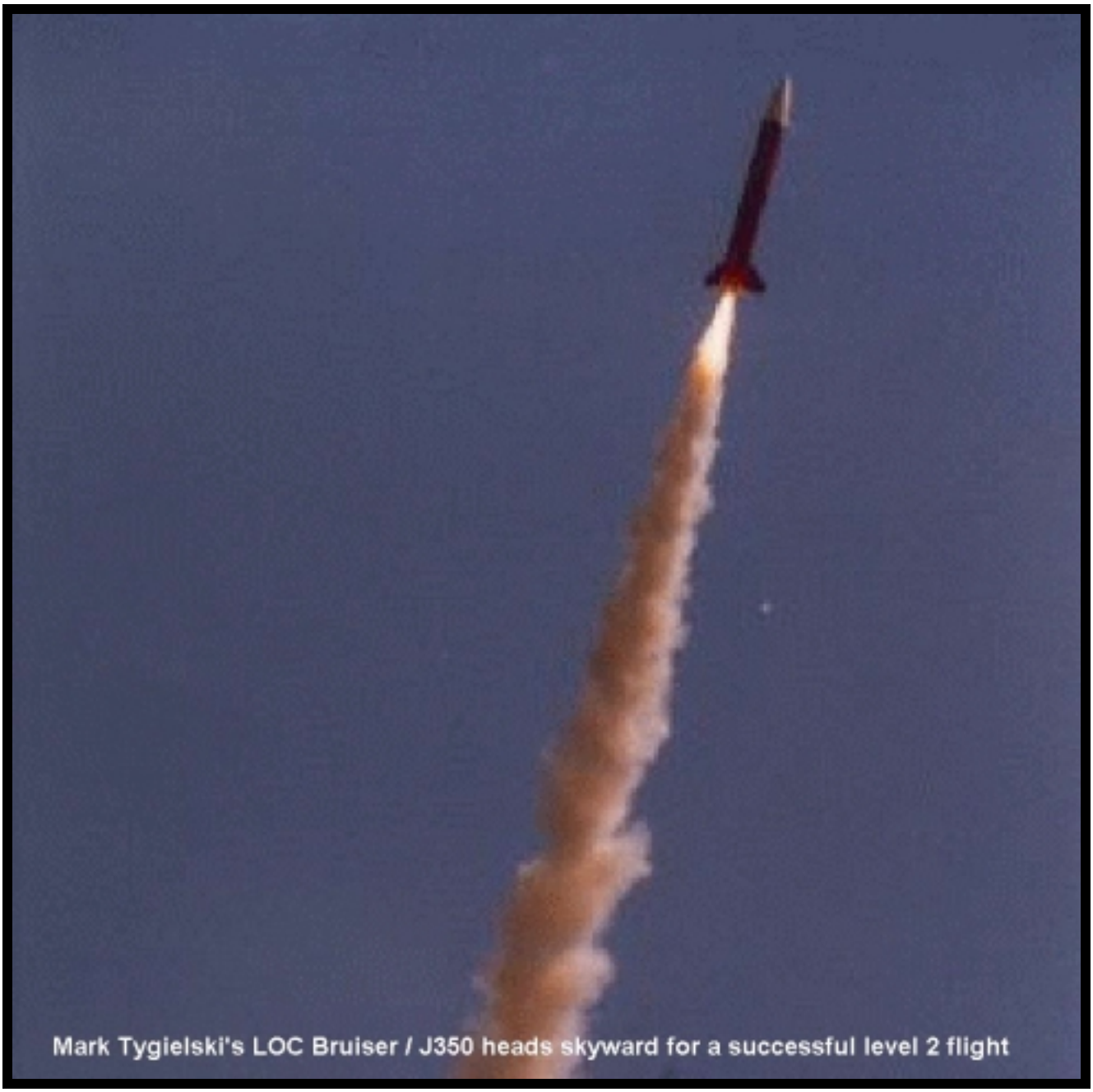
MAX-Q

HARA

Newsletter of the Huntsville Area Rocketry Association **Volume 11, Number 4, November 1997**



Mark Tygielski's LOC Bruiser / J350 heads skyward for a successful level 2 flight

Inside *MAX-Q:*

MAX-Q

Vol. 11, No. 4 November 1997

Editor: Brian Day

Contributors: Peter Alway, Chuck Andrus, George Gassaway, Vince Huegele, Mark Tygielski, Greg Warren

MAX-Q is the official newsletter of the Huntsville Area Rocketry Association (HARA), NAR Section 403. Subscriptions are included as part of membership dues, or available to non-members for $10.00 per year (4 issues). Any material contained in ***MAX-Q*** may be used freely, so long as proper credit is given. The editor welcomes any suitable material submitted for publication.

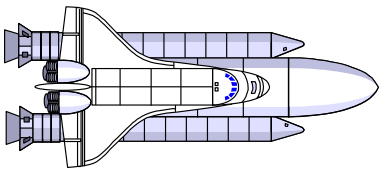
Previews of ***MAX-Q*** can be found on HARA's World Wide Web page located at:

http://hiwaay.net/~bday/hara

Send all submissions and payments to:

HARA
1120 Pratt Avenue
Huntsville, AL 35801

Submissions may also be made in electronic form via email to: bday@hiwaay.net.



President's Pad

by Brian Day

As the flying season winds down and we head into the "building season", I look back on this year with many fond memories. Although our club found itself a bit "real estate challenged" at times, we were able to participate in a variety of launches accommodating both model and high power flights. Many thanks go to Greg Warren for arranging the use of the field behind St. Paul's Church in Athens, which drew a surprisingly large crowd at times. Those launches reminded me that it doesn't take a huge field and big rockets to have a great time with this hobby. Meanwhile, our friends in Tripoli Birmingham seem to have acquired the occasional use of a great sod farm for those of us with interest in high power. We look forward to more launches involving both of our organizations.

Highlights for me this year included the challenges of serving as HARA President and newsletter editor, welcoming several new members to the club, and meeting and working with our neighboring rocketry clubs to make this hobby more enjoyable for more people.

Next year promises to be even more exciting. HARA plans to sponsor again the "Rocket City Classic" - a rocket launch and contest for area school students immediately following Space Week in March. We're just now getting the planning underway, so if you'd like to participate, let me know.

I'd also like to mention that our web page on the Internet has served as a valuable tool in getting announcements out to our members this year. HARA's web page has been accessed over 2000 times since February, and rocketeers from as far away as Germany have enjoyed browsing the online preview copy of the Max-Q newsletter. I'd like to encourage all of our members to consider getting Internet access to get last minute announcements and participate in the various rocketry newsgroups and online forums.

– *Brian*

HARA welcomes the following new members:

- **Rick Bevel**
- **Ronald Dunn**
- **Bryan Johnson**
- **Johnnie Paul**
- **Sam Williams**
- **Jack Wood**

-- NOTICE --

HARA will NOT be launching at the Rocket City Marathon this year.

Confessions of a Level II Rocketeer

by Brian Day

It all started at LDRS-XV, July 4 1996. I had hoped to certify "level 2" at LDRS with my 4 inch, 9 pound camera rocket on a J180, but the weather didn't cooperate fully and I never got my chance to fly the J. (I did, however, get to take and pass the written exam part of the certification). In the back of my mind I had been wondering if perhaps a fatter, draggier rocket would be more sensible for my certification attempt. Cathy and I had just enjoyed the "official" LDRS barbecue dinner and just couldn't suffer through any more of the Tripoli meeting, so I gave my raffle tickets to Neal Redmond and we went back to the hotel.

After we returned to Huntsville, Neal kindly informed me that one of my raffle tickets been good for a $75 gift certificate to LOC/Precision. Now what would I possible want from LOC? Within a few days, my new LOC Magnum kit was on its way.

I opened the box like a little kid at Christmas time, anticipation and excitement flowing through my veins. Fondling the rocket parts, sliding all the body tube pieces, couplers, and nose cone together, my eyes were like pie plates marveling at this 5.5 inch behemoth. So naturally, being an engineer, my first thought was "How am I going to modify this thing?"

I settled on the following modifications to the stock kit:

- 2 layers of 6-oz fiberglass lamination on body tubes
- 1 layer of 6-oz fiberglass on fins
- fiberglass tape over and under all fillets
- brass launch lugs
- third centering ring at forward edge of fin tabs
- aluminum "L" brackets holding fins to centering rings
- altimeter compartment with access door
- custom "redundant" shock cord mount

The fiberglass, extra centering ring and fin mounts weren't so much to withstand aerodynamic forces as to hold up to the abuse of hard landings. I've developed a pretty good technique with my router and a circle-cutting jig to cut custom centering rings, so that part was easy. I'd never used fiberglass as heavy as 6 ounces (per square yard) before, but the 2 layers I laid up on the body should hold up to a lot of abuse. In retrospect, I wish I'd used a lighter 'glass on the outer layer to save some sanding and finishing time.

The resulting rocket weighed 13 pounds with a "J" motor - several pounds heavier than advertised. But I'm the kind of rocketeer that likes to recover his rockets, so if it meant sacrificing a little altitude in the interest of durability, so be it. I also believe that for certification flights, it's best to be conservative and fly a big simple rocket to a moderate altitude, where as few things can go wrong as possible. (A certification flight isn't supposed to be an altitude event or new technology demonstration).

For recovery, I decided that I'd use my ALTS2 altimeter just to fire a 2.5g charge at apogee, deploying the single stock parachute, using the motor charge (10 sec) as a backup.

I selected the J460 since its high thrust of about 125 lb. would be plenty to get the 13 pound rocket safely off the pad, and, well, simply because it's one of the coolest "J" motors I've ever seen! Now all I needed was an opportunity to fly this thing! As luck would have it, Tripoli Birmingham finally got permission to use a wonderful 700 acre sod farm, and the Magnum and I had a date.

I assembled the ejection charges with flashbulbs and mounted the altimeter in the electronics compartment a week or so prior to the launch. Carefully reading the instructions, I assembled the motor (loosely, without ejection charge or ignitor) the evening before the launch on September 13. I also took some time beforehand to dip some Firestar FS-18 ignitors a few days ahead of time, and warned James Long, Prefect of Tripoli Birmingham, of my certification attempt

Once at the field, I briefly talked with James. After verifying the stability of the rocket, James gave me the go ahead to set it up for launch. Just as Neal, Mark Tygielski and I got it settled to my satisfaction on the pad, the wind picked up a little and we had to readjust things a few times. When it had finally calmed down to an acceptable level, I told the LCO to let 'er go. My heart pounding in my throat, the Firestar ignitor took about a second or two to ignite my first "J" motor. I was awed by the 2 foot blue/violet flame bursting out the nozzle as my yearlong project jumped off the pad and climbed into the sky. I didn't even get a photo as I didn't want to watch my certification flight through a viewfinder. Amid the "ooh's" and "aah's" from the crowd, the ALTS2 altimeter kicked out the main 'chute just after apogee, and the rocket floated down lazily, landing about 200 feet from the pad on a soft patch of Bermuda sod. The only misfortune was that after landing, the wind picked up again and caught the 'chute enough to drag the rocket across a little gravel road, scratching up the trim Monocote on one of the fins. Approaching the rocket, I could hear the altimeter dutifully beeping out 1-8-1-7, not too far from my pre-flight estimate of 1800'.

James signed my certification sheet, and handed it to his wife (Tripoli Headquarters secretary Shelle Long) for processing. What service!

This thing's just begging to fly on that K550 …....

Sod Fest ’97 Highlights

Harpersville, AL Sept 13-14, 1997

Nick Andrus proudly displays his father Chuck’s handiwork.

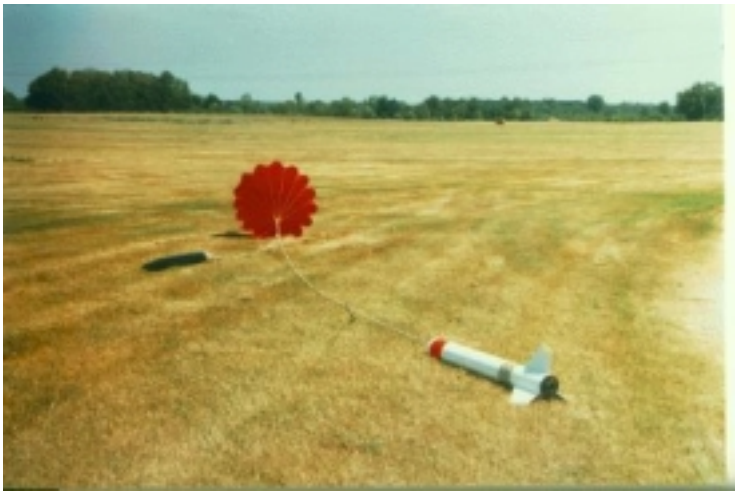
Chuck’s Python in flight at Birmingham

Brian Day admires Neal Redmond’s Fiber Dawg / J460 prior to flight

Sam Williams and his rocket, motor, yadda yadda yadda…

Neal Redmond helps Mark Tygielski prepare for his level 2 flight

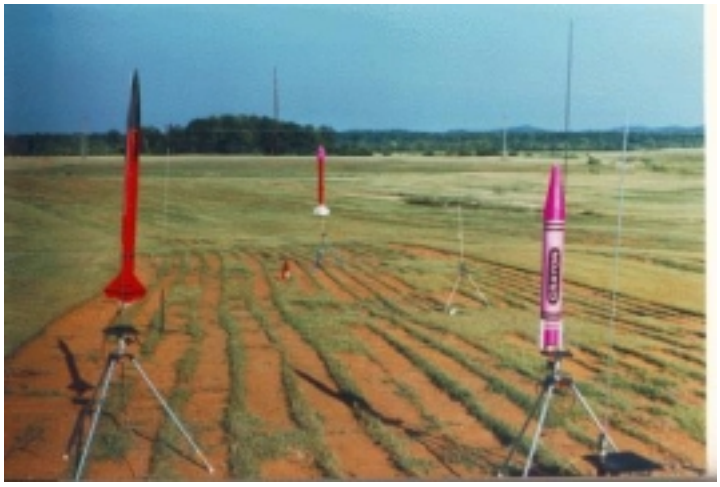
Gene Hornbuckle’s Patriot takes off on a beautiful flight



Clockwise from top left:

- Neal Redmond and Phillip Burroughs help Brian set up.
- A perfect landing spot.
- Vince Huegele demonstrates a new recovery technique.
- Vince's PML Explorer, Brian's Crayon and Mark Tygielski's pig rocket ready for an odd-roc launch.
- Mark showing how pigs can fly.
- Brian's Magnum ready to fly.

(photos: Mark Tygielski, Greg Warren, Brian Day)



Catlofting for Fun and Profit

a research article by Peter Alway

[ed.] Those of you who know Peter Alway are aware of his dedication to research and attention to detail. I came across this article on the Internet and just knew that it needed to be published. Animal lover that I am, I normally wouldn't print this, but for Hector's sake…

The French Biological sounding rocket program was started by Comite d'actions Scientifiques de la Defense Nationale in 1960, though it was soon taken over by Centre National d'etudes Spatiales. The experiments centered on the effects of weightlessness on the nervous system.

The first subject, Hector the Space Rat, flew on Feb. 22, 1961 Aboard a Veronique AGI (#24). He later starred in a series of musicals for children.

Felicette flew safely on October 18, 1963. (Veronique AGI # 47) Evidently lacking the ability to carry a tune, there is no report of any venture in musical theater.

Six days later, an unnamed male cat flew aboard Veronique AGI #50. The rocket crashed. If you wish to commemorate this flight at MRRF (and I fail to see how this is more tasteless than modeling ICBM's and other weapons of mass destruction), the closest I can suggest is to model the Veronique AGI in "Rockets of the World," changing the number from 18 to 50. I have no specific payload or color data for these flights.

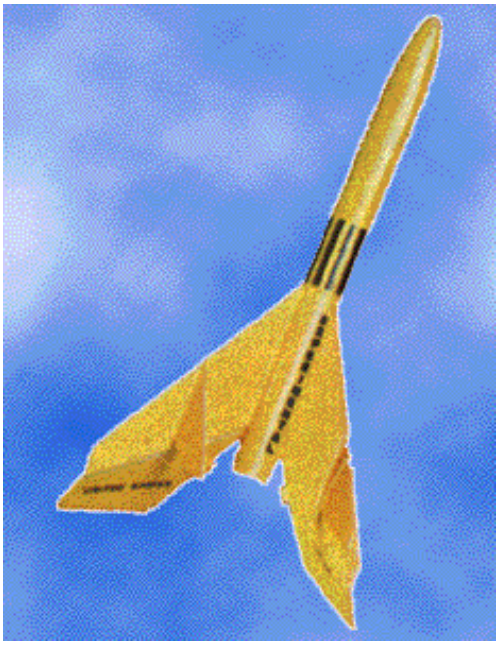
By the way, the program concluded with two launches of monkeys aboard Vesta rockets (see "Rockets of the World" for drawings), both of whom survived the flights.

There was a program, "Felix" in Brazil to launch a cat in a clear plastic payload section. For a couple photos, see Aviation Week, January 5, 1959, p. 25. The rocket was a modified French Nord SS-10 antitank missile. The only other reference I've seen to it was a clipping in the NASM archives about a flood of letters objecting to the project. I don't know if it came off.

You may find this an appealing modeling project because you might be able to find a toy cat of the right scale to put in the payload section.

Plan O' The Issue

This issue's rocket plan comes from the archive collection of JimZ Hobbies in Clawson, MI. Jim's got an impressive collection of old Estes, Astron and Centuri plans scanned and available for download from the Internet. Visit Jim's web site at *http://www.rust.net/~jimz/jimz.htm*. The Gyroc is a 18mm minimum diameter rocket featuring helicopter-like auto-rotational recovery. I challenge anyone to build and fly the Gyroc, especially because I really want to see one fly! I'd especially like to see some of HARA's more advanced fliers scale up this plan to a mid-power model.



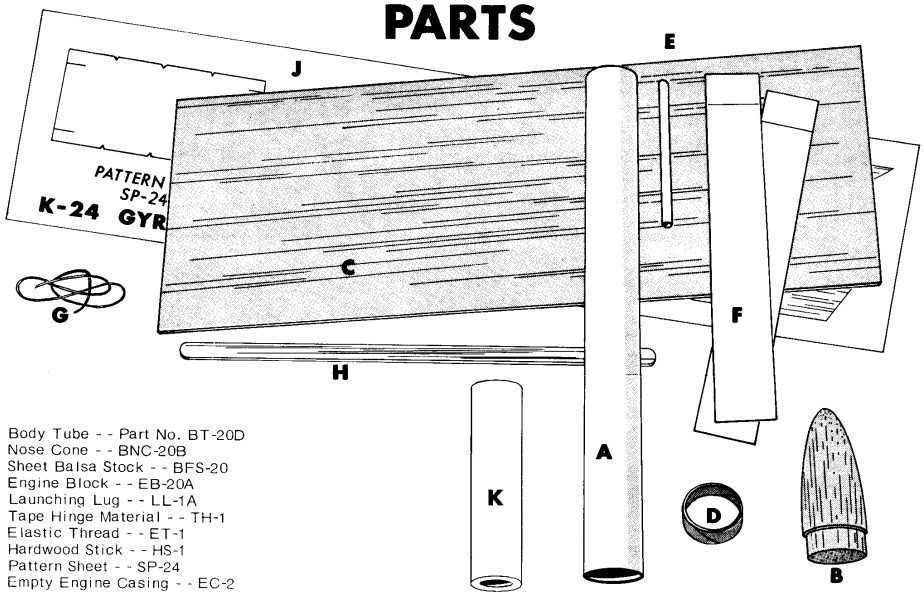
Built a Rocket Kit Lately?

Why not write a review and publish it in ***MAX-Q***?

E-mail is convenient, but if you don't have a computer or Internet access, just mail your submissions to:

HARA/Max-Q
1120 Pratt Avenue
Huntsville, AL 35801.

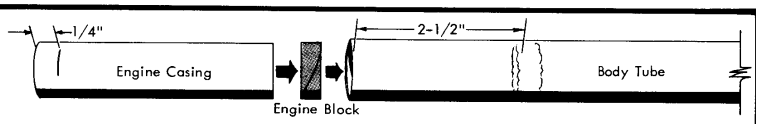
PARTS



A 1 Body Tube - - Part No. BT-20D
B 1 Nose Cone - - BNC-20B
C 1 Sheet Balsa Stock - - BFS-20
D 1 Engine Block - - EB-20A
E 1 Launching Lug - - LL-1A
F 2 Tape Hinge Material - - TH-1
G 1 Elastic Thread - - ET-1
H 1 Hardwood Stick - - HS-1
J 1 Pattern Sheet - - SP-24
K 1 Empty Engine Casing - - EC-2

ASSEMBLY

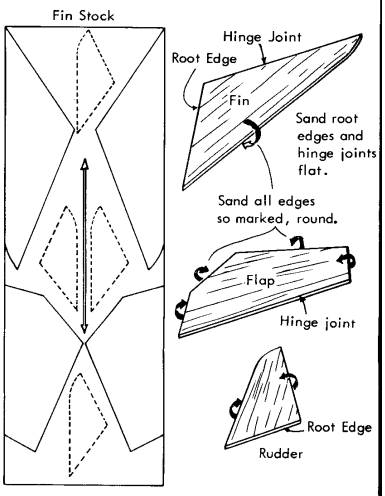
STEP 1



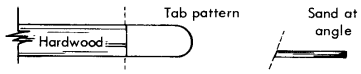
☐ Step 1. Mark an engine casing 1/4"from one end for use as a depth guide. Apply glue to the inside of one end of the body tube at a depth of 2-1/2". Insert the engine block into this end and press it into place with the marked engine casing.

STEP 2

☐ Step 2. Cut the rudder, fin, and flap patterns from the pattern sheet. Lay out fin and flap patterns first as shown then the rudder pattern. Trace around each with a ball point pen. Cut out and sand all the parts as shown.

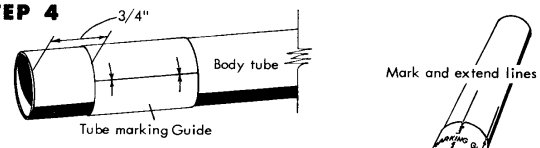


STEP 3



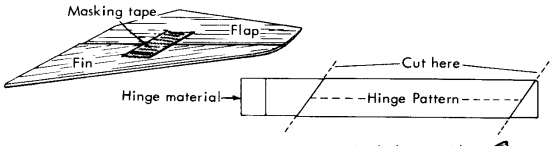
☐ Step 3. Cut out the flap holder pattern and from the hardwood piece, cut two holders. Sand the square edge to a slight angle as shown. Set aside for later installation.

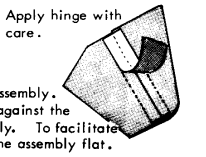
STEP 4



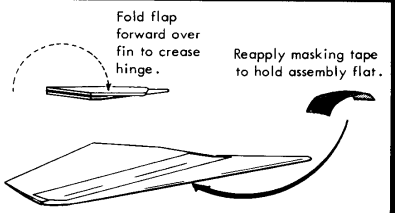
☐ Step 4. Cut out the tube marking guide and wrap it around the rear of the body tube 3/4" from the end. Match the end arrows carefully and mark the body tube at both fin and launching lug notches. Remove the guide and connect the marks with a straight line. Carry all lines toward the front end of the tube at least 3" as is shown. (Save the guide. It will be used later.)

STEP 5



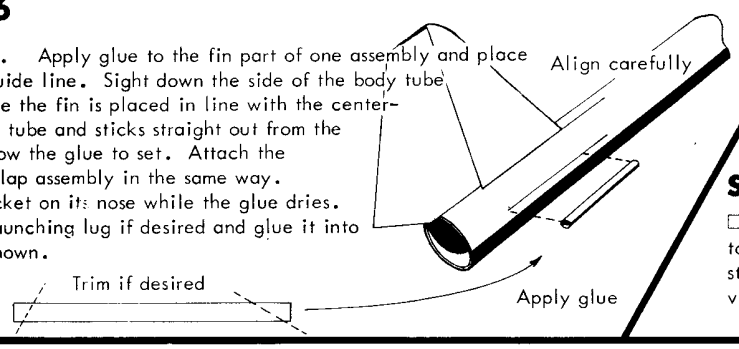


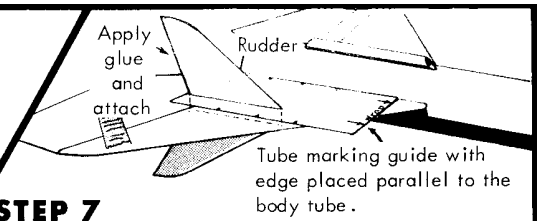
☐ Step 5. Tape the fins and flaps together as shown. Cut out the hinge pattern and cut one hinge from each piece of material provided. Strip the backing paper from a hinge piece and apply it as shown. Do the same to the other hinge and fin-flap assembly. Remove the masking tape and bend the flap back flat against the fin to crease the hinge. The flap will stay bent slightly. To facilitate handling, replace the piece of masking tape to hold the assembly flat.



STEP 6

☐ Step 6. Apply glue to the fin part of one assembly and place on a fin guide line. Sight down the side of the body tube making sure the fin is placed in line with the center-line of the tube and sticks straight out from the tube. Allow the glue to set. Attach the other fin-flap assembly in the same way. Set the rocket on its nose while the glue dries. Trim the launching lug if desired and glue it into place as shown.



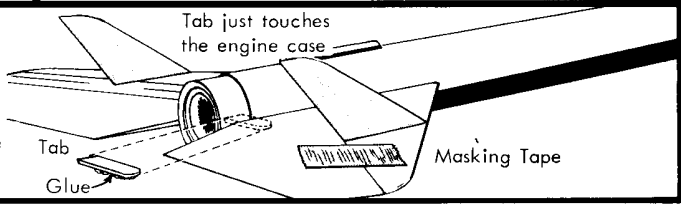


STEP 7

☐ Step 7. Use the tube marking guide as shown to glue the rudders into position. Place them to stick straight away from the fin on either side. (See the rear view of the general layout illustration.)

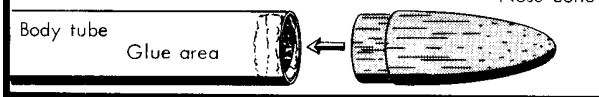
STEP 8

☐ Step 8. Place an engine casing into the body tube. Apply glue to a hardwood tab and put the tab on the flap on the side opposite the hinge. As shown, position the tab with the square side just touching the engine casing. Apply the other tab in the same way. View your model from the rear and compare the rear view of the general layout with it.



STEP 9

☐ Step 9. Glue the nose cone into place.

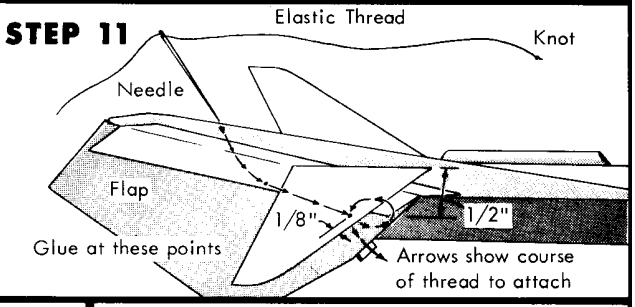


STEP 10

☐ Step 10. Remove the masking tape from the fin-flap joint. PAINT the model the color(s) of your choice. The elastic thread is installed as the last construction step.

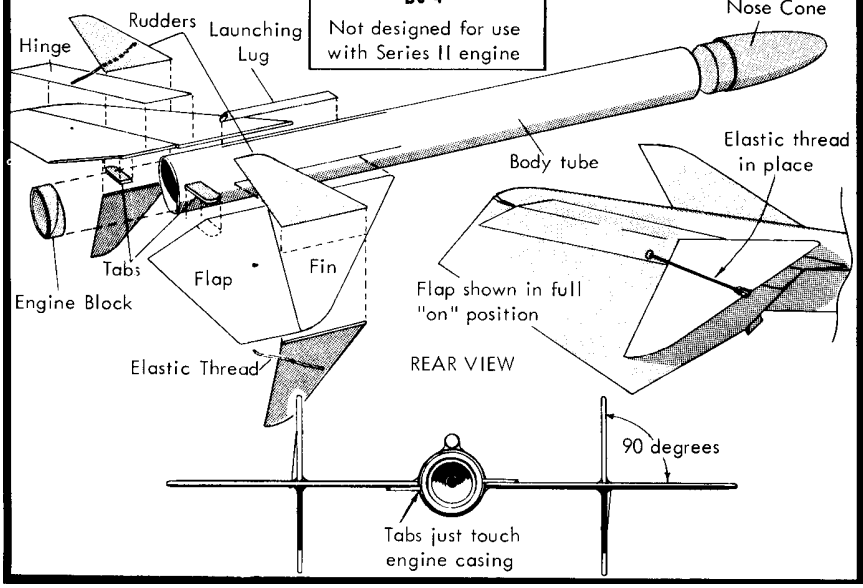
STEP 11

☐ Step 11. Thread the elastic thread through the eye of the needle, and knot the other end of the thread. Hold one flap against its rudder and push the needle through the flap from the back. The needle point should come out through the hinge 1/16" from its rear edge. Draw the elastic thread through until the knot is seated against the flap. Apply a touch of glue to the knot side forcing just enough glue through the hold to appear on the hinge side. Allow this glue to set. Locate a point 1/2" up from the root edge and 1/8" back from the leading edge of the rudder. Push the needle through and draw the thread tight enough to pull the flap from a straight position to full flap position. Apply glue as you did on the flap and hold the elastic thread in this position until the glue appears firmly set.



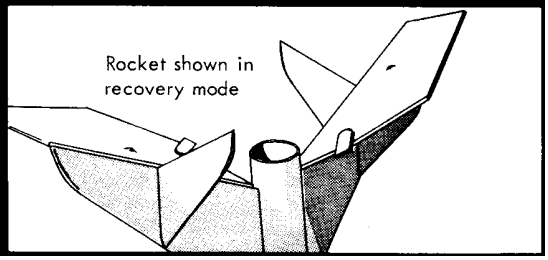
GENERAL LAYOUT

Suggested Engines:
1/2A6-2, A5-4, A8-3, B6-4
Not designed for use with Series II engine



COUNTDOWN ✔ LIST

☐ 10 Select an engine and insert an ig-niter following the instructions that came with the engines.
☐ 9 Hold flaps in their neutral position and slide the engine into place. No tape is needed - - just release the flaps.
☐ 8 Place the rocket on the launcher. Clean and attach the clips to the igniter leads.
☐ 7 Clear the area, check for low flying aircraft, alert recovery, timer, and track-ing crews.
☐ 6 Arm the launch-controller and check continuity.
☐-5- ☐-4- ☐-3- ☐-2- ☐-1- LAUNCH!



Glamorous Glennis Flies Again

by George Gassaway

I was asked on the Internet to describe how the X-1 model was built. So what follows is a description of the building and the flying. I have also set up a simple web page that shows a picture of the model after the decals were applied, and a drawing showing a number of key details about how the model was built. You can find it at: ***http://members.aol.com/GCGassaway/page1.html*** It also has a link to Alex Seltsikas' R/C Rocket Glider page, which among other R/C models includes a number of pictures of the X-1 model before and during flight.

The X-1 has a scale factor of 1/10, with a diameter of 5.4", length of 37" and span of 36". The wings are just a bit bigger than scale, for a wing area around 165 sq. in. (150 would have been scale).

It's got all-wood construction. The nose section was built up using round formers and 24 stringers, with 24 3/16" balsa "planks" glued across the stringers. The 24-facet cross-section was sanded to a round cross-section. The center fuselage was also built up, but a very simple frame with bulkheads, skinned by 1/8" balsa curled to shape. The rear section was a straight cone made up of 3/32" balsa curled similar to how paper & cardboard transitions are made. Some 3/16" balsa was glued inside the lip of the slightly oversized large end of the tail cone so when sanded down there was a 2" curved transition instead of a sharp break. Not quite the right rear fuselage shape, but practical and light.

The wing was also based on balsa construction, with 1/16" wing skins, and using a Bob Parks BP-3d airfoil. The wing had a 5.75" span center section that glued into the fuselage mid-section, the outer panels of the wing plugging into the center section using telescoping fiberglass tube joiners and music wire alignment pins.

Wing control surfaces consist of what were flaps on the real X-1 (going out about half-span from the root). On the model, those flaps were used as flaperons, moving both as flaps and as ailerons. The flap capability has recently been taken out- they act only as ailerons.

The horizontal tail section was built to be all-moving, a "flying tail". That simplified making the tail removable for transport, slipping the two halves and their joiner rods from the bellcrank inside the hollow fin/rudder assembly.

The X-1 is powered by a 32mm reloadable motor, as used by the AeroTech "Phoenix" Rocket Boosted Glider, for G12 and F13 power. I might do an F16J someday but the endburners are more my speed. The burnoff of the propellant would cause a VERY significant shift in the CG due to the far aft location. To compensate for this, a vacuformed water ballast tank was added as far up front as possible. It held 90 grams of water with a fill/drain line and a vent line. At liftoff the drain line comes unplugged to allow the water to drain out by gravity-feed. The ballast tank is fully drained about 4-6 seconds into positive-G glide after a G12 reload.

Final details of the model were that the upper and lower ventral system tunnels were made out of vacuformed plastic. The finish of the model was primarily by using orange Towerkote iron-on covering. The lower ventral tunnel was painted using a color-matched paint by Monokote. I wish I'd painted the upper tunnel too, as the Towerkote produced some stubborn bubbles.

The big "Stars & Bars" markings were mostly cut-out trim Monokote, plus some red decal stripes that Ed Lacroix added. The decals for "Glamorous Glennis", "Bell Aircraft", and a few other markings were done in MacDraw (much traced from scans of X-1 kit decals Alex Seltsikas did for me) and color printed. The color print then was used as a master in a color Xerox machine to print onto some high quality clear water-decal film Tom Campbell gave me information on (From Micro-Mark). Obtaining the decal material and printing them was described in more detail earlier this week in the thread about how to make decals.

The model's mass turned out to be around 30 ounces in liftoff mode on a G12, 25 ounces for glide (5 ounces lost by water dump and propellant burnoff).

Now, when I planned building this a few months ago, it was going to be "for fun", to sport fly at NARAM. But part of the way through building it, I started to think about entering it in sport scale at NARAM. It actually was a dumb thing to do if our team wanted to score well; the Little Joe II has a good track record, while the X-1 would not score well in static. But in helping to run NARAM this year, our team wasn't flying as "seriously" as we usually do. Ed LaCroix agreed it seemed like a neat thing to do this year, so we decided to use that for Southern Neutron's sport scale model after all. Indeed it didn't score up there in static - 5th place.

I'll jump to the flying (leaving out the launch angle portion which has been beaten to death). Ed LaCroix assisted getting the bird ready to fly from the tower, as we loaded the water ballast, plugged in the battery pack, and popped the canopy in place. At launch it took off out of the tower straight. But it had a bit too much up trim; it pitched up near vertical and I had to use full down to keep it from going beyond vertical onto its back. It also had a roll that I let go while working the pitch control . Finally settling down into a glide, it stalled somewhat due to the trim still being off. I got it sort of

Glennis (continued)

trimmed, and also trimmed out a roll to one side. Finally ready to land and coming in just fine, it pulled to the left. The flaps didn't deploy symmetrically. Landed safely, but missed the runway.

OK, so it was planned to be one flight. But that flight wasn't satisfying. So, quickly it was ready to fly again. This time with downtrim added, and aileron throw reduced (it had been sensitive in roll on glide). The launch was very smooth, as though on rails. Pulled a bit of up to bring the final climb angle to around 60 degrees, and corrected a bit of roll. So it was a very smooth easily controlled boost. Altitude was around 500 feet. Never even felt the difference when the last bit of water ballast drained out, it felt good in glide off the bat. Still a bit sensitive still in roll during glide, so I went back to the boost low rate for aileron throw. Did at least one very large racetrack pattern, maybe two, before going to the far end of the runway to set up for landing. Got there with lots of altitude, so did a couple of 360's to burn it off, might even have been able to use a 3rd. Got it on line and came in to land... and it kept on going. Had expected to land 50-100 feet in front of me, but it flew 50-75 feet past (flaps would have helped there to shorten the slope but after the first miscue, they were not going to be used for the 2nd flight). Fortunately landed on the dirt runway anyway... but not with much room to spare. No idea of the glide time, just it was a lot of fun (once it finally got into the air).

It scored some nice mission points, moving it past the previous 3rd and 4th place static models. Unfortunately, the 1st and 2nd place models, John Pursley's (Jekyll & Hyde Team) huge Saturn-V (around 1/66 scale, 60" tall), and Mark Bundick's (All the President's Men Team) nicely built Atlas-II both crashed, so the X-1 ended up taking 1st place in the Team division.

The model has flown 7 more times since then, 3 at Muncie (US Team flyoffs) and 4 at this month's Birmingham Tripoli launch. One of the last flights was timed, for about 2:15, though that was probably with a bit of a thermal assist.

"Yippee!! That may have been a small one for Neil, but it was a big one for me!!"

- Astronaut Pete Conrad

HARA Membership Application Date _____

1998 Dues: $10.00 first family member; $5.00 each additional member, up to $20.00 / family

Name: _____

Address _____

City, ST ZIP _____

email address? _____

Phone: _____ NAR Member? Y N #_____ Insured? Y N

Age (if under 18) _____ TRA Member? Y N #_____

Send to: **HARA**
1120 Pratt Avenue
Huntsville, AL 35801 Ph: (205) 536-0508

Mark Tygielski's Minnie Magg leaves the deck.

Check the HARA web page:

http://hiwaay.net/~bday/hara

or look for flyers in the local hobby shops for our 1998 launch schedule!

Huntsville Area Rocketry Association
1120 Pratt Avenue
Huntsville, AL 35801

Return Requested

First Class Delivery to: