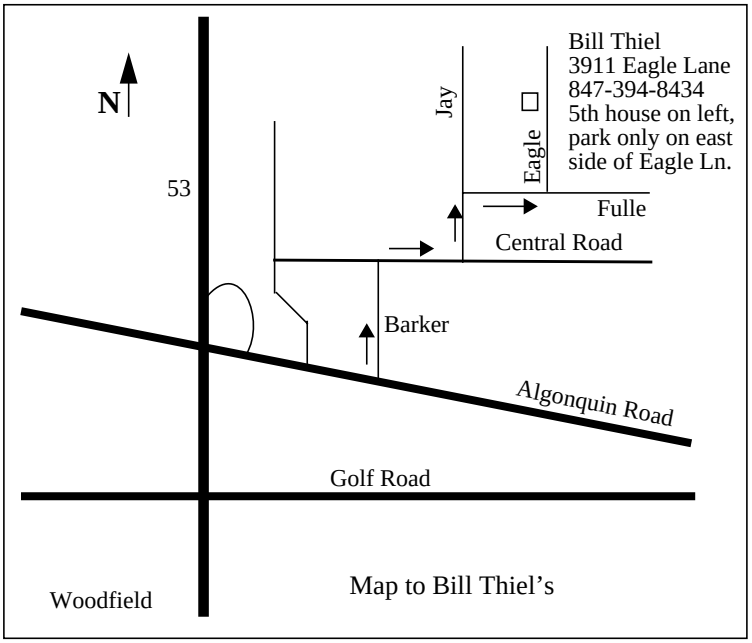
Bob Wiersbe - Fixer of spelling errors, Combiner of words and visual objects into something that resembles a newsletter. Ric Gaff -Crackerjack Copier, Professional Pleater, Bodacious Binder, Sticker of Stamps, Master of Mailing.

CONTRIBUTORS

Lawrence Bercini, Mark Bundick, Ric Gaff, Norm Heyen, Bob Kaplow, Rick Kramer, Bob Wiersbe



Map to Bob Kaplow's House



Map to Bill Thiel's

1996 NIRA Schedule of Events

January 5 - Monthly meeting (ok, so you already missed it)

January 21 - Building Session at Bob Kaplow's, see map on this page for directions. Don't miss it!

February 2 - Monthly meeting.

February 18 - Hubble Picture Show at Adler Planetarium. 2pm

March 1 - Monthly meeting.

March 17 - Building Session at Bill Thiel's. See map below.

March 24 - Club Launch at Community Park, Lisle. Note: this is a newly scheduled launch, only known to NIRA members.

April 12 - Monthly meeting. *NOTE - this is not the first Friday of the month! Mark your calendars!*

April 21 - Club Launch at Community Park, Lisle.

May 3 - Monthly meeting.

May 19 - Club Launch. Site may be Community Park, Pratt Wayne, or Bong. Details will be announced later this year in the newsletter.

June 7 - Monthly meeting.

June 15, 16 - Midwest Regional Fun Fly (MRFF), 2 day Sport Launch! Plan to be there!

July 5 - Monthly meeting.

July 21 - Club Launch, Community Park, Lisle.

August 2 - Monthly meeting.

August 10 - Possible HPR launch at Bong Recreation Area in Wisconsin. Details will be announced later.

August 18 - Club Launch, Community Park, Lisle.

September 6 - Monthly meeting.

September 15 - Club Launch at Community Park, Lisle.

October 4 - Monthly meeting.

October 19, 20 - RCHTA Show at Rosemont Expo Center.

October 27 - Club Launch at Community Park, Lisle. *Note: The kits built at RCHTA will be flown at this launch. Also, this is NOT the third Sunday of the month. Write it down!*

November 1 - Monthly meeting.

November 17 - Last Club Launch at Community Park, Lisle.

December 6 - Monthly meeting.

December 8 - Holiday Party! Where and when to be determined.

THE LEADING EDGE, published bimonthly by and for members of the Northern Illinois Rocketry Association, NIRA, NAR Section #117, is dedicated to the idea that Sport Rocketry is FUN! Articles, plans, photos, other newsletters, and news items of interest should be sent to Bob Wiersbe, 1835 Shetland Drive, Wheaton, IL 60187 (or electronically via Internet to hrbob@ixstar.ih.att.com.) Photos will be returned, other material returned if requested. Send membership applications (dues: $3/year, including a six issue subscription to the Leading Edge) and nonmember subscriptions ($5 per six issues) to Ken Hutchinson, 84 Jefferson Lane, Cary, IL 60013. Any item appearing in the Leading Edge may be reprinted by Sport Rocketry with proper credit given; all other uses require written permission of the Northern Illinois Rocketry Association. The Leading Edge - finding new ways to fill 12 pages with really cool stuff, and usually succeeding. Those with differing opinions may call the complaint department, as soon as we make one and get a phone.

1996 Officers:

President - Cheri Chaney
Vice President - Mike Ugorek
Secretary/Treasurer - Ken Hutchinson
Safety Officer - Bob Kaplow

Cheap Rocketry - Where to save money on motors and kits.

by Richard Gaff

Has the high cost of rocket motors kept you from flying as much as you would like? I know how you feel, $8 for a pack of D12's! or $4.79 for a pack of B's is pretty stiff. What can we do about it? Shop smart!

The first place people go to for motors and other supplies is the local hobby shop. The nice thing about hobby shops is the convenience. You pay your money and walk out with what you want (usually!). Some hobby shops even have people who know enough about rockets to help beginners. The downside is that you'll pay full retail for everything. Fortunately some hobby stores offer a discount to people who are members of local clubs. The discounts are typically 10-15%, not large but better then nothing! If you want to take advantage of these discounts check the latest issue of the Leading Edge. Each issue lists all the hobby shops known to give NIRA members a discount. If you don't see your favorite hobby store listed, talk to the manager and find out if one is available. If it is let Bob Wiersbe know so he can add it to the list. You will also need your NIRA membership card to prove you are a member. If you don't have a card contact Rick Gaff.

Another occasionally useful place to shop is an arts and crafts store called Michaels. I say occasionally because the thing that makes Michaels interesting is their sales. Michaels has two types of sales during the year; a 40% of any one item per visit and a 25% off an entire purchase. These sales occur throughout the year and are typically 1 or 2 days long but can be as long as a week. The down side of shopping Michaels is that their selection tends to be a bit limited and nobody there knows anything about rockets. Michaels also carries some plastic models.

Hobby shops and Michaels are pretty good, but where do we find the real bargains? For that you have to go to mail order. Mail order discounts vary from 25 to 40% plus you generally don't pay any sales tax. Many discounters also carry a variety of non-model rocket materials (such as glue, wood, decals etc.) making one-stop-shopping possible. The disadvantages to using mail order are waiting several weeks (or more), paying shipping charges and hazmat fee and if you get the wrong item it's a pain to return. When you mail order you generally can't spend a small amount of money (unless your part of a group order) so you end up spending a bigger chunk of money at one time. But it is possible to save money by using mail order so lets look at some of the better known discounters.

America's Hobby Center
146 SP W. 22nd St.
New York, NY 10011-2466
(212)675-8922
Catalog Price: free
E

Only carries Estes and has a sliding discount, the more you buy the more you save. A maximum of 40% off if you buy over $400 (we're talking group order here!)

Bruckner Hobbies II Inc.
2908 Bruckner Blvd.
Bronx, NY 10465
(718)863-4002
Catalog Price: free
E Q A L TF
Also carries model airplanes and cars, air brushes etc. This company prefers credit card calls, they discourage people from sending in orders.

Belleville Hobby
1827 N. Charles St.
Belleville, IL 62221-4028
(618)234-9202 FAX
Catalog Price: $2
E F MR C
Not a prime choice for Illinois residents as they must charge sales tax. It is good to be on their mailing however since they occasionally have close out specials and at 75 or 80% off sales tax doesn't hurt as much!

Countdown Hobbies
3 P.T. Barnum Sq.
Bethel, CT 06801-1838
(203)790-9010
Catalog Price: $2.50
E Q N AA T L V TF A MR C F P PH RR M
Major 1-stop-shopping! They carry pretty much the whole hobby and then some. They also have a very nice package deal for catalogs. $8.99 for copies of all the model rocket companies they carry and $15.99 for the HPR companies add $5.50 for shipping.

Magnum Inc
PO Box 124
Mechanicsburg, OH 43044
(513)834-3306
Catalog Price: $2
AA P W T F C N E M V I K VS R RR PH A
Another good 1-stop-shopping place for rockets with a wider variety of engine manufacturers.

Red Arrow Hobbies
5095 Red Arrow Highway
Stevensville, MI 49127
(616)429-8233
Catalog Price: free
A T N M P C E
Another good 1-stop-shopping place for rockets and non-rocket materials.

Key to manufacturers:
AA -AAA Model Aviation Fuels
A -Aerotech
C - Custom Rockets
E - Estes
F - Flight Systems Inc
I - ISP
K - Kosdon - TRM
L - The Launch Pad
M - Public Missiles
MR - MRC
N - North Coast Rocketry
P - Loc Precision
PH - Pratt Hobbies
Q - Quest
R - Rocket Flight
RR - Robby's Rockets
T - Thoy
TF - Top Flight Recovery Systems
V - Vaughn Bros. Rocketry
VS - Vulcan Systems
W - West Coast Rocketry

A small price comparison.

Item	list price	Magnum	Bruckner	Red Arrow	Belleville	America's Hobby Center		Countdown
						10%	40%	This information not available at press time
Mercury-Atlas	$47.99	$32.15	$39.99	$35.99	$33.59	$43.19	$28.79	
Alpha III	$9.49	$6.40	$7.89	$7.40	$6.64	$8.54	$5.69	
Broadsword	$20.99	$14.10	$16.99	$15.99	$14.69	$18.89	$12.59	
A8-3	$4.49	$3.05	$3.49	$3.15	$3.14	$4.04	$2.69	
C6-5	$5.39	$3.65	$3.99	$3.80	$3.77	$4.85	$3.23	
D12-5	$8.29	$5.55	$5.99	$5.25	$5.80	$7.46	$4.97	

(photos by Ric Gaff)

The winner of the 1995 “If At First Award” is Bill Thiel. From left to right, an Estes D11-P unplugs itself and the top of The Cone. Next, an Estes E15-4 lives up to all expectations and removes some more of The Cone, as well as it’s own nozzle. Last, Bill makes some quick repairs with a plastic cup and tries once more. This time he uses a D12-3, and gets a roller coaster ride from it.

Some parting shots from the November launch: Left, Bill Larry contemplates launching his Phoenix. Center, Jeff Pleimling helps some cold kids prep their rockets from the Hobby Show. Right, Dad holds son who holds rocket while Tom Pastrick holds the launch rod.

Jerome Mrozak tests the hinge of his sideways ejecting rocket before letting it fly. Jerome seems to be getting very reliable results with his system. (Ric Gaff photo)

Tube Fin Rockets of the world unite! Three variations on the same theme: Bill Thiel with his Pringle Roc, Jeff Pleimling with his Finite Loop, and Rick Kramer with his own version. All fly amazingly well! (photo by Ric Gaff)

DML V-2 Conversion
by Frank Burke

I've just discovered a great plastic model conversion candidate. It's the Dragon Models Limited (DML) V-2 kit. I'm mot sure of the exact scale, but it's about 14 or 15 inches long or so. The body diameter is just larger than a 1.6 inch Estes tube (BT-60) and is easily shimmed to fit perfectly. The only real conversion was deleting the steering vanes off of the bottom and fitting a cardboard thrust plate to the bottom of the V-2 to take the motor thrust.

I assembled the model as per the instructions, adding the motor tube and the Body tube into the bottom half of the rocket. I left the Upper nose section detached and glued the bottom half of a Big Bertha nose cone into the Nose section of the V-2 to act as an adapter to the body tube and give a place to tie the shock cord. It is inset about an inch or so. Due to this, the body tube liner has to be extended above the plastic shell of the rocket about an inch so that the Big Bertha nose cone can fit into the body tube.

I opted to tape the motor in, and didn't use an engine hook. I added 1/2 of an inch of nose weight to the cone, and it passed the swing test with either an aerotech D-21-4 or E-27?-7. The model comes out about 6 or 7 oz. The stock fins are one piece and are heavy, but are strong and are large enough for stability. I added a piece of plastic tube for a launch lug. I built the motor mount and thrust plate with epoxy, and have not had any problems with these high thrust motors.

The great thing about this model is that it does not need any plastic fins added, not much nose weight, flies great and high, and the tube is large enough for two yards of 1/4 inch shock chord and a 24 inch nylon parachute (packed carefully).

I have about 8 flights with this model with the only problem being that I used a piece of square tube for the launch lug, and sometimes it binds slightly at liftoff. Using a round plastic tube would rectify this. A C6-3 could also be used, but since the model is so heavy, the altitude would be very low. I also think that the C6-3bp motor is heavier than the Aerotech motors, so check the balance before flying.

The only negative thing about this model is that it is very detailed, and therefore costs a lot. ~$30-$35. It also comes with the launching platform.

'Twas a week before Christmas, so Tom gets his presents!
from Tom Beach via CIS

(Joyce and I exchange our presents here in New Mexico on the 18th, my birthday, so we don't have to haul them up to the midwest when we go see the old folks at home for the holidays... So why am I telling you this?...)

...Because I got an ACCELEROMETER.

I am the proud owner of a Cambridge Group IA-X95 Integrating Accelerometer (you can never have too many cool electronic rocket payloads). I'm building a 4" diameter payload section for it, initially, but it could easily fit in a 1.6" diameter tube. The wiring harness is rather substantial so the extra room in the 4" tube is nice (this is the basic wiring harness, with one ejection charge line).

I haven't had a chance to fly it yet, of course, but it seems to work as advertised (tip it one way and it thinks it's accelerating upward, tip it the other way and it thinks it decelerating...then it fires the ejection charge when its internal integration says it's at zero velocity... cool).

The manual is clear. I can't run the included software for doing the data reduction and plotting (it's PC stuff) but I can get the accelerometer to talk to my Mac easily enough, both for retrieving data and setting flight parameters. A separate pc board and cable is included with the accelerometer for interfacing the unit to the computer; I just plug it in to my modem cable and it can zap the flight data over to a terminal program at 9600 baud. I can then copy the hex data in the terminal window and paste it into an Excel spreadsheet I've written. The spreadsheet converts the downloaded (velocity) data and finds the acceleration, speed, and altitude values for each time step, then graphs the results. It also calculates and plots the thrust curve for the motor. The supplied software only plots the net force (thrust minus drag) for this step, which seems silly since it's easy to calculate and remove the effect of drag.

All in all, a pretty nifty device. The control functions are easy to configure. This includes such things as: timestep between data samples (any multiple of 32.8 mSec, so the 243 samples can be spread over the desired time period); minimum and maximum parachute deployment times (prevents the chute from being deployed before a certain time, but will definitely fire it by the max time even if the unit fails to "detect" apogee); second and third stage ignition (delays after previous stage burnout can be specified); main chute deployment time delay (after apogee detection/drouge chute deployment).

The unit assumes straight vertical flight, of course, since it only senses acceleration in one dimension. Off-vertical flights will cause errors in the reported altitude & velocity, and cause ejections past apogee. For moderately vertical flights I suspect this will not be a problem. Of course, the accelerometer can't pull your rocketry chestnuts out of the fire with an early deployment as well as an ECS-2 can.

What the accuracy of the unit? The manufacturer claims the unit's measurement precision is 0.01 g and that the measurement error is also 0.01 g. I dunno.

There are a few odd or disappointing features:

The unit stores the integrated velocity values, not the acceleration values, for each timestep. Odd. You can back the accel values out of the velocity data, of course, just remember that it is assuming a minus g is in there.

The unit stops recording after its integration reaches zero velocity (which will occur at apogee if the rocket is going straight vertical). This is a big disappointment, especially since I can't see any good reason for it. As a result, you can't measure the acceleration effects of ejection and recovery system deployment, and you can't watch for the effects of deployment past apogee] (deployment caused by a motor, for example). This limits the versatility of the unit. If they thought the weird oscillations after ejection would confuse the simple user, why not just have their display software stop plotting at apogee?

One of the features that I love best about the Adept altimeters & timers is that they constantly check the continuity of the deployment charges and/or upper stage igniters and warn you (with a different beep pattern) if there is a problem. The IA-X95 has a green LED that blinks if the unit is ready to fly and the batteries have sufficient voltage, but it doesn't monitor the continuity of the pyrotechnics. Sigh.

At $180 it's not a toy for everyone, but I think it'll be a lot of fun. It could be especially useful for getting thrust curves of motors "on the fly" and determining rocket drag coefficients (power on/off, dependence on velocity).

NAR S&T NEW MOTOR CERTIFICATION
Release 30

The following motors have been certified by NAR Standards & Testing for general use as a model rocket motor effective September 25, 1995. They are certified for contest use effective February 1, 1996.

The following are all Apogee single-use disposable motors.

Apogee:

10.5mm x 38mm: 1/4A2-2, -4 (0.62 N-Sec total impulse, 0.75 grams propellant mass) 1/2A2-2, -4, -6 (1.25 N-Sec total impulse, 1.5 grams propellant mass)

10.5mm x 57mm: A2-0, -3, -5, -7 (2.50 N-Sec total impulse, 3.0 grams propellant mass)

S&T announcements prepared by Jim Cook, Secretary for NAR Standards & Testing.

The Flying Carrot
or
What's Up, Doc?
by Lawrence Bercini

Introduction

A few years ago, NIRA regularly scheduled silly contests at every monthly launch. One such contest was called "Kitchen Scale". The objective was to build (and successfully fly) something from a kitchen. This event was quite successful and was even captured on video. My entry that day was the Flying Carrot. It's maiden voyage, captured on video for all to see over and over, was way underpowered with a C6. The carrot followed a shallow arc from pad to impact. Even more time on the video is me, squatting and straining to unroot the firmly planted flying vegetable. Needless to say, the next flight featured D-power! I've since had many fine flights.

Parts List

BT-55 (18")
(2) 5055 Adapter Rings
2.75" BT-50
JT-55C
Engine hook
(2) 3/16" launch lugs
Shock Cord
18" Parachute
12" of 1/4" x 1/2" spruce strip
Green trash bag
5" diameter foam ball
4" diameter base foam cone (~10" tall)
Lead shot (or similar weight)
Twine

Construction

Start by assembling the engine mount. Insert the engine hook 1/4" from one end of the BT-50. Epoxy the 5055 rings 1/2" from each end of the BT-50 (notch one ring to allow movement of the hook). Put aside to cure.

The next step must be done carefully! Insert the tip of the foam cone inside one end of the BT-55. Make sure the tube is positioned straight on the cone. Draw a reference line around the cone using the end of the tube as a guide and then remove the tube. Make certain this reference line is parallel to the base of the cone. Now draw another line parallel to the reference line, but 3/4" closer to the base. Again, make certain this new line is parallel to the base. Carefully cut along this line (a razor saw is the preferred tool) and separate the tip. Set the tip aside for later.

Slice away one side of the foam ball. Sand the flat face of the ball until the flat area exactly matches the base of the cone. Do this sanding carefully, checking often to make certain the face is flat. Keep checking the size against the base of the cone.

Center the BT-55 on the flat face of the foam ball. Trace around the tube. Repeat on each end of the cone, as well as the cone tip. Split the cone in half lengthwise and hollow out the middle. Use the half circles on each end as guides for the shape and size of the hollow. When both sides have been hollowed out, the BT-55 should fit snugly inside. Also, notch an additional channel on one half to allow for passage of the launch rod through the lugs. Repeat the hollowing process with the foam ball. Note: the tip of the cone, although marked, is not hollowed.

Temporarily tape the cone halves together and do the same for the ball. Slide the BT-55 into the cone so that one end is flush with the small end of the cone. Slide on the ball so that the cone base and the sanded face on the ball meet. Mark the BT-55 3/4" away from the edge of the ball remove the tube.

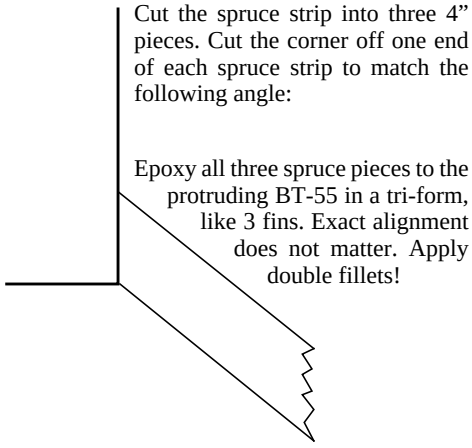
Cut the BT-55 apart at the mark made during the last step. Mark a line along the length of the tube. Epoxy the engine mount in one end of the BT-55 so that the ends of both tubes (BT-50 & BT-55) are both flush. Epoxy a launch lug on each end of the BT-55 along the line described above. Set this assembly aside to cure.

Center the JT-55C on the circle marked on the large end of the cone tip. Press the JT-55C partway into the foam. It should project straight from the base of the cone tip. Fill in enough lead shot to cover the surface of the foam inside the JT-55C. Drizzle just enough epoxy inside the JT-55C to cover the lead shot. Set aside to cure.

Reassemble the cone halves, ball halves, and BT-55 as before, this time epoxying all the pieces together. The launch lugs fit into the channel you created earlier, be careful to avoid excess glue in this area. Remember, the engine mount should be on the ball end. The other end of the tube should be flush with the small end of the cone. Allow to dry.

Take this time to assemble the parachute. Make a shock cord anchor for each end of the shock cord. Mount one end of the shock cord inside the JT-55C. The other end of the shock cord goes into the BT-55 in the standard manner (at least 3" deep).

Using a sanding block, sand the foam ball so that it more closely matches the contour of the cone. If you would like, scribe indentations around the girth of the cone every few inches to simulate the segments in a real carrot. Take a length of twine and twist it into a bundle, wide at the bottom and tapering into a single strand at the top. Use CA (e.g. Hot Stuff) to "freeze" this teardrop shaped bundle into shape. Securely epoxy this bundle to the small end of the cone tip. This twine bundle simulates the fibrous tip of a real carrot.



Test fit a 1/8" launch rod through the lugs. You will need to carve away a notch in the nose assembly to allow free passage of the rod. Make certain the model can slide easily on the rod.

Finishing

Since this model is made of foam, you cannot use dope-based balsa fillers. I used Pic-N-Patch to fill mine. I suspect the Borden's water soluble wood filler so popular with many NIRA folks will not attack the foam. If in doubt about the compatibility of the filler with the foam, apply a small amount of filler near the base where the BT-55 exits the foam.

You don't have to get this model absolutely smooth. Remember, it's supposed to look like a root! On the other hand, carrots do not look like they're made of pumice, so try to fill most of those little holes! You will have to do some extra filling to make the twine blend with the rest of the model.

Paint the carrot orange of course. Paint the body tube and spruce struts green. For added realism, smear graphite (pencil lead) in streaks around the girth of the carrot. Seal the graphite with a clear flat top coat.

Final Construction

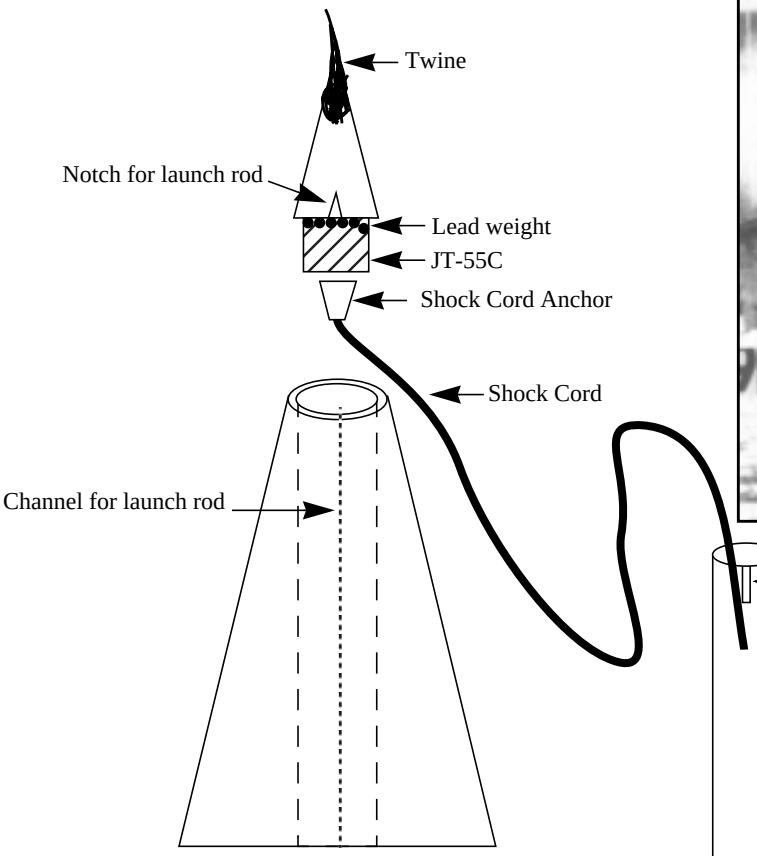
The final step is to attach the trash bag tassels to the spruce struts. Cut the trash bag into 3 rectangles approximately 6" by 36". Cut each rectangle into 1 1/2" strips, leaving 2" at the top of the rectangle uncut. This final 2" keeps the strips together and is wrapped tightly around the spruce strut. Use clear tape to secure the plastic to the strut.

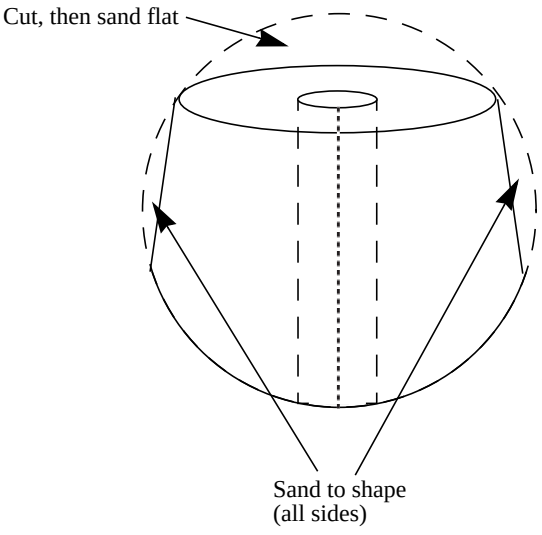
Flying

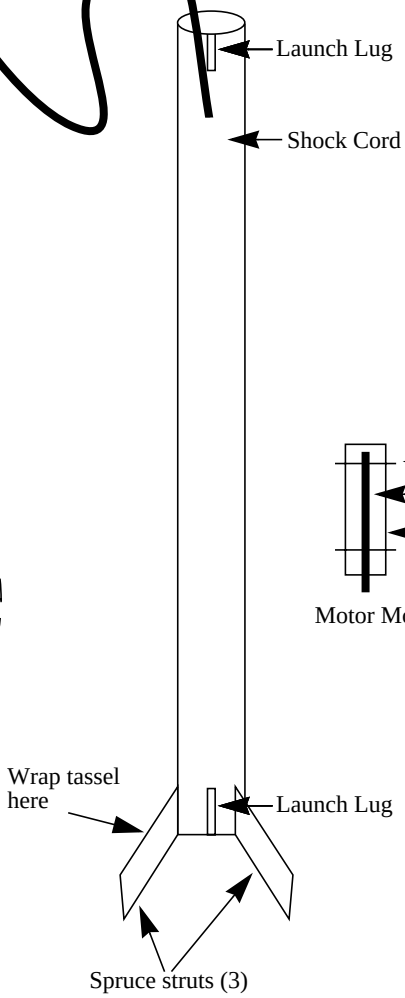
Fly with a D12-3. Use low pad so you can spread the carrot's greenery out and away from the initial blast. Enjoy!

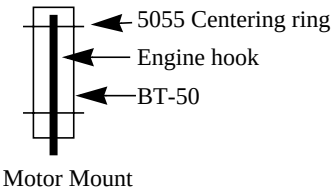
Flying Carrot

by Lawrence Bercini

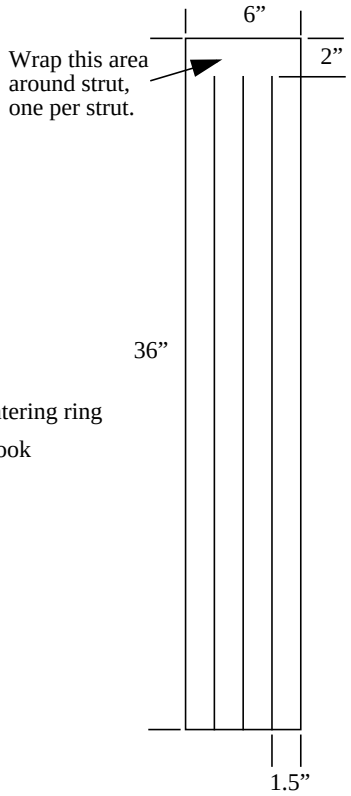








Tassel Pattern, make 3



Tips On Taking Rocket Photos
by Norman Heyen

First, use good equipment.

1. I'm not a big fan of auto-everything cameras. You will need to be able to over-ride the auto-exposure. The bright ignition plume will cause problems, as will the bright sky background. Set your exposure for the ground near the rocket and don't mess with it.

2. The same goes with the auto-focus. Face it, the area of interest isn't going anywhere. Once the rocket is in the air, it's gone and there isn't much to watch until `chute deployment and recovery. That little dot with smoke coming out is pretty boring. Even if it is your rocket. And then it will be at what the camera considers `infinity' anyway.

3. You will need a telephoto lens. Safety, and common sense, dictate that you stay away from rockets as they are launched. I use a 200mm for most photos. This lets me fill about 1/4 of the frame with most rockets. A longer lens would be nice, but I don't have one and can't afford one. Any one have an extra 300mm Nikor?

4. Use a reasonable film speed. I shoot ASA200. Rockets take off in the bright sunlight, or at least bright hazy conditions. This lets me shoot at 1/1000 at about f5.6 or so. You need at least 1/500 shutter speed, 1/1000 is better and 1/2000 would be excellent. At least I think, mine doesn't do 1/2000.

Use good techniques.

1. First the obvious, the long side of the frame goes up! Don't laugh, think of all the rocket photos that you've seen the other way.

2. Position the rocket in the lower corner, with the launch rod pointing toward the opposite corner. Forget about the foreground. Make sure the horizon is horizontal.

3. Listen for the LCO's announcements and countdown. A Graduator on an H242 is going to be your basic picture of a smoke trail. Black Jacks are good. Blue Thunders aren't very photogenic, not enough smoke and visible flame.

4. When you see the first flash of light or puff of smoke, press (don't `snap') the shutter. Hopefully, the motor won't sit for a while and build up pressure, or the ignitor won't get spit out.

5. If possible, see if you can get a decent position. There shouldn't be anything real distracting in the background. Try for the sun at your back, or at least to one side. Shooting into the sun is dramatic if you can pull it off. The sunlight will help light up the smoke and cast nice shadows for more illusion of depth.The best if to get the sun at about half way between your back and the launch pad.

What else?

1. Pick a good photofinisher. If you get a roll back that looks under-exposed (dark), ask for the roll to be reprinted. The bright flame will sometimes confuse the auto-exposure mechanism in the photo processor.

2. I use `jumbo' sized prints (4x6) instead of the smaller ones. I've found that these tend to be done better and have a better finish. Spend the extra few cents per photo.

3. Don't expect a perfect picture every time. Don't even expect to get the rocket in the frame every time. Some times things work against you.

4. So far, all I've mentioned are launch shots. Be sure to include some people pictures. Most folks that aren't familiar with the hobby need a few pictures of someone standing next to an 8' tall rocket to give them a sense of scale. Include a couple of shots of people setting up the rocket, posing in front of it, hooking up the ignitors, etc. And of course, a picture of someone smiling through their tears, holding the remains of a couple of months' labor of love. Just to hint at the dark side of our hobby.

5. Try for some diversity. Nothing is worse than a boring slide travelog of a hundred pictures of mountains. No matter how pretty they look, after awhile, one mountain looks like the next. Same with rockets. Get some pictures of rockets on display, during prep, some kids with Alphas, people helping people, kids and parents, little rockets taking off, big rockets taking off, what ever. Try to capture the spirit of the day, not just 50 tubes with fins spitting smoke and fire.

Other, Different Photos

OK, so what else could you do? Well, launch the camera. But that is a different topic. If you have a camera capable of electronic, remote control, you could get some interesting shots of the lift-off. The trick is to get the shutter tripped at the right moment. I haven't actually done this, but here are some thoughts. These require more planning and setup. And the co-operation of the LCO and RSO.

1. Mount a lever switch on the pad and adjust it so that the contacts close after first movement of the rocket. This could be either the body tube of a fin.

2. If you have some experience with electronics, you should be able to use one of the opto devices that have the emitter and detector in one unit, with the slot

between them. Place it under a fin, so that the signal is sent as the fin clears the slot.

3. A long wire remote release. Should be the easiest, but relies on your reaction time.

4. I would set the camera up on the ground away from the `blast' area, or at least protect it as much as possible from harm. The shutter speed could be much lower as the motion is away from the camera, instead of at right angles. Use as small of aperture setting as you can get by with, to increase the depth of field. A shorter lens can be used, like maybe a 50mm. Pre-focus for the middle of the rocket.

5. Group photos are a pain. Find someone with a wide angle lens, like a 28mm or shorter. Forget trying to splice two or more shots together for one panoramic shot. You will need to mount the camera on a tripod, fix the exposure and level the camera. The camera has to be pivoted around the film plane. Trust me, it is a lot of work and the results, if poorly done are pretty `cheesy'. Maybe one of the disposable, panoramic cameras might work. Be forewarned that they need LOTS of light for decent pictures, require special handling in processing and printing.

6. Video cameras are another topic, and I can't offer suggestions. Maybe next year.

Questions? Comments! Contact Norman Heyen at neheyen@micro.honeywell.com or Norman1927@aol.com

SCALED UP NINJA

BY RICK KRAMER - NIRA - NOVEMBER, 1995

PARTS LIST:

Motor Mount ..... Estes EH-2060
1/8" X 4" X 20"..... balsa fin stock
Elastic Shock Cord from fabric store 1/8" X 28"
1/8" Diameter X 2 1/2" ..... launch lug
Nose cone ..... Estes PNC-60AH
Shock cord mount ..... Made from business card
Body Tube 18 inches ..... Estes BT-60
Parachute 18 inch ..... Estes PK-18
1/4" Metal .....Screw Eye

INSTRUCTIONS:

Mark the rear of the body tube at 0, 60, 120, and 240 degrees. Extend the marks up the body tube about 12 inches. Label the 60 degree mark LL for launch Lug. Assemble the motor mount following the manufacturer's instructions. You may wish to add a quick release engine clip. Glue motor mount into body tube with the end of the engine tube flush with the end of the body tube. From the rear of the body tube, mark the LL line at 3 inches, and each of the fin lines at 2 inches. Glue the fins on one at a time with the point where the root edge angles upward located at the 2 inch mark. Ensure that each fin is perpendicular to the body tube and the glue has set before moving on to the next fin. Glue the launch lug to the body tube with the rear of the launch lug at the 3 inch mark on the LL line. Cut a standard business card into the shape of an Estes shock cord mount and install the shock cord. Apply a drop of plastic cement to the nose cone screw eye hole and install the screw eye. Tie the free end of the shock cord to the nose cone screw eye. Assemble the 18 inch parachute and also attach it to the screw eye. Decorate with red and black spray enamel. This scaled up NINJA flies well on a wide range of engines from B-4-2 to C-6-5.
Enjoy!!

Aw! Chute!
by Lawrence Bercini

Some months ago, Bob Wiersbe surveyed the recipients of "The Leading Edge" to find out ways it could be improved. One reoccurring emphatic request was: "More articles for beginners!" Next, Bob did what editors are supposed to do, he started nagging people for the material he needed. Being the pushover I am, I agreed to fulfil his request. Next, I did what so many newsletter contributors do, I procrastinated.

So, here it is. This is the first in a series of articles for our newer modelers. In this installment, I will ruminate on the topic of parachutes. Over the years, I've seen many beginner modelers struggle with getting reliable parachute performance. What I will do here is list common failures and ways to prevent them.

Failure #One: The Curse of the Wad

The "curse" manifests itself in two ways. One way is when the parachute refuses to come out of the tube at ejection. In the more extreme case, the parachute is difficult to pull out by hand, often tearing the lines loose in the process. The second manifestation is less extreme, the chute does eject, but stays crumpled in wad form, trailing the rocket like a pathetic pom-pom.

Either manifestation of the "curse" is bad. At minimum expect to break some fins. At worst, the "curse" leads to a major crash. Not recommended . . .

Most of the times, beginners bring the "curse" on themselves: either they ignore the need for wadding, or they cram the chute into the tube.

Don't scrimp on the wadding, folks. It's not nearly as expensive as the rocket itself. Until you get familiar with how much wadding is required for a particular tube diameter, read the instructions! There should be enough wadding to block the ejection gases, but not so much that it will not slide easily out of the tube. Try blowing it out yourself. If you can't, you've jammed it in too tight, setting yourself up for a "curse."

Even with the proper amount of wadding, many beginners still "curse" themselves. Instead of properly preparing the parachute, they crumple it up and stuff it into the tube. The natural tendency of a plastic parachute is to expand. As the crumpled chute expands, it presses against the tube wall in all directions and essentially locks itself in place inside. If by chance this crumpled wad does manage to escape the tube, it is not in a position to "catch air." It will not billow open into a canopy shape. It falls to earth still in a wad.

Here's the solution to that problem:

FOLD!

Repeat after me: **F-O-L-D**.

Again: **FOLD!!!**

The proper way to prepare a parachute to insert into the model is to fold it. Place the parachute on a flat surface and fold it in half so that the shroud line attachment points lie on top of each other. Continue folding in half (or thirds) until all the attachment points are all stacked on top of each other. If this is done properly, the parachute should be in a flat diamond shape (or shaped like a pie slice if the parachute is round). The surface of the plastic should be smooth and flat. Continue folding the this diamond shape in half lengthwise until you have a narrow "dagger" that will slide easily in and out of the tube. A couple of loose loops of the shroud lines around the "dagger" will help hold the shape while you slide it into the tube.

Failure #Two: Parting Company

There are two main reasons why shroud lines "part company" from the parachute. The first reason is because of insufficient attachment. The second reason is far too much shock.

Fortunately, most newer kits feature parachutes which require the lines to be tied on. This attachment method is very strong, and if done properly seldom fails. Many kit parachutes still use the method of attaching shroud lines by taping them in place. If the tape provided is some kind of adhesive-backed paper disc or strip, throw them away! They will eventually loosen and turn your parachute into a streamer. Replace them with some kind of plastic film tape. The preferred material is an adhesive Mylar, such as trim Monokote. If you can't find that, use plain, old transparent tape (such as Scotch tape). Avoid masking tape - it's too thick and will age and lose its grip.

When taping lines on, make sure you give it enough line under each tape strip. A good 1/2" to 3/4" of line should be sandwiched between the tape and the parachute material. Form the line into a loop underneath the tape. This will make it harder for the line to pull out from underneath.

Parachutes are not made to withstand the shock of ejection. That is the job of the shock cord. Ideally, ejection should occur at peak altitudes when the airspeed is lowest. If the parachute is exposed to a high airspeed during ejection, it can cause one or more lines to "part company." I've even seen "shocked" parachutes ripped into tatters. The resulting crash can be ugly.

The first thing to do to avoid shocking your chute is to select the proper motor delay! If the delay is too short (or long), the model is still coasting upwards (or downwards) at a pretty clip. This will cause your chute to attempt to be an airbrake and it is not meant for that purpose!

Even with a proper delay, the chute can be overly shocked. This happens when the shock cord is too wimpy to do its job. Usually this means the shock cord is too short. A good rule of thumb is, if you hold the nose of the model, allowing the chute and shock cord to dangle below it, the length of the shock cord should be twice that of the parachute shroud lines. If you think your shock cord is too short, replace it, or extend it with a strong length of braided nylon cord (such as a good kite line).

Failure #Three: Too Much of a Good Thing

Strictly speaking, it's really not a failure when a parachute works too well. The parachute obviously has worked perfectly. Unfortunately, your model is now taking up residence in another county. Nevertheless, this end result is unacceptable! What can you do about it?

A really common problem with beginner modelers is inappropriate motor selection. Given your typical 10" long, 1" diameter beginner's model powered by a C6-5, and a field like Lisle Community Park in the midst of typical Illinois winds, a fully functional parachute will take that model to Batavia! Just because it says so in the catalog, the highest power motor is not always the best choice! Work up to the more powerful motors only after trying the lower powered motors. Your field may be too small or the wind too strong to let you go up the most powerful motor.

You can, of course, adjust for the wind somewhat. One way is to angle the launch. Another thing you can do is to make your parachute less efficient. A simple way to do that is to "reef" the shroud lines in. Take a small strip of tape and wrap it around all the shroud lines halfway down. This will prevent the parachute from opening completely, thus catching less air. Reefing causes the parachute to descend more rapidly, and, unlike cutting a spill hole in the middle of the chute, is reversible!

Closing Comments

There are many other ways parachutes can fail. There are also other reasons for the failures listed here. But generally speaking, careless packing and poor motor selection account for the majority of parachute failures among beginner modelers. I hope the recommendations above can help minimize failures in the future.

If you find this column helpful, please contact the editor with suggestions for future topics.

Kit Review: Stellar Dimensions Inc Spinnaker
by Bob Kaplow

The most innovative rockets I saw at the 1995 RCHTA show were the square laser cut models from SDI. They sent me a sample Spinnaker for review, which I built over the holidays. First a warning: just as with small die cut balsa parts, some of these parts are very fragile, and easy to crack while separating them from the scrap. I recommend a sharp thin knife be used to pop the pieces out, to prevent breaking anything. I would suggest that SDI make some of these

parts from plywood instead of basswood to reduce their potential to crack or break.

That aside, this kit almost snaps together. All the parts fit perfectly with no sanding or other fudging. I simply snapped parts together, and wicked thin CA into the cracks to assemble the kit. Then I went nuts and filleted places I shouldn't making nose "cone" installation impossible without lots of sanding and filing. Resist the urge to do so.

This kit has more parts than anything I've built in a long time, 50. Remember that the "body tube" counts as 12, 6 bulkheads, and there are 12 laser cut parts to the parachute kit as well. The lower body snaps together with 4 square bulkheads that serve as motor block and baffle. A few dots of CA and it's done. The nose "cone" assembles similarly, then the tip parts are bent inward and CAed into place to form a very tall skinny pyramid.

Heed the warning about excessive pressure cracking body parts. I did this too once, but thin CA fixed such cracks easily. The mid section was a bit challenging to assemble, as there is no bulkhead plate to hold everything true. Stick it into the base of the rocket to align it during assembly, to be sure it is square.

I found the parachute shroud lines to be a bit short for my taste, so I replaced them with longer and stronger lines. I found the novel shroud line attachment to be interesting: the extra reinforcement under the sticky paper should make it very durable, but the adhesive paper, also laser cut, reminded me of the old Gyroc hinge material. Anyone who still has one of these from the 60's knows that the paper doesn't stay stuck forever. I'd use adhesive backed mylar for this part if I had the choice.

Even the motor retainer is a laser cut piece of teflon that twist locks into the back of the model. The launch lugs are brass eyelets on wooden standoffs.

The only error I found in the kit is the last bulkhead piece for the nose "cone" is referred to as "F", but actually was not labeled. Since it's the only one left at that point, it wasn't hard to figure out which piece it was. Again, be careful about slopping glue on the inside mating surfaces of the nose "cone", as this must slide over the body "tube". Use a work table to be sure the body is straight during final assembly, and slower CA to allow work time here.

The model has lots of laser surface etching, so don't over-sand the surfaces or paint over it all with something that will block it out. If you don't like the dark brown burnt edges, they can be lightened by light sanding. I'm going to "stain" mine with a single coat of colored dope, so all the detailing remains. Flight reports will have to wait until the Chicago area thaws out this spring.

Overall, I thought that this was the most innovative kit I've seen in many years. It's very different in assembly, yet still quite easy to assemble, and all the parts fit perfectly. It's reasonably priced compared to the competition too. I can't wait for their larger D powered model to show up. I may just start building more square rockets of my own, using SIG plywood. Hey, I might even have to go out and buy a laser cutter to make all my rocket parts now.

Stellar Dimensions Inc.
2135 Roosevelt Ave.
Enumclaw, WA 98022
(360)802-0953

Yankee Rocket
by Adam Elliott

Yankee Rocket blasted off on a C6-5,
And right away it disappeared up into the sky

Chorus:

Yankee Rocket blasted off, right before my eyes.
See it go so far away, high into the skies.

chorus.

I heard a pop and saw some smoke, but couldn't see the rocket.
Desperately I looked around, oh I had to spot it.

chorus.

Around and 'round I look about, but much to my despair,
My brand new bird was nowhere seen, up in all that air.

chorus.

Hours of work just seemed to fade, along that nice rocket.
It was so sad I had to pull a hanky from my pocket.

chorus.

Wouldn't you know it came in sight, streamer waving gladly.
Quietly I thanked the Lord my rocket worked so grandly.

chorus.

It landed close, not far away, but harder than expected.
I ran up near and saw that it was only Estes dented!

Heard On The Street

Rumors and such, with apologies to the Wall Street Journal

Welcome to the club - Lawrence Beyer, Rich Knipfer, Rick Knipfer, Loren & Ryan Thompson, Brian Waterloo, Kevin Wickart, Bill Tuleja, Jeremy Petersen, Nate Kitterman, and Dan Wolf have joined NIRA recently, welcome!

Too Hot to Handle - A Lockheed-Martin review board has pinpointed the cause of the LLV launch failure of August 15, 1995. Video of the vehicle in flight shows hydraulic fluid from the first-stage thrust vector control system igniting and eventually burning thru a control cable. That cable connected the first stage controller and the pitch actuator in the thrust vector control system. A second anomaly occurred 127 seconds after liftoff, during the coast phase. The vehicle's inertial measurement unit (IMU) malfunctioned due to electrical arcing within the unit. After failure, the IMU began providing incorrect data on the orientation of the vehicle, and it flew off course. Lockheed Martin will increase first stage thermal insulation, capture the hydraulic fluid instead of letting it vent, and encapsulate the IMU to prevent arcing.

Reloads-R-Us - Easy Access RMS hardware and reloads are available at 25% off retail at Al's Hobby Shop in Elmhurst, Illinois. Al's does not ship, so it is strictly a walk in kind of thing. Also, Al's does not discount as much with credit card orders, they like cash/checks.

Ouch! - Speedy recovery wishes to Lawrence Bercini who broke a rib recently.

Timely Tips
(taken from rec.models.rockets)

Sam Saenz writes: I have just come across a fine little rocket model which I would like to construct for a scale competition, however, because of aging, the decals have yellowed. Does anyone out there have a way of dealing with this problem, other than throwing them our and painting on the models?

Sven Knudson replies: The 'standard' approach to fixing this is to put the decal sheet in a ziplock baggy and tape the baggy to a window that faces the sun. Make sure the decal faces the sun to allow the solar radiation to fade the yellow away. Putting the decal in a baggy prevents any condensation from forming on the decal itself. I think the yellow should go away in a week or so.

Astrocam Tips from Marc McReynolds

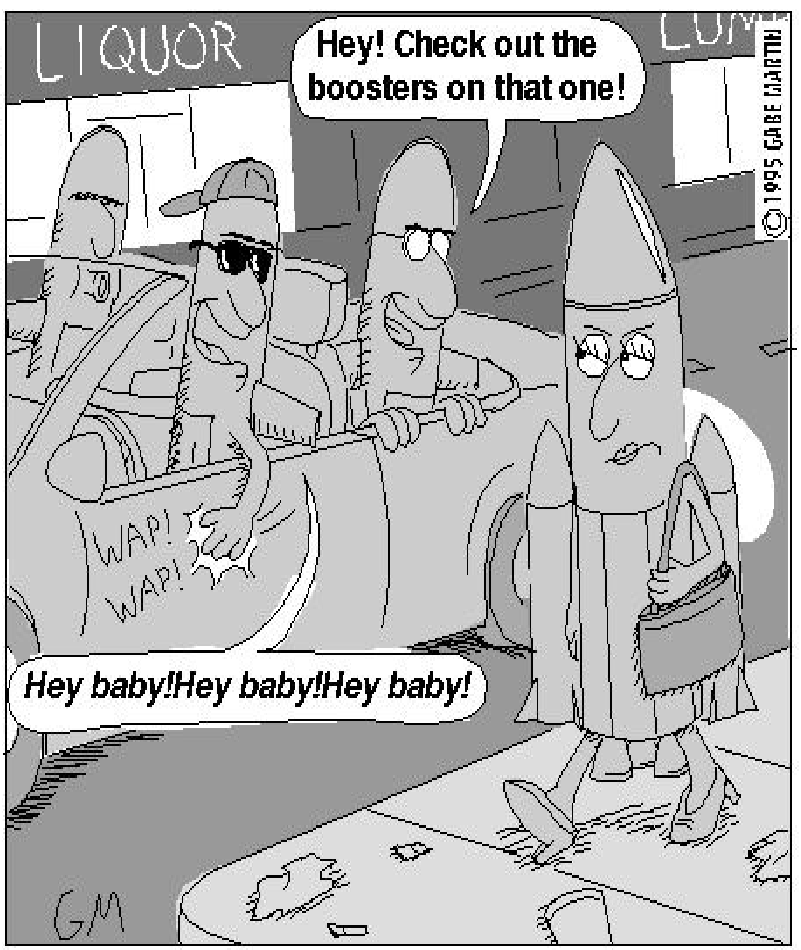
I've been flying the AstroCam for however long they've made it, and the "just keep flying" advice of the previous posting is appropriate.

A few years ago, I got into RC gliders with the idea that this would make for reliable pointing of the AstroCam. I finally tried it at NARAM 37 (hand launched), and I now have RC AstroCam glider pictures of the sky and grass. I'll get it right eventually.

By the way, I fitted the AstroCam with an external glass lens from a 35mm point & shoot camera about five years ago, and opened up the aperture for ASA 200 film (standard with the current AstroCam). When everything stays steady, the resolution is quite good. To this end, add a section of tube below the AstroCam with small fins at the bottom -- basically a dummy upper stage. At ejection, the camera is stable rather than beginning to tumble, so there is less chance of blurring.

The BORDERLINE™

By Gabe Martin
borderln@cts.com



Cruise Missiles on a Friday Night

http://www.cts.com/~borderln/