THE LEADING EDGE

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

Volume 24, Number 6 November/December 2001

Club News and Notes

Holiday Party Out, Outing In – At the November meeting, NIRA determined that the traditional holiday party was passé and decided to have an outing to the Museum of Science and Industry instead. Details on this and the other winter activities are one column over.

Club Elections – At the January meeting, NIRA holds an election to decide the club officers for the year. Nominations can be made anytime prior to the voting.

The only officer position that is considered open is that of Vice President. Pierre Miller, our current Vice President, is now attending college in Michigan and has indicated that he doesn't think he can perform his duties remotely.

Although there haven't been any nominations as of this moment, none of the other officers have indicated that they want to step down from their position and will probably be re-nominated at the December meeting. This shouldn't stop anyone else from running, however, as choice is always good for the club.

Again, if you would like to run, or nominate someone else, nominations can be made up to the election at the January meeting.

Bylaw Changes – Besides the voting of club officers, January is also the meeting where we vote on any bylaw changes proposed by club members.

If you have any changes that you want to propose, either come to a club meeting or contact Rick Gaff to get them put on the agenda.

The current club bylaws can be found on the NIRA webs site: http://nira.chicago.il.us/

March Launch – At the repeated urgings of Tom Pastrick, NIRA has decided to try holding a launch in March 2002 instead of having a building session (or yet another outing).

Instead of being on our traditional third Sunday, the March launch will be on March 24th - the **fourth** Sunday. This will hopefully bring better

***(Club News and Notes** continued on page 11)*

Winter Activities

December - Museum of Science and Industry
57th Street and Lake Shore Drive
Chicago, IL 60637
(773) 684.1414
http://www.msichicago.org

December 16th, 2001 - 10:00 to ?

Instead of a holiday party, NIRA's going on an informal outing to the Museum of Science and Industry. We'll meet up at 10:00 in the main lobby by the ticket counter and wander inside.

Besides the usual exhibits (including the Henry Crown Space Center and the U-Boat), the Robert Lesser Collection of Robots and Space Toys will be on exhibit.

This exhibit is the result of Robert Lesser's twenty years of collecting robots and space toys. There are more then 200 rare and valuable items from famous films, books and TV shows, including "Forbidden Planet," "Buck Rogers" and more. It will be on display at the Museum of Science and Industry, from November 16, 2001 through January 6, 2002.

Map of area around the Museum of Science and Industry

Prices for General Admission and parking to the Museum are as follows:

Visitor	Outside of Chicago	City Residents
Adult	$9.00	$8.00
Child (3-11)	$5.00	$4.25
Senior (65+)	$7.50	$6.75

Parking – General Public $7.75 per vehicle

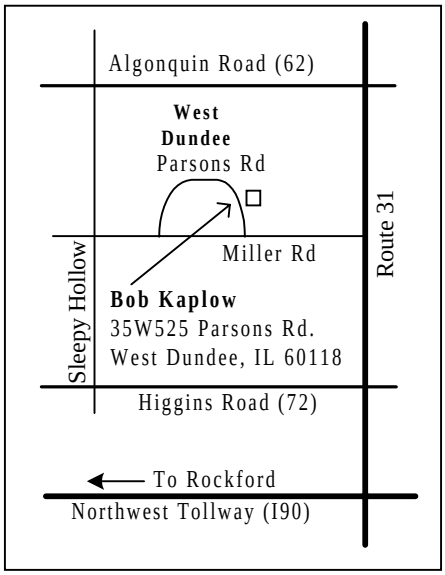
January - Building Session
Bob Kaplow
35W525 Parsons Rd.
West Dundee, IL 60118

January 20th, 2001 - 1:00 to 5:00 (or so)

It January so Bob is hosting a building session (our only one this year). "Bob's Hobby Shoppe" is always worth the trip with his basement full of various power tools, rocket supplies, built rockets, unbuilt rockets, plastic models, large motor collection… This session usually includes NIRA's first flight of the year (in Bob's back yard – indoor launches sill being prohibited by the NAR's safety code).

This is an informal session to build rockets, talk rocket, look at rockets, or just hang out. Bring

***(Winter Activities** continued on page 11)*



Map to January's building session at Bob Kaplow's house.

THE LEADING EDGE

Volume 24, Number 6
November/December 2001

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:
Jeff Pleimling, Editor
The Leading Edge
245 Superior Circle
Bartlett, IL 60103-2029
or emailed to leadingedge@pleimling.org
Photos will be returned, other material returned upon requested.

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 notifications to:
Ken Hutchinson
82 Talcott Avenue
Crystal Lake, IL 60014-4541

NIRA's web site: http://nira.chicago.il.us/

Leading Edge site: http://www.pleimling.org/le

NIRA InfoLine: (630) 830-1587

CLUB MEETING DATES

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

December 7

January 4, 2002

February 1

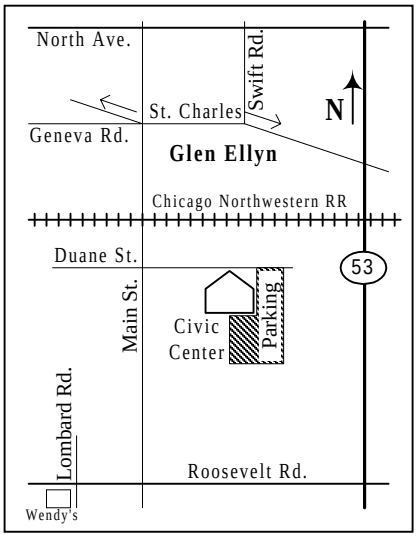
March 1

April 5

May 3

June 7

July 5



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 infoline for pre-launch information: 630-830-1587.

December 16 - Museum of Science and Industry trip (see page 1 for details)

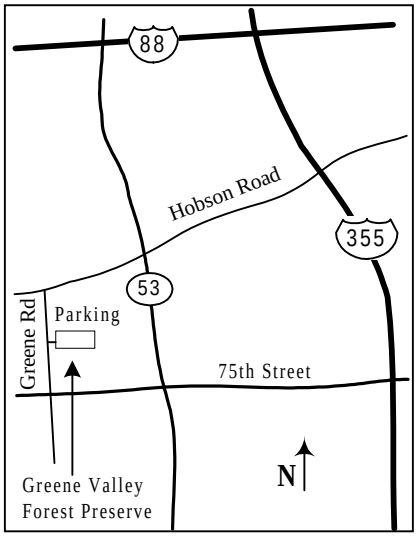
January 20, 2002 - Building session - Bob Kaplow's house (map on page 1)

February 17 - Adler Planetarium trip (see page 1 for details)

March 24 - Greene Valley Forest Preserve (note: this launch is on the **Fourth Sunday**)

April 21 - Greene Valley Forest Preserve

May 19 - Greene Valley Forest Preserve



Model of the Month Winners! (photos by Jeff Pleimling)
October – Youth winner Riley Montag hold his Estes Eliminator alongside Kevin Keehn with his Ring Leader (originally from Enterprise Rockets, now available from Fat Cat Rockets).
November – Bob Kaplow holds his scratch built Milkbone rocket while Victoria House holds her Aerotech Aerospike that she built at the Hobby Show and is now signed by Homer Hickam.

Homer Hickam Book Signing
information from Bob Kaplow and Victoria House

As reported in the last Leading Edge, Homer Hickam (author of *October Sky)* was at Anderson's Bookshop in Naperville on October 23rd to sign copies of his new book *Sky of Stone*.

According to reports there were several NIRA members in attendance. Thanks to Kevin Keehn for letting the club know about this event.

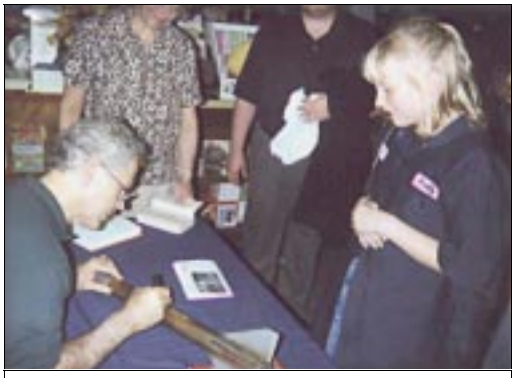
Bob Kaplow reported that "Homer talked for about half an hour, took questions for another half hour, and then started autographing, posing for pictures, etc. **very** nice guy, interesting story teller (a requirement for a good author). I wish I had videotaped the evening. I was #41 in line, and it took about an hour to get to me. He promised to stay until everyone got autographs. There were at least 100 people there!"

Bob also reported that "[Homer] was wearing a cool 'Rocket Boys' shirt that's supposed to be available from his web site." His web site is at:
http://www.homerhickam.com/

Besides books, two of the NIRA members in attendance had rockets autographed by Mr. Hickam. Kevin Keehn with the Rocketman 'Rocketboy' he appropriately named "Homer" and Victoria House with the Aerotech Aerospike that she built at the hobby show.

Victoria won the Youth Model of the Month contest at the November meeting with this Aerospike. When she was asked if she was going to fly the rocket again (and possibly lose it) she replied with a very firm "no way!"

Kevin Keehn and Homer Hickam pose with "Homer"
(photo supplied by Kevin Keehn)



Homer Hickam signs a rocket for Victoria House.
(photo supplied by Victoria House)

A Rocket Girl poses with a Rocket Boy.
(photo supplied by Victoria House)

"Homer," Kevin Keehn and Bob Kaplow listen to a story. (photo supplied by Kevin Keehn)

Apogee Components Releases Saturn V Kit
Apogee Press Release, 11/8/2001

Apogee Components is now shipping the huge 1/70th scale Saturn V rocket kit. Standing over 5 feet tall and 5.67 inches in diameter, this is the largest flying model rocket kit of the Saturn V moon rocket in the world.

From the tip of the nose to the base of the display nozzles, this is a totally "new" kit. It includes:

- Highly detailed injection-molded plastic nose cone and escape tower
- Injection molded RCS nozzles for the Service Module
- Injection molded F1 Display nozzles that are removable when you are ready to launch your rocket.
- Embossed paper wraps for the upper transition piece between the third stage and Service Module.
- 6-color water transfer decals (with special mission specific decals for 12 Saturn V's that rocketed into space).
- High quality paper tubes that were sized to exactly 1/70th scale.
- 7 highly detailed plastic corrugated wraps - that include all the small tunnel covers pre-molded (so assembly is quicker).
- Extra sturdy die-cut centering rings along with a 29mm motor mount that fits your favorite high power rocket motors.
- 2 large nylon (60" and 36" dia) parachutes so your rocket descends slowly to the ground to be launched again and again!
- Molded plastic fins that are removable when you transport your rocket to and from the launch site.
- Four hours of how-to videos that show step-by-step how to build this rocket. By watching the videos, you'll see the techniques that practically guarantee a great looking and well-built rocket kit.

This is a rocket kit that was truly engineered by real rocket scientists -- not simply whip together and tossed into a box. It is strong enough to fly on big high-power rocket motors, but is still light weight. In fact, when prepped for flight, this rocket is only 2-1/2 lbs, so you do not need a FAA high-power waiver to launch it! It flies great on a G80-4 rocket motor - which you can purchase at your local hobby store. No high power certification or special rocket motors are required.

All the kits that were pre-ordered by customers will be shipped out prior to November 9, 2001. New orders are being accepted right now, and will be shipped as soon as all the pre-orders have been filled.

For more information on this product, visit:
http://www.apogeerockets.com

LOC "Cyclotron"
by Bob Kaplow (NAR 18L)

I was thrilled when I won the new LOC Cyclotron kit at the raffle at SWOOFF over Memorial Day weekend. And it was most appropriate that it was the extra raffle ticket that I got for working a shift of SCO that won me this neat prize. Thanks SCAM and Launch Crue for the launch, and to LOC for the generous donation.

The LOC Cyclotron is the first new kit from LOC since it's new owner Barry Lynch took over the company. The good news is that everything you liked about LOC is unchanged. This includes the perfect fitting machined plywood centering rings. The bad news is that everything you didn't like about LOC is unchanged. For me, it's the sparse instructions, and not documenting the CP location. While not a problem for the experienced modeler, those just entering HPR or LMR for the first time may need some guidance in building a LOC kit. Conversations with Barry indicate that he's working on updating the instructions.

On to the specifics of the kit. It's a 3" HPR version of the popular tube finned rocket. One twist here is an adapter and a 2.2" payload section. The tube fins are standard couplers rather than body tubes. This means you don't have to cut 6 tubes from one large tube. The down side to this is that they are slightly smaller in diameter, leaving a small gap between 2 of the rings. That gap is filled, either by design, remarkable coincidence, or necessity, with the 1/2" launch lug. The other downside to the couplers is that they don't have the smooth finish of the LOC tubing. More work for priming before painting. But there are no fins to fill and seal.

LOC 'Cyclotron' Specifications:
Length: 56.75"
Diameter: 3.00" to 2.14"
Weight: 35 oz.
Recovery: 36" parachute
Fins: 6 tube
Motor Configuration: 1 - 38 mm
List Price: $87.95

The rest of the kit is typical LOC. The rocket has a 38mm MMT (a 29mm adapter is included) which was long enough for me to include a baffle, adding a third centering ring, and of course Kaplow Klips for motor retention. I also used some small #2 sheet metal screws to attach both the adapter and nose cone to the payload section tube, so I can open it up in the future if I desire. I used the standard LOC shock cord attachment, and the provided elastic, which seems to be long enough. The 36" chute quality strikes me as not quite what it used to be from the old LOC of years gone by, but is on par with most HPR kits.

Bob's Cycloton (and arm…) at a club meeting.(Jeff Pleimling photo)

Other than the modifications for the Klips and Baffle, I built the kit stock. Assembly was with the System Three trial kit epoxy. I complicated the assembly by deciding to EconoKote the entire rocket. This requires covering the parts, cutting away the covering at all the glue joints, both body to ring tube as well as ring to ring, then assembling. Getting the iron on covering on to the insides of the ring fins was NOT an easy task. The only other challenging part was covering the nose cone, which I could have done better.

Finally, I added rail buttons inside one of the tube fins next to the stock launch lug. Yes, there is enough clearance for a rail to fit inside one of the tubes.

I did calculate the CP location. Depending on how you model tube fins, the CP is anywhere from 48.26" to 52.51" from the tip of the nose. I find it more convenient to measure CP from the fin (or in this case tube) leading edge, as it's much closer to the CP location. Those locations would be 2.74" forward to 1.51" back of the tubes leading edge. CG on my rocket with a single use G motor was 11.2" forward of the tubes, giving it plenty of stability margin.

The model weighs in a few ounces heavier than the cover sheets 35oz claim, but given a centering ring, baffle, Klips, etc. I added, it's pretty close. I've flown it twice so far: its maiden flight was at NARAM-43 in Geneseo, on an H123-SW which seems like an ideal motor for this rocket. I flew it again at the October NIRA launch. The smallest motor LOC recommends for the kit was the F62 reload, which I didn't have, but I did have an F62-4 Dark Star, which has a bit more total impulse, and did a fine job on this rather large rocket. OK, a -3 would have been even better. An F50-4 expendable should also work OK. I certainly wouldn't try anything smaller or with less average thrust than the F50 for this rocket. At the upper end, the largest motor LOC recommends is an I161. With nothing but surface mount for the ring fins, I'd be careful to not over do the power in this rocket. While the motor mount might hold a bigger reload, I wouldn't advise it.

This is an easy to build and fun to fly rocket. With a high thrust F, it can be flown on moderate size ModRoc fields under FAR 101.22 notification, and it's certainly usable for your L1 certification flight. It's certainly a must have for fans of tube finned rockets.

Now, where's that 8" Sonotube?

Large rail buttons now available!
Press Release on r.m.r. 11/27/2001

Okay guys... you asked for it... and now they're here. railbuttons.com is now carrying Delrin buttons specifically designed for the 80/20 "1515" extrusion. The "1515" is a 1.5" x 1.5" 4-channel 5/16"-slot rail, capable of supporting even the largest projects.

The best news? The larger buttons are only $1 a piece. (If you do the math, that's still cheaper than the small buttons offered by others.) These are one-piece buttons and are currently only available in black.

As always I still carry nylon and Delrin buttons compatible with the most popular 1/4"-slot rails for 25 cents and 50 cents each, respectively. The 3-piece nylon buttons are available in 6 mix-n-match colors and the Delrin buttons are available in black and white.

I thank you for your continued support of what started out as a "little project". My goal isn't to make a living off of this, but rather to make rail guidance affordable to the masses.

Thanx!
Matt Stum, NAR#73280 L2
http://www.railbuttons.com - Making rail guidance affordable....

Spearchutes Plus from Giant Leap Rocketry
ROL Newswire Press Release on r.m.r. 11/26/2001

(ROL Newswire) -- Giant Leap Rocketry, Inc. releases a line of true hemispherical panel chutes. These are higher quality and lower cost than Giant Leap's prior line of panel chutes. They come in alternating flourescent orange and white panels and incorporate 400 lbs test shroud lines attached with a high density stitch. Each includes a 1000 lbs. swivel already attached to the shroud lines. "These have never been available to the public" points out Ed Shihadeh of Giant Leap Rocketry. He adds, "panel chutes have always been kind of pricey. The idea here was to create a multi-panel parachute of super high quality, but at prices close to those of some single piece chutes out there. All chute come with their own nylon carrying case. "This is not a bunch of panels sewn together, but a high-drag, true hemispherical chute, right out of the textbooks" Ed says. The Spherachute PLUS+ is available only from Giant Leap Rocketry.

Giant Leap also offers a brand new line of single piece chutes made by Spherachutes. These are priced substantially lower than their prior line of single piece chutes. Dealer inquiries are welcome.

All parachutes can be seen under the "recovery" section at Giant Leap's webpage at: www.giantleaprocketry.com

Build the Skywriter-100

First drill a hole in the center of the crayon plastic aft closure to fit the motor mount tube (MMT). A 1 1/4" hole saw does a good job for this. Enlarge 2 of the holes in opposite sides of the 7 cm ring to hold the 6-32 T-nuts. With a hammer gently tap them in place (they will stick out a bit on the bottom of the ring), then remove them. Fill their threads with grease to prevent glue from getting inside. Epoxy them in place filleting over the top of each T-nut with epoxy. Put the #6 fender washers over the other two holes and secure them with some CA wicked under each ring. Fillet over the outside edges with a bit of epoxy. Allow to dry. Using this ring as a template, drill 4 matching holes in the bottom of the plastic aft closure around the MMT hole.

Mark the MMT 1 cm from each end. Mark the TOP end of the MMT as you would for 4 fins. Mark each of those four lines at 4, 6, 8, 10, and 12 cm from the forward end. Drill 1/4" holes at each of the 20 marked locations forming 4 lines of vent holes near the top of the tube. Wick thin CA into the edges of the vent holes and when it has hardened sand away any fuzz on the inside or outside of the tube, or in the holes. A rat tail file is handy for cleaning out the holes.

Glue the 7 cm ring 1 cm from the bottom of the MMT. The T-nuts and washers should be facing forward. Allow to dry. Fit the aft end of the MMT through the hole in the plastic and flush with the bottom of the plastic aft closure. Glue the solid 9.55 cm ring to the MMT at the top of the plastic aft closure. Glue the 9.55 cm ring with the baffle holes 1 cm from the top end of the MMT so that the baffle ring holes are BETWEEN the MMT vent holes. Glue the plug just inside the forward end of the motor mount tube using a liberal puddle of epoxy, invert, and allow it to spread out over the plug as it dries, forming an epoxy seal inside the MMT. Fillet all the rings and plug with epoxy. Allow to dry.

Next assemble the nose cone. Cover the coin slot from the inside with some matching electrical tape and then a piece of duct tape. Sand or carve off the rings molded into the nose cone until the cone is snug but not tight into the tube. Take the bulkhead disk with the small hole and bevel the exposed side at a 45 degree angle. Place one fender washer on the eye bolt and insert the bolt through the exposed side of the disk. Place the other fender washer over the bolt on the front of the disk, then one of the hex nuts. Tighten snugly down. Then jamb the second hex nut into the first one. A drop of CA on the nuts will insure they never loosen.

Nosecone Bulkhead
(Jeff Pleimling photo)

The disk is held into the nose cone with hot melt glue. Almost nothing else will stick to this plastic. Practice this without the glue before doing it for real. You have to work quickly. Be careful, as hot melt glue is HOT! Deform the cone slightly by squeezing opposite sides enough to slip the disk into the cone. Holding the disk by the eye bolt, push it in the cone, and allow the plastic to return to its original shape. Pull the ring into place at the base of the cone and be sure it seats solidly. Bevel more if necessary. With a pencil mark around the disk so you know where to put the glue. Now remove the disk the same way you inserted it.

Quickly run a bead of hot melt glue around the circumference of the disk outside the pencil line. Reinstall the disk inside the cone and pull firmly to seat it against the cone base. Run a fillet of hot melt glue against the disk where it meets the plastic. Allow to cool.

Cut the fins from Lexan window glazing. Leave the paper protector on the fins until you are done with all construction to prevent scratching. A fine tooth blade on a band saw or jig saw is the best way I've found to cut this stuff. Once cut the edges can be sanded straight and rounded with a belt sander or palm sander. Don't force the plastic or it will gum up. Scrape any gum off with a modeling knife.

Cut the 3 aluminum angles and backing strips to length. Drill 3 matching 1/8" holes in each per the plan. Mark the aft closure as for a normal 3 finned rocket and mark hole locations using one of the angle strips. One hole will be through the lip. Drill matching holes in the plastic aft closure. It is also necessary to notch the aft closure lip to recess the backing strip flat inside the closure. On the other side of each angle drill the 3 holes for the 4-40 screws with a #43 (3/32 is close) bit. Note that these are offset from the holes on the first side, and not symmetric. Drill matching #43 holes in the fin root edge. Tape the #43 holes with a 4-40 tap.

Now we start assembling the rocket, from the bottom up. Pop rivet the aluminum angles to the aft closure as follows. Run a single pop rivet through the bottom hole in the aluminum angle, then through the bottom hole in the closure. Install the backing strip over the rivet on the inside. Align the two metal pieces, then tighten the rivet with the tool until it "pop"s. Now do the same with the center rivet. Do NOT do the top rivet yet. Continue with the other two aluminum angles and plates. Next pop rivet the 7 cm MMT base plate into the closure, aligning the holes and the T-nuts with the holes drilled in the closure earlier. Install 2 pop rivets and fasten.

Epoxy the crayon tube onto the motor mount. First test fit the tube to the closure / MMT assembly. It takes some maneuvering to get the tube past the aluminum parts. Remove and put a ring of epoxy inside the tube, just below where the baffle ring will sit. Install the MMT half way, then put another ring of epoxy in the tube for the center ring. Now slide the tube in place. When the epoxy has set, drill the third set of holes in the aluminum angles through the cardboard, and install the third set of pop rivets in each angle and backing plate.

Fold the Kevlar cord in half, and tie a figure eight knot about 5 cm from the ends. Tie two additional figure eight knots as close to each end as possible. Tape this shock cord anchor through its center as far inside the tube as you can reach. Cover the two ends and all three knots and the space between the knots with a big blob of epoxy. Allow to dry, then remove the tape.

Take the elastic shock cord and fold each end over about 15 cm. Tie a figure eight knot in each end forming a loop at each end. Slip one end through the Kevlar loop, then through the loop at the other end of the elastic, and pull tight. It should snug itself against the Kevlar. Attach the other end of the loop and the parachute to the eye bolt with the quik-link.

Scrape or sand a spot on the tube for the launch lug, clear of the aluminum angles, starting about 10 cm forward of the angle end, extending another 10cm forward. Epoxy the metal launch lug to that spot and allow it to dry.

Finally make the Kaplow Klips (refer to the October 1996 Sport Rocketry article). Carefully drill an 11/64" hole at the end of each of the brass strips. Install the motor or reload casing you intend to use and bend the brass strips to go to the MMT, down, across, and in the case of a reload up into the closure, and cut to length.

You can either install the fins now, or at the flying field. Removable fins make the model easier to store and carry to remote launches. Using an Allen wrench, screw 3 4-40 cap screws through each Lexan fin and into the aluminum angle. Get them snug but do not over tighten and strip the aluminum.

Install the motor, and use the 6-32 cap screws to install the two Kaplow Klips to retain the motor. Loosely pack the chute and install the nose cone. No wadding is necessary.

Fin/body tube joint
(Jeff Pleimling photo)

Skywriter-100

Convert a crayon bank into an attention-getting rocket

Parts List:

A. 1 Ralphco Crayon bank 10 cm diameter x 90 cm tall (can be found at many toy and department stores)

B. 1 centering ring 9.55 cm OD x 30 mm ID x 1/8 lite ply
C. 1 centering ring 9.55 cm OD x 30 mm ID x 1/8 lite ply with 4 15 mm holes for baffle
D. 1 centering ring 9.0 cm OD x 4 mm ID x 1/8 lite ply for nose cone bulkhead
E. 1 centering ring 7.0 cm OD x 30 mm ID x 1/8 lite ply motor retention mounting plate with 4 1/8" holes for bolts.
F. 1 plug 29 mm OD x 1/8 lite ply (I cut my centering rings on a drill press using a circle cutter, but you can now order them from BMS.)

G. 1 29 mm MMT 30 cm long

H. 2 6-32 T-nuts (also called blind nuts)
I. 2 6-32 cap screws
J. 2 #6 fender washers (fender washers are large OD washers)
K. 2 1/4" x .025 x 2" brass strips

L. 1 10-32 (3/16") eye bolt
M. 2 10-32 hex nuts
N. 2 #10 fender washers

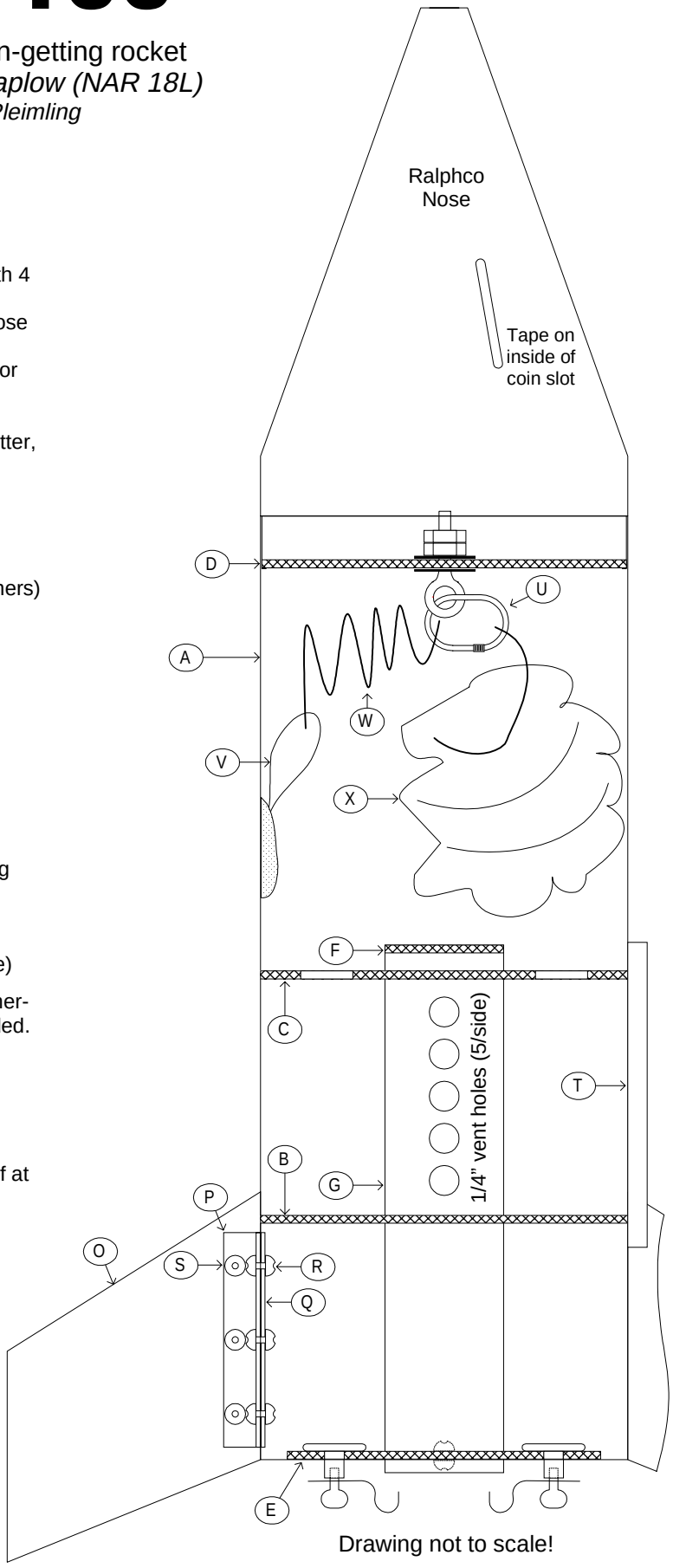
O. 1 sheet of 3/32 Lexan window glazing for fins
P. 3 aluminum angle 1/2" x 1/2" x 9 cm
Q. 3 aluminum strips 1/2" x 1/16" x 9 cm
R. 11 pop rivets 1/8" medium length aluminum
S. 9 4-40 cap screws

T. 1 5/16 OD x 10 cm aluminum or brass tube for launch lug
U. 1 1/8" Quik Link
V. 1 30 cm 300# Kevlar cord
W. 1 3/4"x9' elastic
X. 1 36" nylon parachute (match the crayon color if possible)

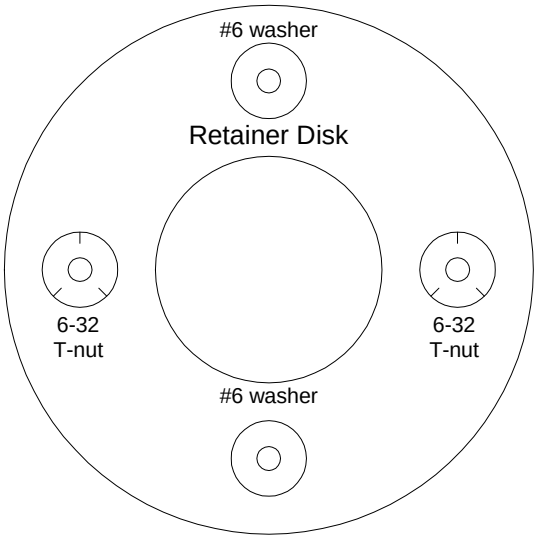
Use 30 minute epoxy for assembly except where directed otherwise. Thin CA, hot melt glue, and pop rivets will also be needed.

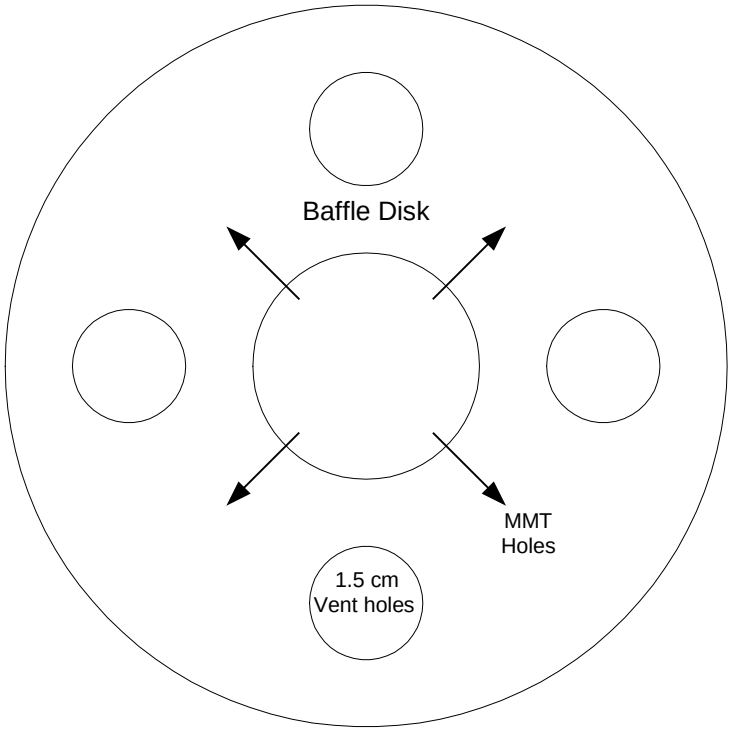
Specifications:

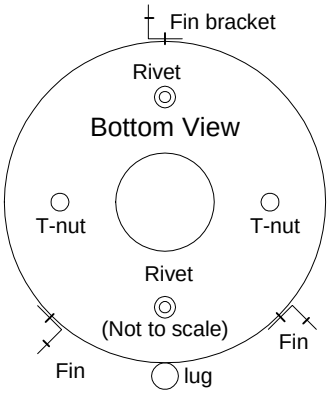
Length: 90 cm
Width: 10 cm
Weight: 800 grams (approximate)
Recommended Motors: almost any 29mm F, G, or H motor of at least 32N average thrust. It has flown on an F40, G33 (marginal due to weight), G64-4 and a H97.
CP: 66 cm from nose, 12 cm forward of the fin leading edge.

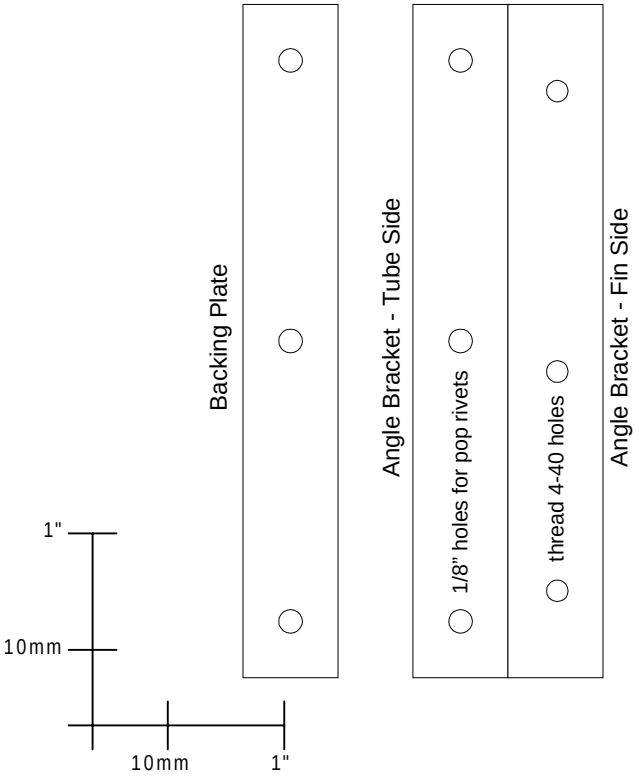


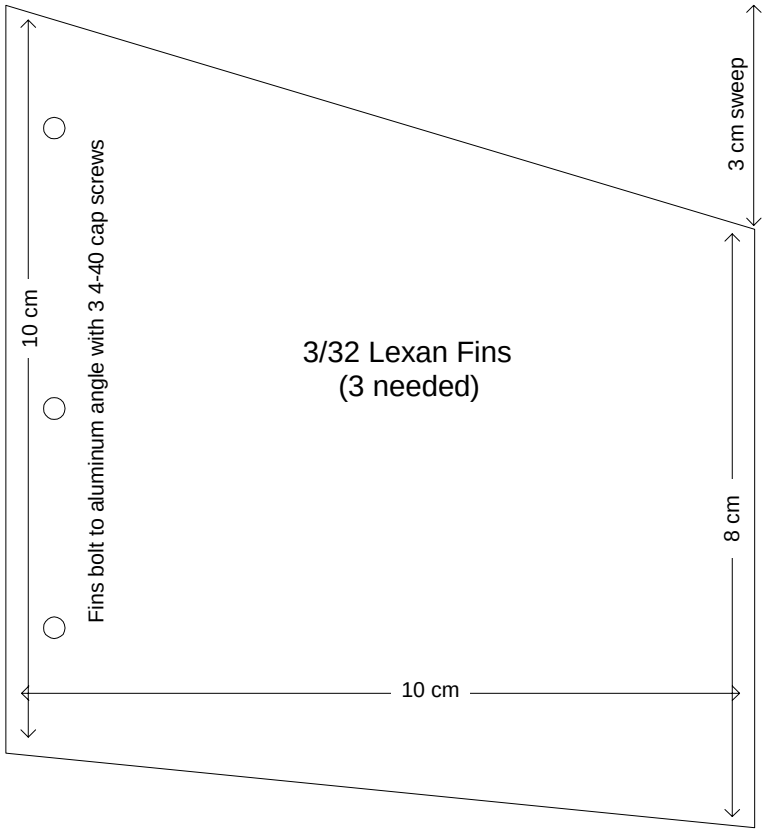
Drawing not to scale!


#6 washer
Retainer Disk
6-32
T-nut
6-32
T-nut
#6 washer


Baffle Disk
MMT
Holes
1.5 cm
Vent holes


Fin bracket
Rivet
Bottom View
T-nut
T-nut
Rivet
(Not to scale)
Fin
Fin
lug


Backing Plate
Angle Bracket - Tube Side
1/8" holes for pop rivets
thread 4-40 holes
Angle Bracket - Fin Side
1"
10mm
10mm
1"


3 cm sweep
10 cm
Fins bolt to aluminum angle with 3 4-40 cap screws
3/32 Lexan Fins
(3 needed)
8 cm
10 cm

Space Launch Report for September-October 2001
by Tim Johnson

On September 11, the U.S.-Russian International Space Station (ISS) crew could see smoke from the burning World Trade Center staining the atmosphere for hundreds of miles across the Atlantic. Commercial imaging satellites saw it too. In fact, space-based observation seemed necessary to reveal the scale of the devastation.

The attacks and the resulting war will almost certainly affect future commercial, civil, and military space planning. They had little affect on space launch activity during September and October, however, when 12 space launches took place from seven sites in five countries.

A Taurus launch from Vandenberg AFB failed, but Atlas IIAS, Delta II, and Titan IV boosters flew successfully from that California base. Another Atlas IIAS lifted off from Cape Canaveral. From Baikonur, a Proton and two Soyuz rockets flew. An Ariane 4 rose from Kourou, a Molniya-M launched from Plestesk, and a PSLV lifted off from India. In Alaska, a Lockheed Martin Athena 1 inaugurated a new space launch site at Kodiak. It may have been the last Athena, however.

ISS Missions
Two Soyuz-U launches from Baikonur LC 1 supported ISS. The first, on September 14, added the 3,900 kg Pirs docking compartment to the station during mission ISS-4R. Pirs was steered by a Soyuz propulsion module that undocked and deorbited itself after completing its mission.

Soyuz TM-33 lifted off from LC 1 on October 21 on a Soyuz taxi mission. Victor Afanasyev, Konstantin Kozeev, and ESA's Claudie Haignere joined the Expedition 3 crew; Frank Culbertson, Vladimir Dezhurov, and Mikhail Tyurin; on ISS two days later. After eight days, the taxi crew returned to earth aboard the Soyuz TM-32 spacecraft.

Soyuz TM-33 launch to ISS (CNES photo)

Taurus Failure
A four-stage Orbital Sciences Taurus 2110, serial T6, failed to reach orbit after launch from Vandenberg SLC 576-E on September 21. Orbview-4, a 368 kg commercial imaging satellite, and QuikTOMS, a NASA ozone mapper, were lost after the Orion 50S second stage flew out of control at staging. The rocket recovered and continued into space, but fell short of orbital velocity. It was the first Taurus failure in six flights. Taurus 2110 uses a Castor 120 first stage, a commercial variant of the MX-ICBM first stage, topped by three Pegasus Orion solid rocket motors. The failure looked much like the still- unexplained X-43A Pegasus booster failure in June that resulted in an Orion 50S stage flying out of control.

Failed Taurus T6 upper stages prior to stacking atop Castor 120 first stage. (NASA photo)

Commercial Missions
There were only two successful commercial space launches during September-October. Delta 288, a 2.5 stage 7320-10 model, launched 980 kg QuickBird 2 into sun synchronous low earth orbit (LEO) from Vandenberg SLC-2W on October 18. QuickBird 2 replaced a sister DigitalGlobe imaging satellite lost in a November 2000 Kosmos-3M launch failure. Arianespace launched the last Ariane 44P variant on Mission 144 from Kourou ELA2 on September 25. The rocket put Eutelsat's 3,150 kg Atlantic Bird 2 communication satellite (comsat) into geosynchronous transfer orbit (GTO).

Milsat Season
Seven of the September-October launches carried defense payloads. Lockheed Martin's Atlas IIAS flew twice for International Launch Services on secret U.S. National Reconnaissance Office (NRO) missions. AC-160 lifted off from Vandenberg SLC-3E on September 8 with what may have been a cluster of signals intelligence (sigint) spacecraft bound for LEO. The 4,725 kg payload was the heaviest ever for Atlas. AC- 162 flew from Cape Canaveral SLC 36B on October 11 with a sigint or data relay satellite. The two-burn Centaur mission, dubbed "Aquila", boosted the payload to GTO.

Titan 404B-34 "Charlotte", another Lockheed Martin product, thundered into space from Vandenberg SLC-4E on October 5. The $350 million, 91 meter tall rocket boosted a 16,500 kg NRO imaging satellite into LEO.

Two launches put Russian military comsats into orbit. A Krunichev Proton-K/DM-2 boosted a 2,000 kg Globus, or Raduga 1, into geosynchronous orbit (GEO) from Baikonur on October 6. On October 25, a 3.5 stage TsSKB Progress Molniya-M rocket propelled a 1,900 kg Molniya-3 into a high-inclination 12 hour elliptical orbit from Plestesk LC43/3.

What may have been the last Lockheed Martin Athena launch vehicle put three experimental U. S. defense satellites and a small NASA science satellite into LEO from Kodiak Launch Complex, Alaska on September 29. The three-stage Athena 1, serial number LM-01, provided the fifth Athena success in seven flights since the initial 1995 launch. After performing Alaska's first space launch, the launch team was disbanded because Athena has no future missions assigned.

India launched TES, a 1,100 kg experimental defense imaging satellite, on Oct 22 aboard PSLV-C3 from Sriharikota. The four stage launcher put its prime payload and two small piggyback satellites into sun synchronous LEO.

Launch Vehicle News
Aerojet test fired an Atlas V solid booster for the first time in early September. The 177,000 kgf thrust, 20.4 meter rocket is the world's largest monolithic solid rocket motor.

*(**Space Launch Report** continued on page 9)*

The last? Athena 1 launch, the first space launch from Kodiak, Alaska. (Lockheed Martin photo)

Halfway to Anywhere
Book Reviewed by Mark Soppet

"Get to low earth orbit and you're halfway to anywhere in the solar system." This quote from Robert A. Heinlein serves as the basis for *Halfway to Anywhere*, one of the last books by model rocketry founder G. Harry Stine.

When McDonnell Douglas first flew their DC-X reusable rocket prototype, G. Harry Stine came out as one of the idea' staunch supporters. He elaborates on this idea in *Halfway to Anywhere*, explaining the long history of single-stage to orbit rockets and why he enthusiastically supports their continued development.

The first half of the book deals with the long and largely untold story of how single stage rockets were developed. The struggles of Phillip Bono to build an SSTO are documented for the first time since the 1960s. Although his work was largely ignored, Max Hunter and many other dedicated engineers worked with the concept until it materialized as the Mc Donnell Douglas Delta Clipper.

The second half deals with the political struggles that would kill off the orbital Delta Clipper. The shady goings on in Washington and elsewhere are explained in a way that most readers can understand. This section ends with the announcement that Lockheed Martin was chosen to build the X-33, a suborbital demonstrator for an SSTO.

Halfway to Anywhere: Achieving America's Destiny in Space
Author: G. Harry Stine
Format: Trade Paperback
Published by: M. Evans & Co.
Publication Date: April 1998
ISBN: 0-87131-847-4
List Price: $14.95
(1996 hardcover edition is out of print)

The last chapters are perhaps the most enlightening of the book. Mr. Stine takes the opportunity to address the brave new frontiers that are opened with inexpensive, private access to space. High-speed transport of people and goods becomes a reality. Space launch costs are dramatically reduced. And for the first time, people other than Dennis Tito can take a space vacation.

In the five years since *Halfway to Anywhere* was written, a lot has changed. G. Harry Stine and Max Hunter have both passed on. The DC-X, which so impressed Stine, flopped over and burned long ago. Lockheed has failed to deliver on its promises of revolutionary space travel with the X-33, and NASA withdrew all funding. But the book is made even more relevant by the last fact. Stine predicted that Lockheed might try building their X-33 expecting it to fail, delaying the SSTO movement, and then declaring that SSTO is technically impossible. Stine argues that SSTO is technically possible. The only problem with this book, in my opinion, is that Stine doesn't delve into the mathematics that prove that SSTO is possible.

Routine access to outer space will always be the dream of noble, forward-thinking people. It's an idea whose time has come. The ideas that Stine presents in *Halfway to Anywhere* will serve as our light in the darkness as we become a space-faring people. If future space is your interest, you must read this book.

Highly Recommended.

*(**Space Launch Report** continued from page 8)*
The first Atlas V booster, denoted AV-001, was erected on the mobile launch platform in the SLC 41 Vertical Integration Building (VIB) at Cape Canaveral on October 11. The AV-001 Centaur was erected the following day to allow testing of the 58 meter tall 400-series booster.

The first Delta IV flight CBC stage arrived at the Cape in early October aboard Delta Mariner.

NASA director Daniel Goldin announced plans to retire just as elements of his "Better, Cheaper, Faster" program scored successes. The Deep Space 1 probe flew by and returned remarkable images of comet Borrelly on September 25. Mars Odyssey entered Martian orbit on October 24. Delta 2 rockets launched the spacecraft for NASA in 1998 and 2001, respectively.

The launch of PSLV-C3 from Sriharikota, India.
(India Space Research Organization photo)

Park Forest Rocket Launch and R/C show
Rick Gaff Photos

These photos are from the Park Forest Rocket Launch and R/C show that's put on every year by the Suburban Aeroclub of Chicago. John Kallend (pictured below left with a rocket) is a member of the Aeroclub and NIRA invites NIRA members to attend and demonstrate some of their rockets (see the March/April 2001 Leading Edge for details).
This year's event was on July 22nd and although we didn't get a launch report we do have these excellent photos. See you next year!

Confused Stages – Stage 22
by Jonathan Charbonneau

Engine mount assembly is usually the first step in the construction of a rocket. While the basic engine mount is quite simple to construct, it is extremely important that it be constructed well. "How well?" you ask. Very well. The engine mount is a vital part of a rocket. It can be considered to be the rocket's intestines. A person cannot perform well whe he or she is having problems with his or her intestines. Likewise, a rocket won't fly well if its engine mount is poorly made.

With kits, follow the directions carefully every time. Do **not** assume how the engine mount will be constructed because not all engine mounts are the same. Some have extra long engine tubes (e.g. Big Bertha); some are clustered (e.g. LOC's Viper 3); some have their rear rings recessed one or more inches to allow for other parts (e.g. display nozzles or booster stages). More and more rockets are equipped with thru-the-wall fins. On these, it is extremely important to follow the instructions steps in order so you don't "paint yourself into a corner."[1]

When building a rocket from scratch, give it the largest engine mount it can safely have. You can always use an adapter to fit a small engine in a large engine mount but you cannot ever fit a large engine in a small engine mount.

Engine mount adapters must also be built well as a poorly built adapter is just as bad as a poorly built engine mount.

Notes: 1. Peter Always, "Art of Scale Model Rocketry" page 55

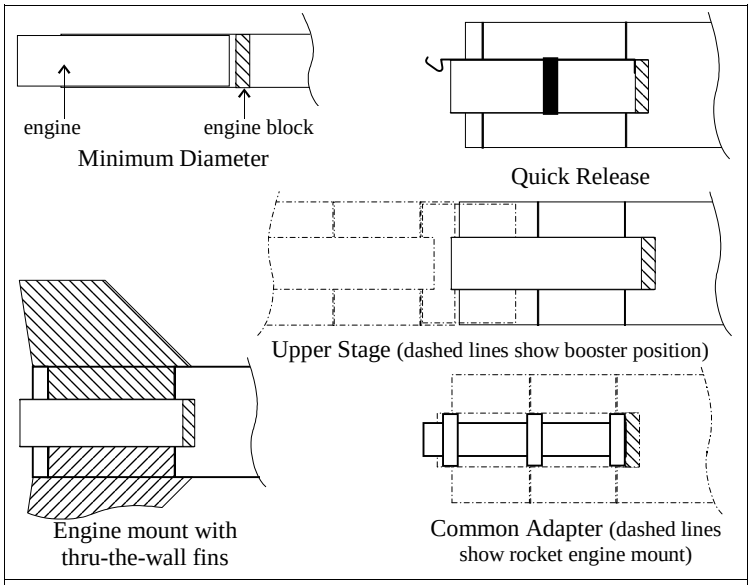


Figure 1: Some representative engine mounts

The Mad Scientists' Club
Book Reviewed by Jeff Pleimling

I first read this book over thirty years ago - it was one of the books that sparked both my love of reading and also my love of science and, through that, rocketry. Bertrand Brinley, interestingly enough, is also the author of *Rocket Manual for Amateurs* (published in 1960) that many people still reference when getting involved in amateur rocketry.

The Mad Scientists' Club is a set of short stories about a group of seven intelligent, inquisitive boys who use their brains to get themselves into (and out of) adventures. It is obviously a book written in the 1960's - there are very few female characters andnone of them are important to the stories.

Also, even though they do get into trouble, there is no mention of zero tolerance policies or even getting suspended from school. Today, the members of the Mad Scientists' Club would probably be expelled from school or even taken to court.

These seven stories take them from spoofing their town with a 'Sea Monster' to finding a dinosaur egg and even a balloon race. Throughout the stories, they work together (mostly) as a team to achieve their goal and they also outwit Harman Muldoon - a former member of the club who was kicked out for conduct unbecoming of a scientist.

This is still an excellent book to get kids interested in reading and science. I've already read a couple of the stories to my kids and they love the stories (what kid doesn't like stories about other kids pulling the wool over adult eyes). I do have to stop and explain some of the early 1960's references to them (and also that there weren't video games or fruit snacks).

The Mad Scientists' Club
Author: Bertrand R. Brinley
Reading level: Ages 9-12
Format: Hardcover - 217 pages 40th edition
Published by: Purple House Press
Publication Date: October 3, 2001
ISBN: 1-93090-010-4
List Price: $17.95

The book is published by Purple House Press, a small printing company that is specializing in reprinting all of the favorite childrens books that are now out of print. If you have a childhood favorite that you haven't seen in a bookstore in a while, check out www.purplehousepress.com.

Response to the republishing of *The Mad Scientists' Club* has been so positive that Purple House Press is getting *The New Adventures of the Mad Scientists' Club* ready to be published in early 2002. This volume contains the last five short stories that Bertrand Brinley wrote about the Mad Scientists' Club. I can't wait!

Peter Olivola Garage Sale
By Bob Kaplow (NAR 18L)

Last night Peter Olivola conned me into picking up all his rocket stuff, as he's getting ready to move. If I knew how much stuff there was, I'd never have agreed to take it. Now I'm stuck with his headache, and need to liquidate it for him ASAP. No reasonable offer refused on anything!

Since the bucks for this go to Peter and not me, and I'll have to mail it to him, the rules are:

1. **Everything must go ASAP!!!**
2. **Checks Only**, made out to Peter Olivola. I don't take American Express OR cash! I might make exceptions and trade for AP!
3. **No Shipping**!!! You can pick the stuff up from me at home (Dundee, all in IL), at work (Downers Grove), at a NIRA meeting, or a NIRA launch (space permitting).
4. **No Reasonable Offer Refused**!!! I've only bounced one lowball offer so far. (Can't blame him for trying...) Based on offers to date, half the Magnum or other vendor current price is a reasonable offer for most of the stuff. Almost anything is reasonable for the built rockets.
5. First come, first served.
6. There is no rule #6
7. I already got first dibs on anything really good! In fact, I bought **way** too much of this junk. And some good stuff.
8. **Please get this stuff out of my garage!!!**

Those who have already "ordered" stuff, or those about to do so, please let me know if you will be at Watch the Grass Grow this Saturday 10/13 in Harvard, and/or at the regular NIRA launch 10/21 at Green Valley so I can bring the stuff with to the right place. And if you're interested in something but aren't sure, especially one of the "RTF" rockets, let me know and I'll bring them with so you can look at them.

The list is to big for the newsletter, access it at: www.pleimling.org/garagesale or contact me directly at BobKaplow@firsthealth.com

Welcome to the Club!

Todd Bavery, Terry Felesena and Linda Piva have all joined NIRA in the past few months. Welcome to the club!
If I somehow missed your name, please let me know!

Trustee Nominations Solicited
from www.nar.org (11/14/01)

In accordance with the by-laws, the NAR has annual elections to fill three of the nine board positions. The three positions to be voted on in July 2002 will be for three-year terms.

If you wish to run for the board, or know someone you feel is qualified and will accept, the NAR is soliciting nominations. If you nominate someone other than yourself, you must include a letter from the nominee indicating his or her acceptance.

Nominees themselves should provide a resume and statement no longer than 300 words to be published with the ballot material. Be sure to include your name, address, and NAR number on your resume. By NAR policy, Sport Rocketry magazine will not publish any campaign-related material, either paid or unpaid. All nomination material (letters and resumes) must be received no later than March 1, 2002 by the NAR secretary. Send to:

George Rachor, NAR Secretary
33380 NW Bagley Road
Hillsboro, OR 97124

Editor's Ranting and Ravings

Not a great name for a section, but this stuff isn't really news, just stuff youmight find interesting

Deadline for Next Issue - the deadline is the NIRA meeting in January. This is the normal deadline - at the meeting for the 'cover month.' If you're not done by then, let me know and I can work around it until you're finished.

The Leading Edge needs Articles - This should go without saying, but all of the articles for the Leading Edge are written by NIRA members. The newsletter needs technical articles, plans, kit reviews, **launch reports**, and whatever else **you** want to write about. There've been only a couple of launch reports in the past few issues even though we've had plenty of launches (club and youth group) and I'm sure some of you've attended non-NIRA launches that members would be interested in hearing about to know if they want to attend. If you have questions, or need help, please contact me! I'm always willing to help someone who doesn't know where to start or when to stop.

New Leading Edge Web Site - surf over to http://www.pleimling.org/le for the new home of the Leading Edge. Having the Leading Edge on a separate site from the rest of NIRA solves several problems including storage space and update times. As I'm writing this, NIRA's website doesn't point to this new location but it should be updated soon. It is open for business and contains PDF files of all the issues I've edited as well as NIRA flyers. I usually put the PDF for an issue up on the site the same day I mail out an issue and then I announce it on NIRA's email list.

NIRA's Email List - NIRA does have an email list where club information is sent out and where we talk about rockets. It's hosted on Yahoogroups and to join you can either send a blank email to nira-subscribe@yahoogroups.com or go to the list's site at http://groups.yahoo.com/group/nira

Photo Correction - Last issues article from Bob Kaplow on the International Model and Hobby Show had some photos mis-credited - all the ones that say 'Rick Gaff photo' should say 'Bob Kaplow photo.' Please, if you ever use the club camera, let me know which photos you take…

*(**Club News and Notes** continued from page 1)*

(warmer & drier) weather.

October Model of the Month contest –
Riley Montag - Estes Eliminator (Youth Winner)
Kevin Keehn – Ring Leader (Adult Winner)
Bob Kaplow – Loc Ultimate
Ken Goodwin – Estes Mercury Redstone

November Model of the Month contest –
Victoria House - Aerotech Aerospike (Youth Winner)
Bob Kaplow - Milk Bone (scratch) (Adult Winner)
Martin Schrader - Hydrogen Freighter (scratch)
Jonathan Charbonneau- Vaughn Brothers Extreme 38

---

*(**Winter Activities** continued from page 1)*

your favorite snacks and a rocket to build. This is the only building session planned for this year so don't miss it!

February - Adler Planetarium
1300 South Lake Shore Drive
Chicago, IL 60605
(312) 922-STAR
(312) 922-7827
http://www.adlerplanetarium.org

February 18th, 2002 - 10:00 to ?

Rather then filling up the winter with building sessions, NIRA's decided to go on another informal outing in February. More information about the outing will be in the next issue.

NAR Call for Agenda Items
from Mark Bundick, President

The NAR Board of Trustees will be meeting, February 1-3, 2002, in Baltimore, MD. Please let me know what topics you'd like us to spend time discussing. Anything submitted by NAR members will be put into the "Member Needs and Concerns" section of the agenda, and we always start the meeting with those first.

You can email Mark at president@nar.org.

NSL 2002 Announcement

GILBERT, AZ-The Superstition Spacemodeling Society (NAR section #506, TRA Prefecture #047) is proud to announce that it has won the bid to host the annual National Sport Launch (NSL) for 2002. The launch will be held over the Memorial Day weekend at the end of May 2002. The NSL is the National Association of Rocketry's launch with the emphasis lots of sport rocketry flying at all certified impulse levels.

NSL 2002 will be held close to Goodyear, Arizona a short drive from the Phoenix metropolitan area. The actual launch site is known locally as Rainbow Valley. The site is privately owned ranch land, and offers the rocketeer miles of relatively flat desert. Vegetation is minimal, and recoveries of even the highest flights are relatively easy. The FAA waiver SSS has traditionally operates under offers flying up to 7500' MSL (the site is at about 1200' ASL), with call-in windows up to 12,000' MSL! The SSS may also obtain a waiver for a night launch, which has been a tradition at some of our other regional events.

The launch site is located close to a number of amenities varying in price and location. Most of these are located in Goodyear, only a short drive from the launch area. There will be camping at the launch site, and RV's are welcome. Phoenix Sky Harbor airport is also close by, along with all of the conveniences and amenities one could expect from the nations' sixth largest city. There's even a casino within easy driving distance from Goodyear.

Best of all, the SSS offers a lot of experience with big launches. We've hosted the NSL in 1993, and have co-hosted a past NARAM. More recently, SSS has hosted the G. Harry Stine regional launch as a muli-day event.

SSS has also made important innovations in range management. Within the last year, the SSS has implemented a modification of the famous 'Misfire Alley' that has reduced launch cycle times to some of the shortest to be found **anywhere** in the country! Developed by NAR Section Advisor Wally Etzell, this new system increases efficiency while at the same time decreasing distraction to the range crew. The net result is a safer range that offers rocketeers a chance to maximize their flying time!

More information will become available as arrangements are made. In the meantime, please direct inquires to the launch director, Peter Riddell, at riddell@prodigy.net. You can also call at (480) 497-1960.

For Sale: Aerotech Mantis Pad and Interlok Launch Controller. New. $60.00 or best offer for the set. This is a great deal – it normally costs $80.00 for more just for the pad alone. See Jonathan "Superman" Charbonneau at a launch or meeting for more information.

Some random photos from the September 16th Club Launch.
(Rick Gaff photos)

THE LEADING EDGE

Jeff Pleimling, Editor
245 Superior Circle
Bartlett, IL 60103-2029

This may be your last newsletter! Check your label for the expiration date.
If it says Membership Expired or Membership Expiring this will be your last newsletter!