THE SENTINEL

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CMASS Hosts NEMROC 2006

Fred from Excelsior Rocketry sold custom decals in the NEMROC cafeteria.

For the second year in a row, CMASS hosted the New England Model Rocketry Convention (NEMROC) over Columbus Day weekend in 2006. The weekend started with a conference on Saturday, with seminars and build sessions held at the Amesbury Middle School in Amesbury, MA. The Saturday conference sessions were followed on Sunday with a launch on a beautiful fall day at Woodsom Farm in Amesbury.

There were about 50 people attending the various educational sessions at the conference-broken down into 45 minute lectures. There were also two make-it/take-it build sessions sponsored by Jim Flis of Fliskits, with a choice of either the Thing-a-ma-jug or Doo-hickey rockets. There were also two vendors happy to talk rockets and sell their products – Fliskits and Fred Talasco from Excelsior Rocketry in Albany. Fred's ALPS printer was churning out custom decals all day long.

The first day of NEMROC finished with a raffle in the cafeteria, with a large assortment of prizes donated by vendors and CMASS members.

NEMROC for 2007 is already scheduled for Columbus Day weekend – October 6th for the conference and October 7th for the launch. Be sure to plan it in your schedule – it is a great opportunity to learn, share, and talk rockets.

Special thanks to CMASS Member Steve Michaels for his summaries of the NEMROC sessions that he attended - all reports are from Steve unless otherwise noted. Read on to learn more.

The Good Old Days and Pearl River

Session by Dick Nelson

From 1971 to 1991, Dick Nelson ran a Model Rocket Conference at the Middle School at Pearl River in New York. Launches were held in the school yard. About 300 to 400 people attended this conference at a time, with attendees usually arriving from as far south as Saint Louis and as far west as beyond the Mississippi River. This conference received coverage in the NAR journal and was attended by CMASS members during the late 1980's. Some of us CMASS folks would pile into Chris Tavares' (the founder of CMASS) van and ride down for the weekend event.

For his session, Dick brought along a photo album and full color posters of photos taken at Pearl River conferences. Readily recognizable in one of the posters was our own Jim Flis, smiling for

the camera and holding an upscale of an Estes Camroc with a Delta rocket.

Other items from the conference that Dick brought along included promotional items such as bumper stickers, mugs and drinking glass coasters printed with Pearl River promo information, and the base of a Styrofoam model rocket that once had 240 Styrofoam cups stacked on it. On the base were one remaining large fin and the engine mounts for the 3 F engines that were used to launch the model. This rocket was shown on the 1980's PBS television show "3-2-1 Contact". This was not the only time that Dick's Pearl River model rocket activities received television time, "Good Morning America" once had a crew present there for ten hours, for a total of eight minutes of broadcast time.

As a teacher at the Pearl River Middle School, Dick was able to get the school building at no cost to host the annual event. There was a time when one new administrator tried to get Dick to pay for use of the school, but Dick was able to maintain the no cost status.

Dick mentioned that much of the help to run the event came from came his students. Students designed promotional materials and other material as needed over the years. Dick acknowledged the efforts of his student assistant George Idiart, who was especially helpful to him.

The Pearl River Model Rocket Conferences ended when Dick Nelson retired from teaching in 1991, but the legacy of the conference's 20 year long contribution to the hobby has been well documented in print and on television.

Simple Tools and Techniques

Session by Glen Avalear

Glen started by saying he had attended a model rocket finishing session at one of the earlier NEMROCs. As someone who is directly involved with the tool design industry himself, he provided some insights as how we can use simple tools and everyday objects to build our model rockets.

Among some of the tips Glen provided are:

- Of sandpaper types, wet or dry sandpaper is the best to use.
- Place a cotton swab stick in a launch lug to hold the lug in place while cutting the lug to size. Use a modeling knife to cut right thru both the lug and the stick at the same time. The stick/cotton also provides an internal support base for the lug so that the knife blade does not crush the lug as you are pushing down on it.
- The fine blue masking tape works well for model rocket paint masking applications.
- Nail filers are handy for rounding fins.
- A scalpel can be used to locate engine blocks in place.
- Use 400 or 600 grit sanding paper to smooth the model prior to applying spray primer.
- Use a sandable primer and sand for a smooth finish before spraying on the paint coats.
- For clean, smooth fillet joints after initial gluing of fins onto body tubes. Use five-minute epoxy, as once it is dry, it does not flex under pressure or heat as much as white glue does.
- Keep rubbing alcohol handy when using epoxy.
- Mix epoxy per instructions on package.
- Smoothly run a bead of five-minute epoxy along the fin & body tube edge.
- Dip your finger in the alcohol and run it across the bead of wet epoxy to get a smooth bead.
- Allow the epoxy to dry. This will provide a smooth fillet of epoxy on the joint.

Mission Driven Design Approaches

Session by Len Fehskens

This session was appropriate for anyone who is involved with, at any level:

- The design and engineering process of any product.
- The design of any scientific experiment or science fair project.
- The design of mission specific model rockets. As sport models must be stable & safe, they too fall in this category.

Len spoke of constants and variables that designers must deal with. Constants are what we can control; variables are what we cannot control, such as wind velocity. Even some things that we may consider to be constants, such as launch rod angle, may not be as constant as we may think. We can begin to identify the relationships between constants and variables, and sometimes define these in an equation. In those cases where we cannot develop an equation, we can specify a qualitative correlation.

Computer simulations, while helpful, do not always take into account everything that can occur, or has already occurred.

The design process is not always Step # 1, Step # 2, Step #3, but it is instead iterative. Len said "In theory, theory and practice are the same. In practice, they are not." Some of us may already all know this as, "Back to the drawing board".

Len brought up other terms that are useful in the design process, such as:

- Sensitivity Analysis to examine what impact changes will have, or "what changes what".
- Characterization, which is doing something over and over to see if the results truly are repeatable, and to identify and minimize cause for variation.
- Robustness versus Repairability, a tradeoff between a solidly built model and a more modular, repairable one.
- Proof of Concept, where a scale modeler might build a prototype to test flight worthiness of a design prior to finalizing details on a finished model.

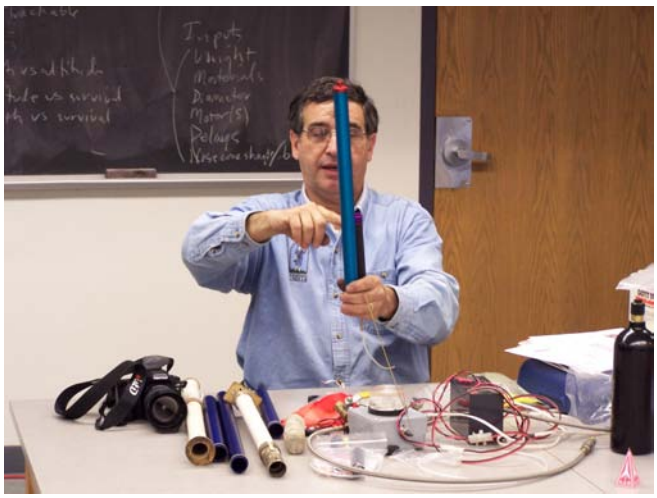
Len asked the class attendees for an example of a model rocket mission they would like to accomplish, and "to win G Super Roc competition" was an example given to him. Len then began to break down the mission within the parameters of what a G Super Roc competition design would involve. Model specifics such as size, power, desired altitude, forces applied, construction and so on were taken into consideration.

Hybrids and their Launch Systems

Session by Bill Spadafora

Bill gave a show and tell overview of the basic equipment used to store, prep, transport and launch hybrid rockets. Hybrids use two elements as propellants, nitrous oxide and a solid. The nitrous oxide is forced through the inside of the solid, a tube of solid fuel that rests inside the metal case of the engine. The nitrous oxide, breaking down, is what provides the energy for propulsion. At the end of the flight much of the solid element still remains. As is the case with solid reloads, one must disassemble and clean the engine case after each flight. The nitrous oxide used here is not the medical grade gas, as it contains sulfur dioxide.

Six companies presently manufacture hybrid rockets, and the hybrid rocket hobby is not currently regulated. Currently the ranges of power available are G, H and I categories.



Bill Spadafora discusses hybrid high-power rocket motors.

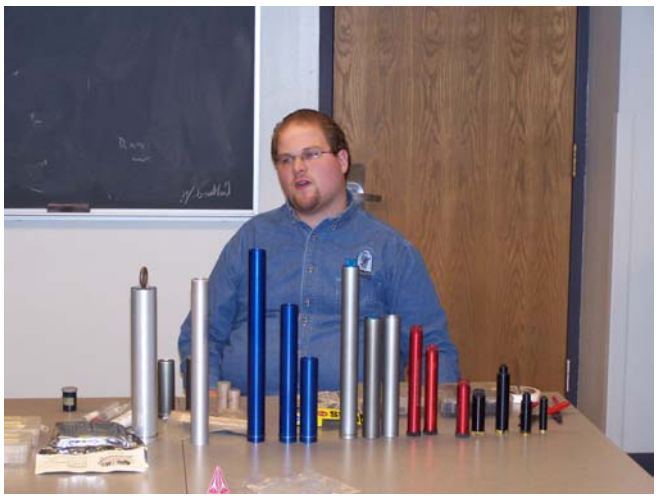
Bill also discussed ignition of hybrids, the role of temperature and pressure, and he pointed out some of the basic differences between solids and hybrids. For example, the center of gravity shifts differently during flight in a hybrid than it does in a solid. Also, timers and altimeters are needed to deploy recovery systems, as these engines do not deploy the recovery systems in the same manner that solid rocket engines do.

High Power APCP Motors and Rockets

Session by Doug Gardei

Doug began by providing an overview of the history of reloadable solid hobby rocket motors. The first commercially available reloadable solid hobby rocket motors were the low thrust Jetex engines, used to propel model airplanes during the 1950's. The first reloadable solid model rocket engines as we know them were introduced by AeroTech. Earlier reloadables covered ranges of B thru M category engines. The reloadable B and C categories are now discontinued.

Doug showed samples of various reloadable engines, and he demonstrated how to prepare, clean and load the engines. The advantages and disadvantages of the different brands of reloads were shown, and common user errors were discussed. Also, methods of trimming time delays to the custom needs of the flyer were demonstrated. By allowing the hobbyist to trim delays to their own specifications, the manufacturers benefit by not having to certify different engines with different delay times.



Doug Gardei during his discussion of reloadable rocket motors.

Precautions to prevent issues of contamination, thermal cycling and component fit were shown. With the proper inspection and assembly of reloadable components, the hobbyist can perform comprehensive quality control and increase the reliability of engine performance.

Presentation from LAUNCH Magazine

Session by Mark Mayfield

Mark Mayfield has been in the publishing business for about 30 years. He has worked for publication companies such as Hurst and Time, he worked on House Beautiful magazine, and he served as part of the start up team for USA TODAY. Today he is co-founder and president of MM Publishing Incorporated, as well as Editor in Chief of LAUNCH Magazine. At this presentation he gave an overview of how he started this new hobby rocketry magazine. He distributed copies of the recently published first issue and he gave a slide show viewing of the second issue, which is now at the presses.

Mark had been thinking of publishing a hobby rocketry magazine for about twenty years, and he felt that there is now a market for it as today there is much going on in the space industry that was not going on years ago. Such things include the non-government excursions into space by way of the X Prize flights and other commercially planned space vehicles. It took about eight months from his decision to begin the magazine to publishing the first issue.

In his first issue, he sought to publish interviews of some of the founders of the hobby at a level of depth that was not done in previous articles. Future issues will go beyond the founding history of the hobby.

Mark does not intend to compete with any of the current hobby rocket magazines. His magazine is aimed at a wider audience and he has worked with Borders and Barnes& Noble to have his magazine sold at these stores. With this, he hopes to champion the cause of publicizing the hobby to those who are not familiar with it.

He is also working with model rocket manufacturers Quest and Semroc to have magazine subscription cards inserted into the packaging of model rocket kits.

Mark Mayfield during his discussion of Launch Magazine.

Mark reminisced of his early model rocket days, and he welcomed ideas and photos of our CMASS launches. He said that everyone has a story to tell, and he is seeking inspirational stories such as about people who give up their free time to fly rockets for schools and the "stockbroker by day, model rocketeer by night" type stories.

Mach III or Bust

Session by Robert DeHate
Summary by Doug Gardei

Robert DeHate showcased his 2 stage O to N powered rocket. The booster motor blew a large chunk out of the nozzle due to a machining error, so the motor that normally would of burned for 4 seconds, burned for about 8 seconds. It was underpowered, and weathercocked into the wind. The N4000 then pushed the 4" diameter sustainer further downwind. The rocket did reach Mach 3, gaining over 55,000 feet in altitude. It was interesting to see what happens to a rocket that goes supersonic. The paint was scorched and blistered, and the carbon fiber layers on the fins were pealed back. Robert says that another second or two at supersonic speeds, the fins would of failed. There was also a huge zipper in the airframe. This was caused by deployment at 400 MPH! I was surprised the Carbon Fiber tube did not slice the tether!

Pictures from the NEMROC Weekend

Tony Vincent's Vapor Trails on the launch pad at NEMROC..


Stephen Boy recovering his model from the Amesbury swamp. Clothes are optional..

Build the Vega 1 Glider

By Lenny Loranger

The Vega 1 is a high performance rear engine boost glider designed for dramatic flights on Estes B6-2, C6-3, and C6-5. With its sweptback wings and long length, Vega 1 will fly straight as an arrow. Introducing a slight spin will also ensure the model will be stable. The balsa that will be used for this project will be out of rigid 1/8" thick C-grain balsa and is heavier compared to A and B-grain balsa. A quick search on the internet may help you to find more information about the different varieties of balsa.

Other items

In addition to the materials listed on sheet on the plans, you will need the following items:

(1) Sharp modeling knife or single edge razor blade.
(2) Scroll saw (easier cutting the balsa wood.)
(3) Yellow wood glue (carpenters preferred)
(4) Ballpoint pen or pencil.
(5) Scissors
(6) 1 spent 18mm x 1" long motor casing
(7) Small plastic bolts (3/16"x3/4" LONG) or smaller dia.
(8) Medium weight elastic thread
(9) 4 Dubro plastic airplane hinges
(10) Coarse and fine grit sandpaper
(11) Primer and paint for finishing the model.
(12) Drill press (used for hinge slots)
(13) Dremel #420 15/16" dia x .045 thick cut off wheel
(14) Tap that is similar in size to plastic bolts
(15) 1/2" diameter copper tubing used as a mandrel
(16) 2 oz cloth from hobby store
(17) Small disposable paint brushes
(18) Latex gloves
(19) 1 (quart) of polyester resin with hardener
(20) Small bubble level mounted on thin wood

Read the directions a couple of times and become familiar with the different drawings and parts before you assemble the Vega 1.

Page 1 of 4 is an assembly drawing. After you have cut all balsa parts be sure you have the following,

1. Two wings
2. 2 right rudders
3. 2 left rudders
4. 1 left and right elevon
5. 2 control tabs with holes drilled, threaded with tap.
6. 1 metal wire brace out of .04 thick material
7. 1 (1" long spent 18 mm motor casing)
8. 1 (1/8" x 3/4" dia plywood plate)
9. 1 Estes NC-20 nose cone
10. 10.1/8" X 1/4" X 2" hard launch lug standoff

Control Tabs

Start the control tabs by looking at the detail drawing on page 3 of 5. Pre drill and thread the holes before cutting them out. Cut the control tabs from 1/8" thick hard balsa, and the bases out of 1/4" X 1/4" X 2 1/4" long spruce or bass wood. To avoid splitting, Test fit the glide control bolts to make sure they are not too tight. If they are to loose, you may have to fill in the holes with glue and trial fit again. Carefully cut and glue each assembly making sure you have a left and right. A scroll saw will cut these parts easily. When finished both assemblies, you should have a right and left part.

Fuselage

Sometimes a boost glider not trimmed correctly can result in a fast spiral glide down. Using an Estes BT-20 body tube by itself will not be strong enough during some of these landings. The thin walled tube has a tendency to wrinkle. Reinforcing the tube with 2 oz glass cloth and resin is an easy way of fixing this problem. Another alternative is to buy heavier walled tubing if you can find some. A nosecone will have to match the tube or you can turn one out on a lathe or drill press. Visit a local hardware store and pick up some ½"diameter copper tubing. The tubing should be ½" diameter on the inside and 5/8" diameter on the outside. The copper tubing need only be about 24-30" long. Use the copper tubing as a mandrel for handling the Estes BT-20 tubing while laying on the fiberglass and resin.

Apply two layers of car wax on the copper tubing and buff off after. This will keep any extra resin and fiberglass from sticking to the copper mandrel. Polyester resin used for auto and boat repairs works fine. A local hobby store will carry 2 oz glass cloth or you may need to look on the internet. Before mixing the resin, follow the mixing instructions and make sure you wear safety glasses and latex gloves to protect eyes and skin. Always work outside if you can where there is plenty of ventilation. Start by passing an 18" Estes BT-20 tube over the copper mandrel and taping both ends in place with masking tape. Cut out a piece of 2.5"x 12" wide glass cloth to size making sure that you will have enough to cover the entire BT-20 tube with some overlap lengthwise. Mixing resin and hardener with paper cups (the ones used for hot drinks) works well. Mix the resin and hardener together per directions and apply a thin coat with a small brush on to the BT-20 body tube. Hold one end of the copper tube while the other end is on the ground. Place the fiberglass lengthwise on the tube. Dab a little resin on the brush and brush out any dry spots on the cloth. Be careful to work out any bubbles that develop. The white cloth color should change to a transparent color when wet with resin. Holding the copper tube at one end, continue laying the rest of the cloth on all the away around until it overlaps the beginning. Use the brush to wet out the rest of the cloth. If the cloth at any time seems to become tacky or starts pulling away from the tube, stop. The resin may be starting to set up. If this happens, stop any more work for another 24 hours until the resin cures. The working time with polyester or epoxy resins may only be 5 or 10 minutes or so depending on temperature and humidity. Working with fiberglass and resin becomes easier with time and practice. Sand any extra resin away from the tube with 220-grit sandpaper. Use a sanding block to accomplish. Start by sanding the tube lengthwise carefully hitting all the high spots and not to sand thru the fiberglass. Another way to get a smooth finish is to sand in 45-degree directions along the axis of the tube. Roll the tube at the same time while sanding with the block. This method of sanding follows the path of the spiral wind in the tube. This will give you an even finish all the way around. Mixing up and brushing on a second thin coat of resin will fill in any low spots left behind. Remember, sanding most of the resin will help to save weight. Repeat this process until you are happy with the finish. Dent and fill auto primer can help with filling any small imperfections in the tube finish. After the tube is done, cut the tube to a length of 9 ½". Cut out the body tube-marking guide in drawing 5 of 5. Wrap this marking guide tightly around the body tube. Mark out the centerline positions of the launch lug, control tab, wing, etc, with an L shaped piece of metal or smooth door jam to finish drawing lines lengthwise on the tube. Look at the 18mm motor block detail shown on drawing 4 of 5. Cut a spent 18 mm motor to a length of 1" and glue a 1/8" x ¾" dia plywood plate at one end. Reinforce the plywood plate on the inside with more yellow glue. Place a little dab of glue at the end of a cotton swab. Reach through the rearward end of the BT-20 body tube 3" forward and make a circular pattern with the cotton swab. Be very careful not to get any of the glue near the rearward end of the body tube. Insert the motor block with the plywood plate facing the rear in the end of the body tube. Then, using spent engine casing, push it forward until the end of the engine casing is just the even with the rearward end of the body tube. Caution: once you have inserted the nose block far enough to come in contact with the glue to not allow it to stop until it is in the proper position. Some glues dry very quickly, and stopping for as long as a second may cause it to freeze in the wrong place. Remove the spent engine casing as soon as the nose block is in place.

Nose cone construction

Purchasing BT-20 size nose cones or using a lathe to turn down a nose cone is another avenue.

Wing construction

Cut out all the templates from page 2 of 4. Match the lines for the right wing and tape them together. 1/8" x 3" wide, c-grain balsa should be large enough to fit the whole wing template in place. Follow the direction of the grain as shown.

Trace the rest of the templates on to 1/8" rigid C-grain balsa. After cutting a left and right wing, sand a rounded edge on the front and back of both wings to give a smooth airfoil. Know is the time to mark location centers for all four hinges for the wing and the elevon. Let us look at the hinge Dremel slot detail on page 3 of 4. Using the Dremel #420 cut off wheel, set the wheel in the drill press chuck and raise the drill press table with the wing on it so that the cut off wheel is half way up the thickness of the wing. This will take some adjusting of the table. Then using a small round sanding tool make a small 1/8" hole where the center mark locations are. Then proceed to cut out a slot as far as the cut off wheel will allow. The 1/8" hole should leave enough room for the plastic hinge to slide in to the cut out slot. If it still does not seat all the way in, then cut a little bit of the square edges off on each corner. Repeat this process 8 times. Rough up the hinges with 60 grit sand paper and glue all four hinges into place on the wing. When the glue is dry, attach and glue the elevons in place. Sand the elevons to shape as shown in the drawings.

Wing and fuselage assembly

The amount of dihedral angle is very critical, (by the dihedral angle, we refer to the angle made by the wings, and the body tube where the wings point upward rather than straight out. Drawing on page 1 of 5 clearly shows this angle on the rear view. The outer edges of the wings are even with the top surface of the BT-20 body tube. The following method will make the right amount of dihedral angle. Place the root ends of the wings tightly together and secure with two strips of tape. Put a line of yellow glue down the wing centerline on the body tube and then lay the wings on top. Align the root edges of both wings on the body tube. The trailing edge of the wings is to be even with the rear of the BT-20 body tube. Press the glue joint firmly to be sure the wings are set evenly and tightly against the BT-20 body tube. While the model is drying, the wingtips and the complete length of the BT-20 body tube should be lying flat against the table. Use small weights to accomplish this. Do not handle the model until this glue joint is completely dry overnight. Reinforce the BT-20 body and wing with another glue joint on both sides. This should help the wing from popping off after some hard landings.

Rudders

Drawing 2 of 5 show the rudder patterns. Cut the rudders out of 1/8" C grain balsa. Make sure you follow the grain direction. Glue 2 of the rudders by their root edge. Use masking tape to keep together. Both rudders should be sweeping backward when glued together. Use the rudder template guide to get the 120-degree angle needed for spacing. Repeat the process for the other rudder assembly. Set these rudder assemblies to dry overnight. Before gluing the rudders on the wing tips, make sure the wing tip surfaces are parallel with the main body tube. Use a small bubble level bought at any hardware store to check for this. Drawing 5 of 5 shows a full size drawing of one. This one was purchased at Home Depot and mounted on a small piece of scrap wood for more accuracy. Place the model so that it will not move around when taking these level measurements. Place the bubble on the BT-20 body tube and level it. Now check the wing tip and make sure that it is level. If it is not level then some sanding will be required until it is. Make sure not to take too much off or one wing will be shorter than the other. Repeat this process for the other side. Glue the rudder assemblies on the wing tips using the rudder template guide.

Almost finished

Install the control tabs following the markings on the side of the fuselage. Looking at page 1 of 5 will give you a good idea where to place them. Glue the launch lug and spacer together as an assembly then place along line as shown on page 1 of 5. Cut a length of .04 thick wire to shape as shown on page 4 of 5. Adjust the wire until there is 8 degrees of downward deflection. Run the elastic thread through the holes drilled in the trailing edge of the elevons. Tie the end of thread with a knot large enough not to pass thru the hole. Make the thread long enough so that it can pass around the plastic bolts and in front of the launch lug spacer yet have enough tension to

get the elevons to snap up once the motor pops out. Balance the model on a ruler to find the center of gravity. The model should balance 1 3/4"-1 7/8" from rear of tube. If it does not then add more weight to the nose by drilling a small hole and adding a steel eye screw with bolt nuts for weight.

Let's go outside and test this thing

Make sure your model balances evenly left to right. You can check this by balancing a ruler down the center of the body tube lengthwise. If the model is a little heavier on one side than the other, compensate by adding a little weight to the opposite side. Apply a little more glue for reinforcement or clay to the side that is lighter. Trimming the glider will be much easier if the model balances evenly from left to right. The gliding characteristics of the Vega 1 can change by turning the glide adjusting screws. It is best to determine first the proper setting to get a straight flight. Prevent damage to the model by finding a tall grassy area to hand launch. To test the glide, grasp the model by the fuselage body and part of the front wing and throw it through the air into the wind. If the model nose-dives, adjust the elevons so that they pitch up. Turn both glide control-adjusting screws so that the elevons move up. If the model stalls, reverse the process. Repeat this testing and adjusting until the model glides straight ahead when thrown. The model should glide for about 15-20 feet. To set the glider for a slight right turn, adjust the right elevon so that it sits a little higher than the left one. Turning the adjusting screw counter clockwise will accomplish this. Turning the adjusting screws in ¼ or ½ turn increments can make small accurate changes in flight. If you want the model to turn left repeat the same procedure for the left elevon. Turning the adjusting screw 1/2 to one complete turn creates a close circle and fast recovery. On windy days (10-15 mph winds), it is best to set the glide for a fast recovery as described above. This is the keep your glider from landing to far way from the launch pad area.

Up up and away!!!!!!

Vega 1 requires one Estes C6-3 or C6-5 motor. This model can launch from a standard 3/16" x 36" launch rod. When inserting the motor make sure that the right elevon deflects down. The left elevon may deflect up a little bit; this should not be a problem. You can use the 8-degree pattern guide on page 4 of 5 to double check the right elevon alignment. Place the right elevon angle guide as shown in drawing 4 of 5. Your only looking for the front surface of the elevon part to line up, not the tapered end. Hook up the igniters and launch. Watch the boost glider to see how it performs. If the model turns steeply left to right, remember to go over the adjustment features to correct the flight. After a while, you will get a feel for what the model is doing. Please email me if you have any questions or comments you would like to make. My email address is draftsman8384@yahoo.com.

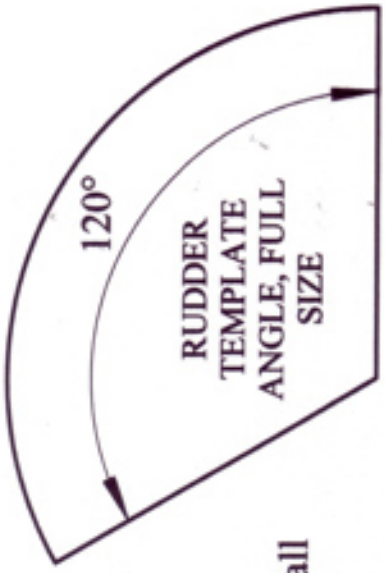
COMING SOON FROM CMASS

Keep your eyes open for an ALL-NEW CMASS website at http://www.cmass.org

- CMASS Forums!
- CMASS Photos
- CMASS Latest News
- CMASS Updated Launch Schedule
- And more…

Check out a preview online at http://new.cmass.org.

1. 2.5" long balsa cone
2. 9.51" Long BT-20 body tube
3. Main wing (2)
4 Rudders (4)
5. Elevon (2)
6. Control Tabs (2)
7. Metal wire brace
8. Motor block
9. Plastic screw (2)
10. Launch lug
11. Balsa standoff
12. Elastic thread
13. Eye bolt with small threaded nuts for nose weight



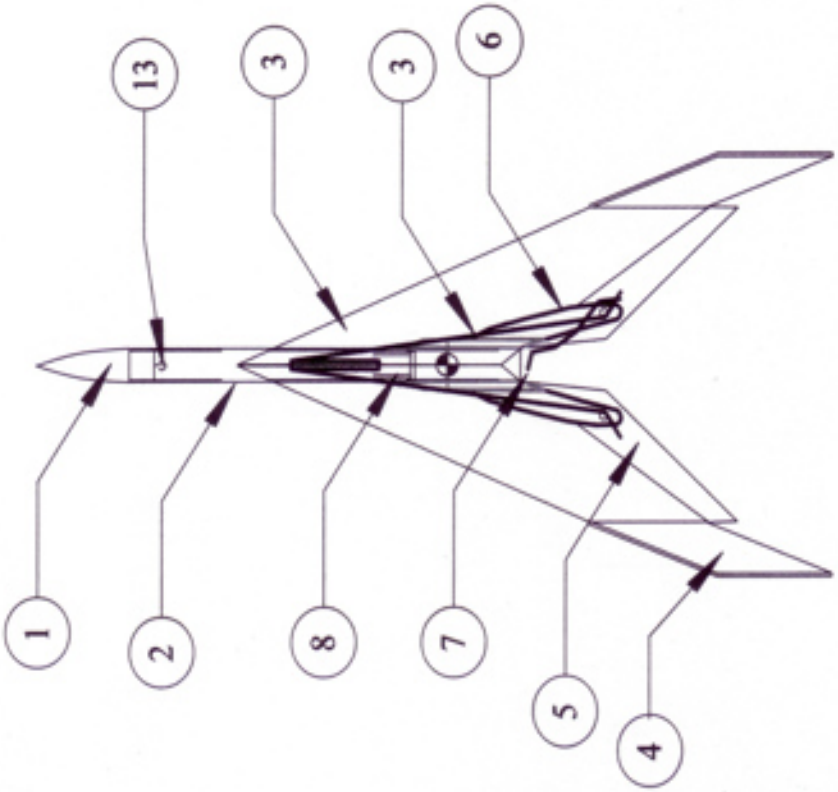
Notes:

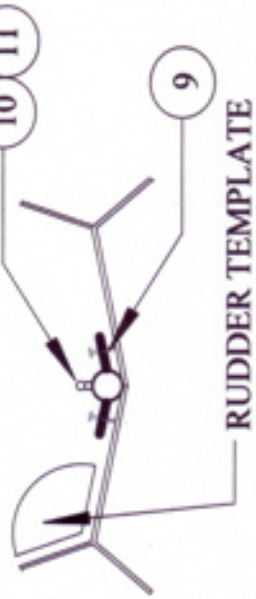
1. Weight of glider with out motor is 2.4 ozs.
2. Use carpenter's glue for all joints and reinforcements
3. Fly on Estes C6-3 motor only
4. Wing loading for glider is .054 ozs per sq. inch
5. C.G. located 1 3/4" - 1 7/8" from rear of tube. Small amount of nose weight added to acheive balance point.

Drawn with TurboCad v12

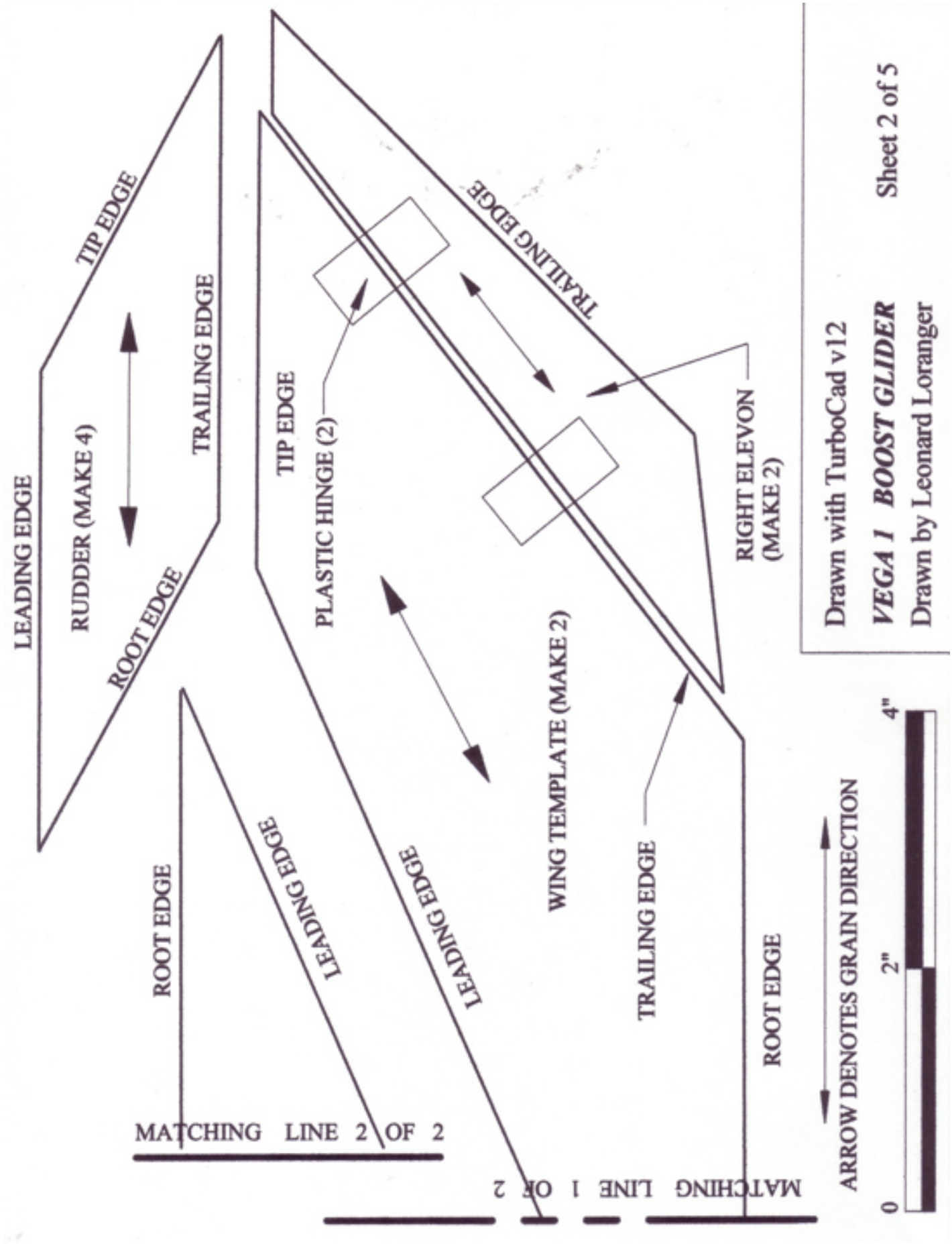
VEGA 1 BOOST GLIDER Sheet 1 of 5

Drawn by Leonard Loranger





NOT TO SCALE


LEADING EDGE
TIP EDGE
RUDDER (MAKE 4)
TRAILING EDGE
ROOT EDGE
TIP EDGE
PLASTIC HINGE (2)
TRAILING EDGE
RIGHT ELEVON
(MAKE 2)
WING TEMPLATE (MAKE 2)
ROOT EDGE
LEADING EDGE
LEADING EDGE
TRAILING EDGE
ROOT EDGE
MATCHING LINE 2 OF 2
MATCHING LINE 1 OF 2
ARROW DENOTES GRAIN DIRECTION
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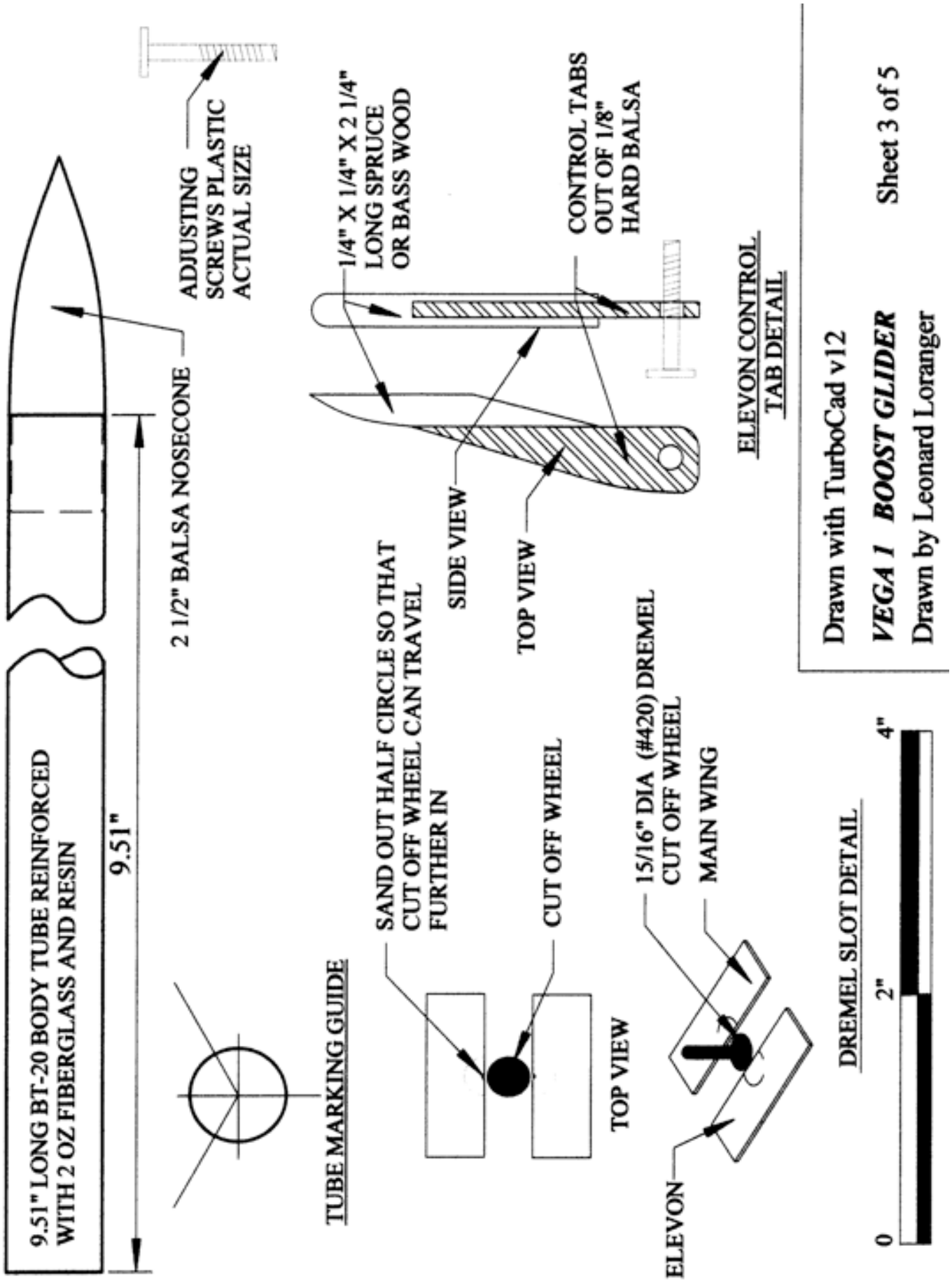
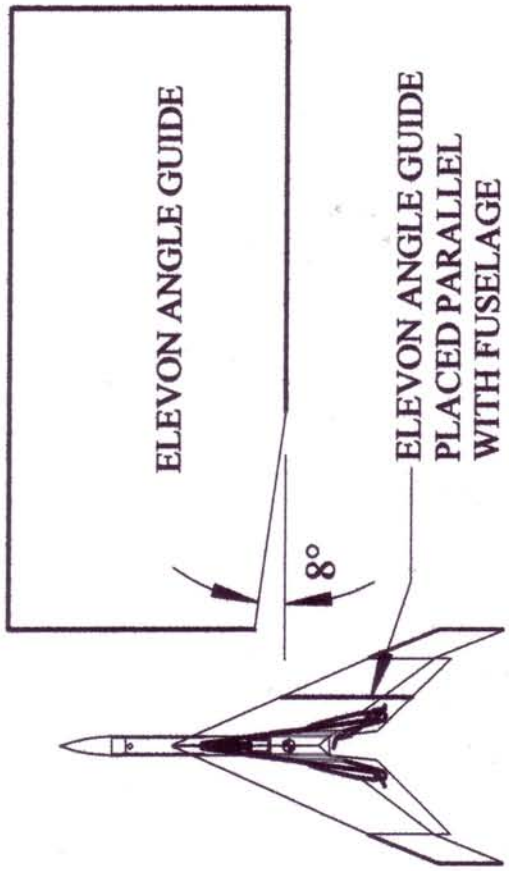
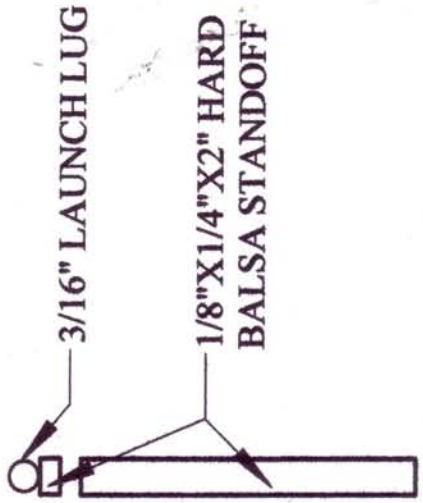
VEGA 1 BOOST GLIDER
Drawn by Leonard Loranger
Sheet 2 of 5


9.51" LONG BT-20 BODY TUBE REINFORCED
WITH 2 OZ FIBERGLASS AND RESIN
9.51"
2 1/2" BALSA NOSECONE
ADJUSTING
SCREWS PLASTIC
ACTUAL SIZE
1/4" X 1/4" X 2 1/4"
LONG SPRUCE
OR BASS WOOD
CONTROL TABS
OUT OF 1/8"
HARD BALSA
SIDE VIEW
TOP VIEW
ELEVON CONTROL
TAB DETAIL
Drawn with TurboCad v12
VEGA 1 BOOST GLIDER
Drawn by Leonard Loranger
Sheet 3 of 5
TUBE MARKING GUIDE
SAND OUT HALF CIRCLE SO THAT
CUT OFF WHEEL CAN TRAVEL
FURTHER IN
CUT OFF WHEEL
TOP VIEW
15/16" DIA (#420) DREMEL
CUT OFF WHEEL
MAIN WING
ELEVON
DREMEL SLOT DETAIL
0
2"
4"



ELEVON ANGLE GUIDE DETAIL

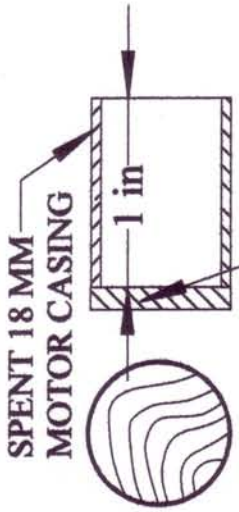


LAUNCH LUG DETAIL

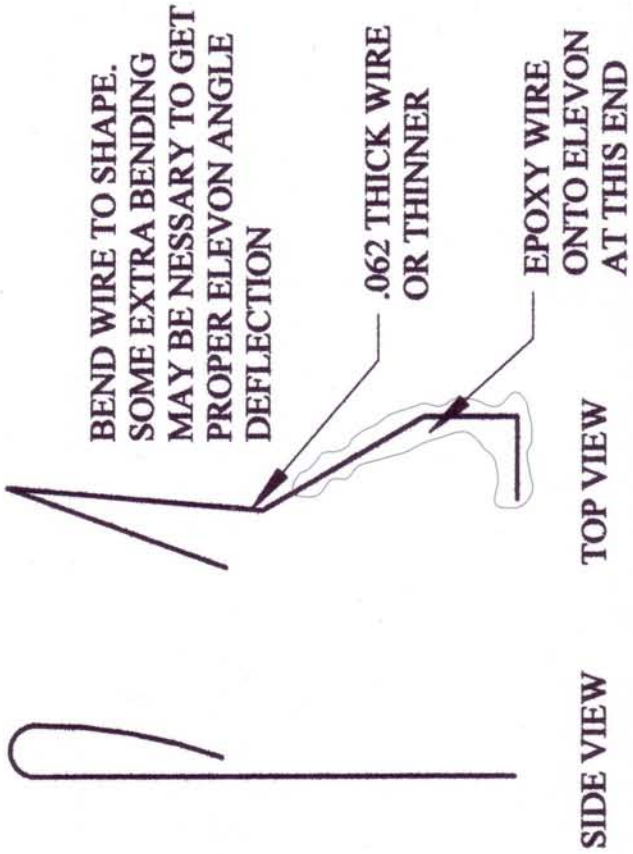
Drawn with TurboCad v12

VEGA 1 BOOST GLIDER Sheet 4 of 5

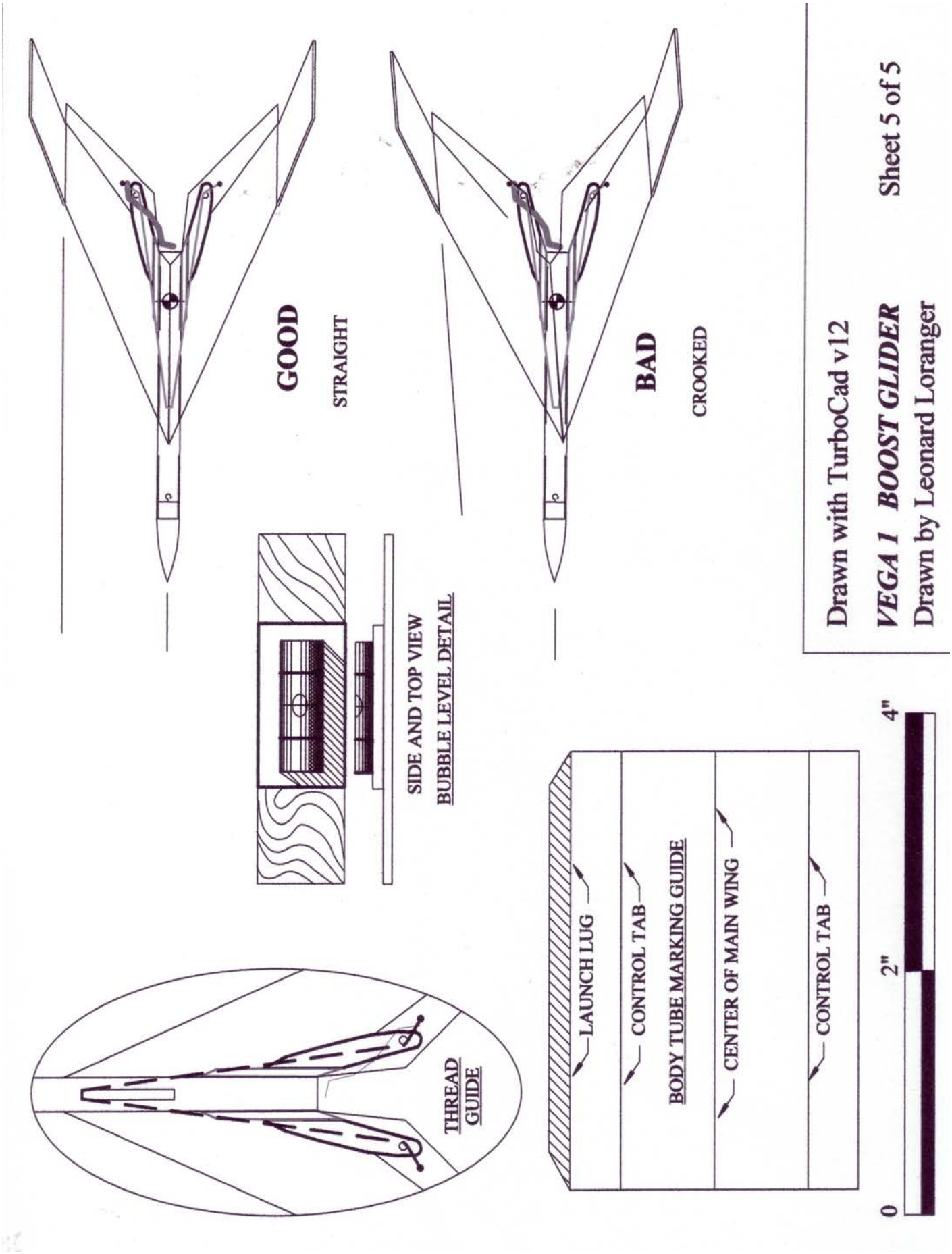
Drawn by Leonard Loranger



18 MM MOTOR BLOCK DETAIL



METAL WIRE BRACE DETAIL


GOOD
STRAIGHT
BAD
CROOKED
SIDE AND TOP VIEW
BUBBLE LEVEL DETAIL
THREAD GUIDE
LAUNCH LUG
CONTROL TAB
BODY TUBE MARKING GUIDE
CENTER OF MAIN WING
CONTROL TAB
0
2"
4"
Drawn with TurboCad v12
VEGA 1 BOOST GLIDER
Drawn by Leonard Loranger
Sheet 5 of 5

FlisFleet 2007, a sneak preview…

By: Jim Flis, President, FlisKits, Inc.

2006 is in the gone and that means another FlisFleet product is now available at FlisKits allowing you to purchase all of the FlisKits model rocket kits produced throughout the calendar year 2006. These models include the Thing-a-ma-Jig and the US TOG but only represent the standard kits from FlisKits and doesn't include the likes of Micromaxx® nor accessories and other items offered by FlisKits last year.

It was a busy year too. The lunge into the world of Micromaxx®, resulting in some of the finest Micromaxx® models ever developed. FlisKits was also able to bring rocketeers the ever elusive Micromaxx® motors as well. In addition to this we saw growth in the selection of engine mount kits, new nose cones and a whole warehouse selection of Micromaxx® parts and accessories to compliment the kit line. Attending two hobby trade shows and keeping up with production filled out the balance of their exciting 4th year of production.

So, what does 2007 look like? Next January what might we see in the FlisFleet 2007? Here is a sneak peek from Jim Flis himself as he is already preparing to roll out models at the upcoming NARCON in Rochester, MN in March.

First out of the chute will be a new kit, not yet discussed on any forum, called the **Borealis.** This futuristic kit stands just a bit over 30" tall with a fin span greater than 8", laser cut fins of a most other-worldly shape, and a new style of peel and stick decal. This release will serve as a test of this new sticker method to see if it can stand up to customer critique. This model has not been discussed publicly as FlisKits wants this one to be a surprise to the rocketry community in March.

Next up, also slated for a NARCON release is the **Interloper**. A Micromaxx® kit featuring laser cut parts and a sharp looking custom nose cone, not to mention water slide decals. Standing 6" tall with a very unique look, the Interloper will be a fine addition to the most exciting fleet of micro rockets ever developed.

For NSL-2007 FlisKits has stepped up to the plate as the sponsors of this exciting launch and includes with this the creation of the commemorative kit for NSL-2007, the **Frick & Frack** two-stage flying saucer. Having all the appearances of a single stage, 6-sided saucer, she stages about 50 feet off of the launch pad, dropping her booster and 3 of the 6 sides of the saucer (drag plates) while the sustainer continues on to an altitude of about 100 or so feet. Perfect for demonstrating multi-stage operation without fear of loosing your rocket, even in a small field!

In addition to these exciting offerings, FlisKits hopes to announce these other exciting kits and accessories some time during 2007:

- **Adfecta** – A futuristic model featuring 24mm power, water slide decals and the most unique turned balsa parts ever offered in a kit!
- **Rose-A-Roc** – The famous, award winning competition helicopter recovery design by Art Rose! FlisKits has received special permission from Art to produce this kit. While staying true to the design, FlisKits has implemented

several manufacturing and assembly steps to make this a much easier build with much greater first flight success than the original design offered. Look for this mid-late spring.

- **Mercury Redstone 1:132 scale**. This ultra tiny 13mm (minimum diameter) scale replica of the famous manned rocket will be FlisKits second Skill Level 4 model but the first with the ability to knock it up to a Skill Level 5 or down to a Skill Level 3 depending on your skills and desired final look. Featuring silk-screened waterslide decals, this model is a must for any scale model enthusiast.
- **Rhino accessories**: FlisKits is planning a whole family of accessories for the very popular Rhino kit. With the Rhino representing one of the premier education kits that FlisKits offers, these accessories will enable schools and youth groups to go on to higher skill levels without the burden of buying a whole new rocket! Accessories are slated to include: A cluster engine mount kit, booster stage for multi-stage conversion, a payload section, a parasite glider and a helicopter hub for the nose cone. Keep watch throughout the year as these accessories become available
- **Engine mount kits** – Beginning with the EMK4-18-70 and the EMK7-18-70 (four 18mm motors in a BT-70 and seven 18mm motors in a BT-70 respectively), FlisKits will be adding to its already enormous offering of some of the finest engine mount kits in the industry.
- **And there's more!** In addition to all of the above, keep watch for additions to the offerings of body tubes, nose cones & adapters, couplers, baffles and more.

2006 was a busy year. 2007 is barely begun and it has been very busy with new product development, expanding into more and more hobby shops throughout the country and around the world. FlisKits continues to feed the rocketry community with creativity, excitement and fun bringing model rocketry back to its roots while striving to balance the best from the past with the best of the future at the same time.

"Aim for the sky, and try not to miss!"™

COMING SOON FROM CMASS

Keep your eyes open for an ALL-NEW CMASS website at http://www.cmass.org

- CMASS Forums!
- CMASS Photos
- CMASS Latest News
- CMASS Updated Launch Schedule
- And more…

Check out a preview online at http://new.cmass.org.

Remember to read the instructions before assembling an Aerotech reload.

Blast from the Past…from the July 8, 1988 issue of the CMASS Sentinel

THE "NO NAME YET"

by Bruce Shea

I have been flying this two-engine rocket this spring, and it flies nicely. Accordingly, people have been asking, "When are you going to publish plans?" Here they are. The only problem is that the rocket doesn't have a name.

This is a two-engine cluster model for D's through G's. It has flown successfully with D12-5's and E28-8's. I anticipate that it should hold together with the lower average-thrust F's and G's, but until I have verified this, exercise caution. [Note: Your mileage may vary anyway, depending on how well you tend to build things! --Ed.]

One nice thing about this design is that it's fairly big and flies impressively with lots of fire and smoke, but it weighs a low 12 ounces without engines. This should allow Massachusetts-legal composite F flights. Note the Barrowman Method CP location. Make sure the CG is at least one body diameter ahead of this!

A combination of heavy-duty AAA BT-80 and lighter-weight Estes BT-80 was employed to allow strength in the lower (stress-prone) airframe, but to save weight in the less-stressed payload area.

Construction should begin with the engine mount section. The two engine tubes are for 29mm motors. Use the centering ring as a forward bulkhead and gas seal. The leftover holes should be filled with scrap plywood and epoxy.

The fins should be secured with epoxy to the engine mount. Note that you will have to make the fins a little larger than the external view indicates to allow them to extend through the body tube and reach the engine mount. Note that two of the fins will need much longer extensions than the other two.

Once the engine mount and fin unit is complete, mark the AAA body tube and cut slits to allow the assembly to slide in. Epoxy the engine mount in. Finish off with epoxy fillets both outside and inside the body at the fin joints.

The fins I used were 1/8" balsa sandwiched between 1/64" plywood. This gives a lightweight but very rigid fin. It doesn't warp, and helps keep the model well under the Massachusetts limit. Keep the fins flat when gluing on the plywood.

The shock cord is a very long piece of squid line attached to one of the fins. [Oh oh! Bruce wins the Sentinel's first "Butt-First Documentation Prize!" ("Take the engine mount and fins and glue them up inside the body tube with lots and lots of epoxy fillets. But first, take this squid line, and...!") --Ed.]

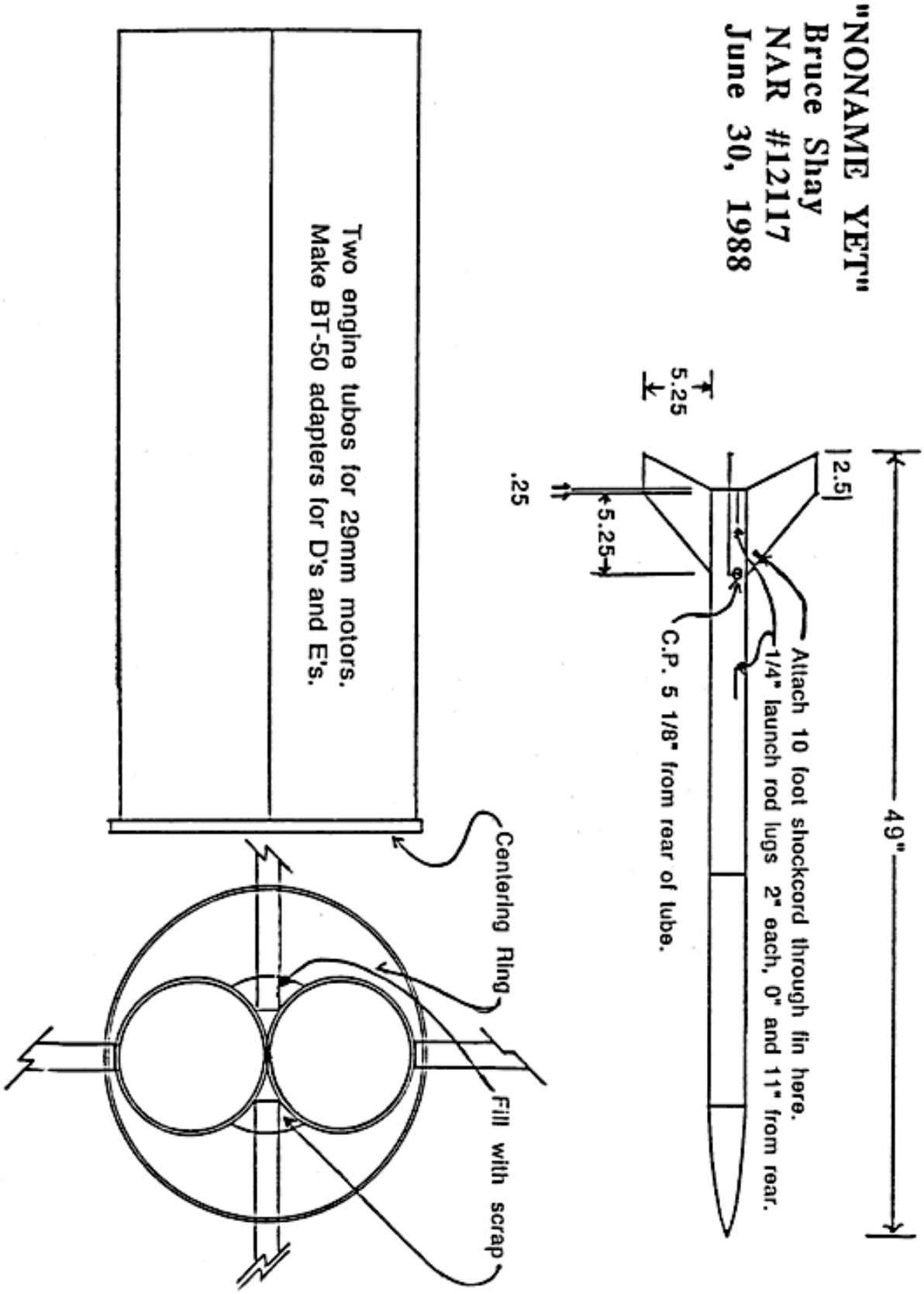
Recovery is by a very large streamer with a small 8" drogue 'chute. Enjoy!

PARTS LIST

Estes	PNC-80K	Nose Cone
Estes	BT-80D	Body Tube
AAA	BT80HD	Body Tube
AAA	BT112HD	Body Tube (for 29mm engine tubes) (Make BT-50 adapters for smaller engines)
AAA	HB80	Hollow Bulkhead for payload coupler
AAA	CR80 HD-F	Centering ring for engine mount gas seal

To build this model, substitute Estes BT-80, or use stronger high-power 2.6" tubes from manufacturers such as LOC, Aerotech, or Balsa Machining Services. The motor mounts should be standard 29mm tubing from any high-power manufacturer.

Blast from the Past…from the July 8, 1988 CMASS Sentinel



The Sentinel is published irregularly by the Central Massachusetts Spacemodeling Society (CMASS) of Auburn, Massachusetts, which is section number 464 of the National Association of Rocketry (NAR).

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Please feel free to contact any or all of us with questions you have about CMASS, the NAR, or rocketry in Massachusetts.

CMASS Membership Form

Name _____ Birth Date _____

Street _____ Phone _____

City _____ State _____ Zip _____ Email _____

Membership type

O NAR: Member number _____ HPR lever: O None O Level 1 O Level 2 O Level 3
O Associate: I agree to abide by the NAR Safety Codes when flying at CMASS launches.

Dues for twelve month's membership
O $4, 14 or younger
O $6, 15-17
O $8, 18 or older

Membership renewals are due either January 1st or July 1st, whichever is closest to the day you joined. Your membership expiration date is printed on the mailing label.

Make checks payable to CMASS and mail with this form to:
CMASS, 248 Millbury Street, Auburn, MA 01501

CMASS Launches

2007 Launches

April 21	Amesbury
May 12	Tewksbury
June 9	Tewksbury
June 30	Acton
July 14	Amesbury
August 18	Acton
September 15	Amesbury
October 7	Amesbury (NEMROC)
October 20	Amesbury
November 17	Amesbury

Launch Day Schedule

9:30	Setup range
10:30	Launching starts
4:30	Take down range

Amesbury: Woodsom Farm Park Amesbury, MA

Tewksbury Livingston Street Park Tewksbury, MA - www.nemroc.org

Acton: North Acton Recreation Ctr. Acton, MA

Directions: Send email to: secretary@cmass.org

Schedule May Change: for the latest info, go to our website, www.cmass.org

Weather Cancellation: *After* 8:00AM on the day of the launch, if the weather is questionable, call 718.231.1018 before heading to the site.

Other Events

June 22-24 New England Regional Fun Fly, Pine Island, NY – www.nerrf.com

July 30-Aug 3 - NARAM-49 (NAR's Annual National Competition), Kalamazoo, MI – www.naram.org
Competition Events: C Sc Alt, C RG, A HD, B ELA, A BG, G SR Alt, B SD, Open Spot Landing

CMASS Club Meetings

Meeting Schedule

April 3, 17	Marlboro
May 1, 15	Saugus
June 5, 19	Marlboro
July 3, 17	Saugus
Aug. 17, 21	Marlboro
Sept. 4, 18	Saugus
Oct. 9, 23	Marlboro
Nov. 6, 20	Saugus
Dec. 4, 18	Marlboro

Meetings are held the first and third Tuesday of each month from 7:00-10:00pm.. The location alternates each month between:

- Bill Spadafora, 5 Granby Street, Saugus, MA – 781.233.0339
- Doug Steinfeld, 72 Prendiville Way, Marlboro, MA – 508.481.9337

Please call for directions or to confirm a meeting. Changes in date or location are sent to the meetings@cmass.org mailing list (email webmaster@cmass.org to be added.)

THE SENTINEL
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