

April 16, 1984

Dear NIRA Members:

As many of you know, the club voted to really try and win the National Section Championship this year. We voted on a contest schedule and events at the March meeting. This letter is to remind you about that project and to get you up to date on how our plans are progressing.

The full contest schedule is attached. There have been some changes due to two things. One, the hot-shot NAR competitors messed up on the event weighing factors, and had to change some events. What we did was drop Streamer Spot Landing from our section meets, and add 1/2 A Parachute Duration. This made the event weighing factors come out even.

Secondly, we weren't able to get Ackerman Park when we wanted it. We had to cut our first section meet to only a day, and reschedule the April section meet until our June rain date.

Finally, the people in Fort Wayne couldn't change their events for us, so we have to fly another open meet on our own. I will be contacting a club in Wisconsin to see if they want to fly against us. If they don't, we'll fly the meet anyway, and drop our people from the low end of the point scale to make the "75% rule".

For those of you new to competition, don't worry. Come on out, help out the club the best you can, and have a good time. Our more experienced members have talked about this competition stuff, and we're committed to helping out the new guys. If you don't know something, ask. We all didn't know it at one time when we first started either.

We've added a section that describes each event briefly. Read the Pink Book rules for this event, and call Bunny, Bob or Ric with any questions. None of them will admit it, but they each helped write that silly rule book, so they should know what's going on, eh? They can explain anything that's confusing to you.

Lastly, we added some suggested kits to use in each event, along with some plans for those that don't have any kits, like gliders. Bunny and Ric are making up some glider kits and will pass them out at the April 22 launch and May 4 meeting. Let Bunny or Ric know if you need a kit. Only a limited number are being made up at this time, but we can make more if more people are interested. Bunny will also be at the April 22 launch to discuss gliders and how they work. Be there with your questions.

Winning the National Championship would be nice, but it would be nicer still if every NAR member in the club flew at least one meet this year. We can't win without everyone flying everything. And it will be more fun if you're out there flying than if you're home doing nothing. So give these contests a try, and come out the Ackerman Park. We'll see you there!

Bunny, Ric and Bob

NIRA CONTEST SCHEDULE FOR 1984

MAY 6, SECTION MEET I, ACKERMAN PARK

Sport Scale	- 11	B Int. SD	- 9
1/2 A Int. BG	- 12	C Egg Dur.	- 6
1/2 A PD	- 5	Open SL	- 2

MAY 13, CLUB LAUNCH, ACKERMAN PARK

MAY 19-20, SECTION MEET II, ACKERMAN PARK

Sport Scale	- 11	B Int. SD	- 9
1/2 A Int. BG	- 12	C Egg Dur.	- 6
1/2 A PD	- 5	Open SL	- 2

MAY 26-27, OPEN MEET, BONG FIELD

Sport Scale	- 11	A SD	- 5
1/2 A Int. BG	- 12	1/2 A PD	- 5
Pred. Dur.	- 5	1/2 A RG	- 12
D Egg. Dur.	- 7		

JUNE 3, CLUB LAUNCH, ACKERMAN PARK

JUNE 9-10, OPEN MEET, BONG FIELD

Sport Scale	- 11	A SD	- 5
1/2 A Int. BG	- 12	1/2 A PD	- 5
Pred. Dur.	- 5	1/2 A RG	- 12
D Egg. Dur.	- 7		

JUNE 16-17, NO ACTIVITIES; A VACATION FROM ROCKETS!

JUNE 24, SECTION MEET III, ACKERMAN PARK

Sport Scale	- 11	B Int. SD	- 9
1/2 A Int. BG	- 12	C Egg Dur.	- 6
1/2 A PD	- 5	Open SL	- 2

June 31-July 1, OPEN MEET, BONG FIELD

Sport Scale	- 11	A SD	- 5
1/2 A Int. BG	- 12	1/2 A PD	- 5
Pred. Dur.	- 5	1/2 A RG	- 12
D Egg. Dur.	- 7		

## RULES AND SUGGESTED MODELS FOR EACH EVENT

**Sport Scale** - In this event you build a model of a real rocket. The rocket must have actually flown. Your model will be judged for appearance and accuracy. You must have either a drawing of the actual rocket or a photograph. You must also have a description of the colors used on the real rocket. A color photograph fills both of these requirements. Many older NIRA members have the photos and drawings you'll need. Call Bunny or Bob if you need help.

**Suggested Kits:** Space Shuttle, Saturn V, V-2, Honest John, Phoenix, Mercury Redstone, Exocet, Cruise Missile, Titan II.

**A Streamer Duration B International Streamer Duration** - You must fly a rocket with streamer recovery and do so successfully. You cannot have the streamer fail to deploy, you cannot have the shock cord break, and you cannot kick out your engine. Whatever goes up, must come back down in one piece recovered by the streamer. In the "International" event, your place is determined by summing the times from three flights. You must return at least one of your flights in Streamer Duration. You don't have to return any flights in International Streamer Duration unless a flight judge asks you to do so.

**Suggested Kits:** Alpha, Wizard, Yankee, Mark II, Meteor, Sky Hook, Spin Fin, Eclipse.

**1/2 A Parachute Duration** - The rules here are the same as for the streamer duration events, except you recover the model with a parachute. Your chute must deploy and catch air. Whatever goes up, must come back down in one piece recovered by the parachute. You must return one of your two flights. Remember, Ackerman Park isn't that big, and if you get an updraft, you can lose your model easily. Try 12" parachutes made out of cleaner bags and sewing thread.

**Suggested Kits:** Wizard, Yankee, Mark II, Sky Hook, Spin Fin, Eclipse, Javelin.

**1/2 A International Boost Glider** - Here, a model must go up like a rocket and glide back like the Space Shuttle. Whatever goes up, must come back down gliding. The WASP plans enclosed are a good start, and the "Millenium Falcon" kits will be available at the next launch and meeting. TAKE YOUR TIME BUILDING FOR THIS EVENT!!! A minor misalignment is OK on most Estes kits, but will ruin a BG. You are allowed to drop the engine in this event. This lowers the glide weight of the model for better performance. The WASP has a "pop-pod" while the Falcon kicks out the engine with the streamer attached. You must get the model to glide, and you must return one flight. THERE ARE NO KITS AVAILABLE FOR THIS EVENT!!!

**1/2 A Rocket Glider** - Unlike the boost glider event, here, the model must keep its engine while gliding. The "REBEL" plans show a "slide-wing" glider. Instead of having the wings mounted permanently on the boom, they are mounted on a plywood box. The box fits snugly around the boom, and slides up and down on it. The wings are pulled to the rear during the engine burn. They are tied back there by a piece of thread. The thread is run through holes in the engine pod. When the ejection charge goes off, the thread burns. A rubber band pulls the

wing forward where is it is stopped by a bit of masking tape stuck on the boom. THERE ARE NO KITS AVAILABLE FOR THIS EVENT!!!

BUNNY WILL BE AT THE APRIL 22 LAUNCH TO HELP EXPLAIN MORE ABOUT THESE TWO EVENTS. BE THERE IF YOU HAVE ANY QUESTIONS. BUNNY WILL SHOW HIS MODELS TO EXPLAIN THING. RE-READ YOUR PAST TWO ISSUES OF THE LEADING EDGE FOR BUNNY'S ARTICLES ON BOOST GLIDE.

**D Eggloft Duration C Eggloft Duration** - You must fly a raw egg, Grade A Large, without breaking or cracking it. You score points by staying up the longest time. THERE ARE NO KITS AVAILABLE FOR THIS EVENT!!! However, you can convert many Estes kits for this event. Go to K-Mart, and buy a package of plastic Easter Eggs. They can be converted into egg capsules by epoxying a stage coupler to one end. The stage coupler should be for a tube the same size as the model you want to convert into an egglofter. Add a standoff for the launch rod to get past the capsule. Only BT-58's or larger will give you enough room for a parachute. Check your parachute carefully, and make sure the shroud lines are on tight. Redo any that aren't on good and tight. Most Estes tape discs will not stand up to the shock of an egg pulling on them. Check your shock cord mount, too. Eggs weight 2-2.5 pounces and will pull out any weak mounts. You must return the model so judges can inspect the egg.

Suggested Kits: Maxi-Streak, Skybolt, Alpha, Comet, Cyclone, Marauder, Meteor

**Predicted Duration** - Try to guess how long your model will stay up in the air. Ric Gaff finished third at the Nationals two years ago flying an Alpha. He guessed his time on the field just before the flight. You must have a qualified flight.

**Open Spot Landing** - Using no more than a C engine, how close can land your model to a stake? We measure the distance from the tip of the nose cone to the stake, and the person closest wins. You can use any recovery device, and you must have a qualified flight.

If you fly in schoolyards or other small fields  
don't miss out on B/G fun

# FLY THE 'WASP'

## Hornet Boost/Glider

*Designed by Marc McRenolds*

The *Wasp* was developed to meet the need for a *small*, high-performance, boost/glider for flying in the restricted flying areas around cities and suburbs. Those big Hawk and Eagle B/G's are fine . . . if you have the room to fly them. But if you live in or near a city, and do most of your flying in a school yard, park, or some other 200 foot by 200 foot flying area, what do you do then? Well, you can give up flying B/G. Or you can put a B or C engine in your standard glider, and give it up for lost on its first well trimmed flight. But if you want to continue flying boost/glider, and you would like at least a chance of seeing the glider again (even though the new competition rules don't require that you return the glider to set a record), the Hornet event is just for you. And the *Wasp* is just the thing for Hornet flying!

On its first test flight, powered by a  $\frac{1}{8}$ A5-2S engine, the *Wasp* turned in a time of 64 seconds. Not a bad time, though it was improved on with some more careful trimming. A couple of more  $\frac{1}{8}$ A flights proved the bird's consistency. Then came the real test of structural strength — its first flight under A engine power. It held together, and turned in a 118 second duration. So don't worry about a well built *Wasp* falling apart in the Hornet event. It's strong enough for an occasional Sparrow flight or two.

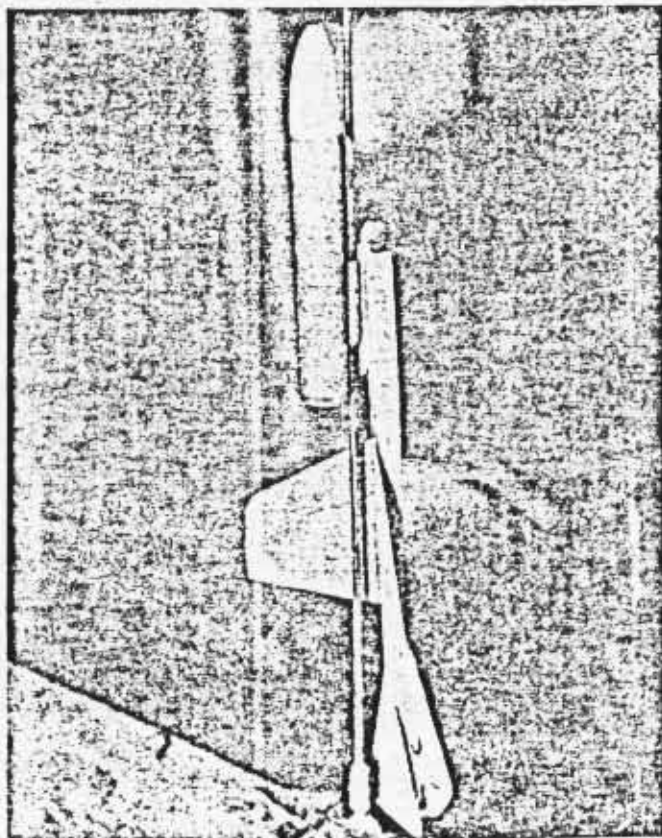
The wings are cut from  $\frac{1}{16}$ " thick sheet balsa. Since the aspect ratio (wing span divided by the wing chord) is quite low, even this thin wing is quite rigid. The stabilizer and rudder are made from  $\frac{1}{32}$ " balsa — much too thin and light for most B/G's. The secret to the *Wasp's* success with a  $\frac{1}{32}$ " balsa stab and rudder is the relatively low aspect ratio of these parts. The stab is twice as long as it is wide, and that shape was chosen to provide *rigidity* not good looks. It's glued to the boom over its entire length, providing the kind of reinforcement that is necessary to brace the thin balsa against the forces of a  $\frac{1}{8}$ A or A engine. The boom itself is constructed from balsa, not spruce, again to save on weight. Though a balsa boom will generally snap under the acceleration from one of the larger engines, flying a Hornet B/G is a whole different ballgame. Balsa is strong enough, and spruce just costs you unnecessary weight. My *Wasp* has flown a dozen times without snapping the boom. These weight saving techniques will make the *Wasp* one of the lightest B/G's seen at any contest. A well finished version should weigh in at no more than  $\frac{1}{4}$  of an ounce, without pod or engine.

If you stick to flying it only in Hornet, you can trim the *Wasp* so you'll never lose it. But if you really want to maximize the duration you'll have to trim it for a fairly tight circle, with a radius of about fifty feet so it can catch a thermal. If you trim it that way and succeed in finding that thermal, watch out! . . . you may prove that it's possible to lose this Hornet B/G.

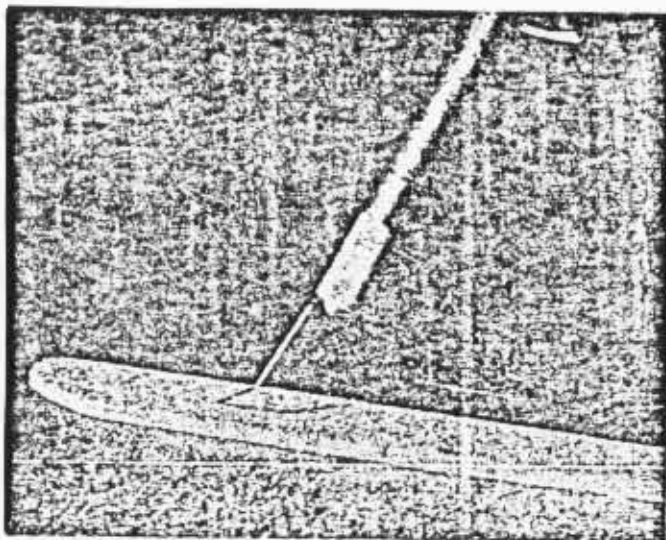
Construction of the *Wasp* is relatively simple for a contest glider. In fact the only tools you really need are a sharp X-Acto knife, or a razor blade, and a piece of #400 sandpaper. It takes about two hours to assemble the *Wasp*, and most of the time it really is fun!

### Boom Construction

As mentioned previously, the boom is cut from a piece of  $\frac{1}{8}$ " thick balsa stock. Choose a strong, warp free balsa boom, as any bend will exert an unwanted tail moment during boost. Just trace the boom pattern from the plans, and use it to mark the boom for cutting. Be sure to use the one pre-cut edge of your balsa stock as the top edge of the boom. It is important that the top edge be



The WASP sits prepped on the pad. A stretched spring over the launch rod is used to keep the pod from sliding down the rod. It's much easier than tape, and the next rocketeer to use the rod isn't left with a mess to clean up. Note that, like most competition B/G's the WASP is left unpainted. Fine sanding, with #400 to #600 sandpaper, of all surfaces is all the finishing that is necessary.



Cut the Piece-X from the boom using a sharp X-Acto knife. Remove the entire section as a single piece. This will be used later as the Piece-X attachment to the pod.

straight since it will be used for accurate alignment of the wing and stab.

Cut the Piece-X from the boom using a sharp X-Acto blade. Don't crush the Piece-X, cut it cleanly using a straight, careful cut. The Piece-X cut from the boom will be used later, so put it aside. Sand the inside of the Piece-X until it is smooth. Be careful not to remove too much material or the pod will fit too loosely.

Sand the boom to the "half-oval" cross-section shown in the plans. The top edge should remain flat, but the bottom is oveled.

The sheet balsa sides of the Piece-X pod should be cut from 1/32" sheet balsa. Apply a light coat of glue to the boom where the sides will be attached. Be very careful not to get any glue inside the pod cutout. Glue the sides to the boom, and set the entire assembly aside to dry.

### Wing Assembly

Cut the wings from a sheet of strong 1/16" thick C-grain balsa sheet. C-grain is much stronger than regular balsa, and will hold up to the engine stresses better. (If you can't locate C-grain, and decide to build the *Wasp* anyway, don't fly it with an A engine.)

Using #400 sandpaper, shape the wing to the airfoil shown in the plans. Note that only the high-point line should remain 1/16" thick. The leading edge is rounded, and the back portion is tapered to about 1/32" thick at the trailing edge. Place the wing on a flat work area and use a sanding block (a sheet of sandpaper wrapped around a 2" x 2" wood block will work fine) to sand the trailing edge airfoil. Since the wing airfoil is flat-bottomed, the entire wing can be sanded in this manner.

After both wing sections are airfoiled and sanded to a smooth finish, they should be glued to the proper dihedral angle. Pre-glue the chord edge of each wing panel with a thin coat of Ambroid. Let it dry for five minutes while you're getting the work area set up.

Place a piece of wax paper on the work board, and locate a box or similar object about 2" high to prop the wing up. When the glue is dry, lay one wing panel to the first, and support the second panel at the proper dihedral angle by placing the 2" high box under the wing tip. Set the entire assembly aside to dry.

### Stabilizer and Rudder

The stabilizer and rudder are cut from 1/32" thick sheet balsa. Trace the pattern in the plans onto the balsa, and cut them out. Lightly sand both surfaces of these parts with #400 or finer sandpaper until they are smooth. Do not attempt to round the leading or

trailing edges unless you are skilled at sanding, or you will break these delicate pieces. Don't worry, they will be much stronger when they are glued to the boom.

Pre-glue the boom, stabilizer, and rudder along the attachment lines. When dry, glue the forward 7/8ths of the length of the stabilizer to the boom and allow to dry. Cut a 1/32" x 1/32" x 1/8" balsa shim from the 1/32" sheet balsa. Gently bend the trailing edge of the stabilizer from the boom, and slide the shim into place between the rear of the stabilizer and the boom. This creates a slight "up elevator" effect on the stabilizer. It's not enough to affect the glider's performance during boost, but it will help the *Wasp* make a fast pull-out during transition. Glue the shim and rear part of the stabilizer into place, and hold it in the bent position for about five minutes while the glue dries.

Glue the rudder into place, and put the entire boom assembly aside to dry.

### Pod Assembly

The Piece-X pod is constructed in the normal manner. Cut the pylon from 1/8" thick balsa as shown in the plans. Sand it to an airfoiled shape as shown. Then glue the Piece-X, earlier cut from the boom, in place on the bottom of the pylon.

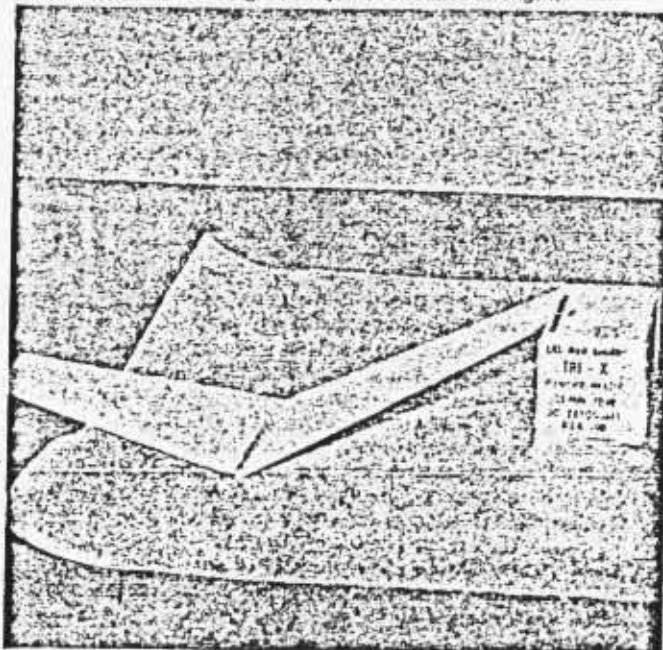
Glue a 4" length of BT-20 to the top of the pylon. When dry apply a glue fillet for added strength.

Hollow a BNC-20A nose cone to decrease the weight. Add an EB-20A engine block to the pod. Tie the shock cord to the front edge of the pylon and to a piece of shock cord attached directly to the nose cone. Use an 8" chute for recovery.

When the pod assembly is dry, slip the Piece-X in and out of the boom. If it is too tight, sand the Piece-X lightly until it just fits smoothly. The fit is correct when the glider just begins to fall off the pod when the entire assembly is held upside down by the pod.

### Wing Attachment

Pre-glue the bottom of the wing chord and the top of the boom along the attachment points. Glue the wing to the boom with the entire wing assembly tilted approximately 10° (see plans). The wing assembly is tilted to introduce a slight turning force, which causes the glider to circle during glide without interfering with the boost. When dry, fillet the wing/boom joint for added strength.



The dihedral is glued in the wings by placing one of the wings flat on a work surface, gluing the joint, and propping the other wing panel up with a 2" block inserted under the wingtip. A standard 35mm film box, 1 1/2" high, is just about the right height to prop up the wing.

## Glide Trimming

Remove the pod and find a small field for glide trimming — any reasonable size backyard will do fine. Clay is probably the most convenient trimming weight. (If your hobby shop does not stock trimming clay, get some artists clay at an art supply shop. It sells for about 40¢ a pound — more than enough to trim hundreds of Wasps.) Trim weight is added to the lower part of the forward boom.

Without any trim weight, if your choice of materials was similar to mine, your Wasp will stall when hand launched. Add a little weight to the lower edge of the boom near to the front. Toss the glider again, and note that the stall is not as great. Continue with the addition of slightly more trim weight each time until the Wasp begins to glide cleanly, just on the verge of a stall. Trimming by this method will usually result in an almost optimal duration glide.

When you get out on the field, trim it again. The time for final trimming is just a few minutes before your flight. If the weather is windy, add a bit more nose weight. This will decrease the angle of attack, and slightly increase the glide speed of the B/G. It seems to

help in windy weather.

The wing was mounted at a 10° angle to cause the Wasp to glide in a gentle turn. If the turning radius is not small enough for your field, you can tighten the turn by adding a small amount of trim weight to the wing tip on the side you wish the glider to turn towards. If you do this, be sure to retrim the glider for optimal duration after the addition of turning weight.

Flying the Wasp is as simple as any other single engine rocket. Just prep the engine as normal. Add some chute wadding and an 8" chute to the pod. Check to see that the pop-pod fits loosely into the boom. To keep the glider from falling off the pod while on the pad, a stretched spring can be used to support the pod. (Take a look at the photograph to see how this is done. Suitable springs are available from Space Age Industries, but the more expensive spring from a ball-point pen will also work if you can't locate the SAI spring at your hobby shop.) Slide the launch lug down the rod, hook up the clip leads, and fire!

*Good Flying!*

## Mr. Wizard's Opens in Mass.

TV's Mr. Wizard (Don Herbert) and Andy Macalaster of Newton, two experienced gentlemen in the field of science education, have combined their talents in a new venture to aid the youngsters in their pursuit of scientific knowledge. They have opened a MR. WIZARD'S SCIENCE CENTER at the intersection of Route 9 and Route 16, in Wellesley Hills, Massachusetts.

SCIENCE SPOKEN HERE is the slogan of this unique Center where traditional science apparatus, science toys and hobbies and science books will all be carried under the same roof. The store has two floors, the first floor exhibits equipment for model rockets, physics, optics, electronics and space, and the second floor carries chemistry, life science, and earth science materials. In addition there is a workshop with raw materials available for project construction. Personnel are carefully selected for their knowledge and experience in science.

The model rocket section of the store features a complete line of Estes, Centuri, and MPC parts and engines, as well as FSI, Cox, Estes, Centuri, and MPC Kits. The stock includes everything from beginners kits and starter outfits, to Saturn V's and CINEROCS for the advanced rocketeer.

Once the first Mr. Wizard Science Center has been established, Herbert and Macalaster plan to have such centers throughout the country.



The first Mr. Wizard's Science Shop, with a complete stock of rockets and supplies, has opened in Wellesley Hills, Massachusetts.

## Gov. Love Tours Estes

### Colorado Governor Fires Saturn-V

Colorado Governor John Love recently toured the Estes Industries plant in Penrose, Colorado. Governor Love, accompanied by Vernon Estes, saw the Estes manufacturing facilities, and launched an Estes 1/100 scale Saturn V model. The Governor was in Freemont County, Colorado, to visit with Republican leaders. He took time out from his busy schedule to look over the world's largest model rocket manufacturing facility.



Governor John Love (left) launches Estes Saturn-V as Vernon Estes looks on.

## NEWS NOTES

### ARRA Convention

The Atmospheric Rocket Research Association is presently organizing the second Canadian Model Rocket Convention to be held in Montreal on July 2-4, 1971. The convention activities will include discussions, speakers, films, rocket competition, and a banquet. Improved facilities and a more suitable launch site are top priorities in the planning.

The Second Canadian Model Rocket Convention will feature activities and discussions for all Rocketeers from beginners to advanced. Convention information is available from ARRA, 7248 2nd Avenue, Montreal 453, Quebec, Canada.

# WASP



A Beginner's Boost Glider  
from 12/70 Model Rocketry

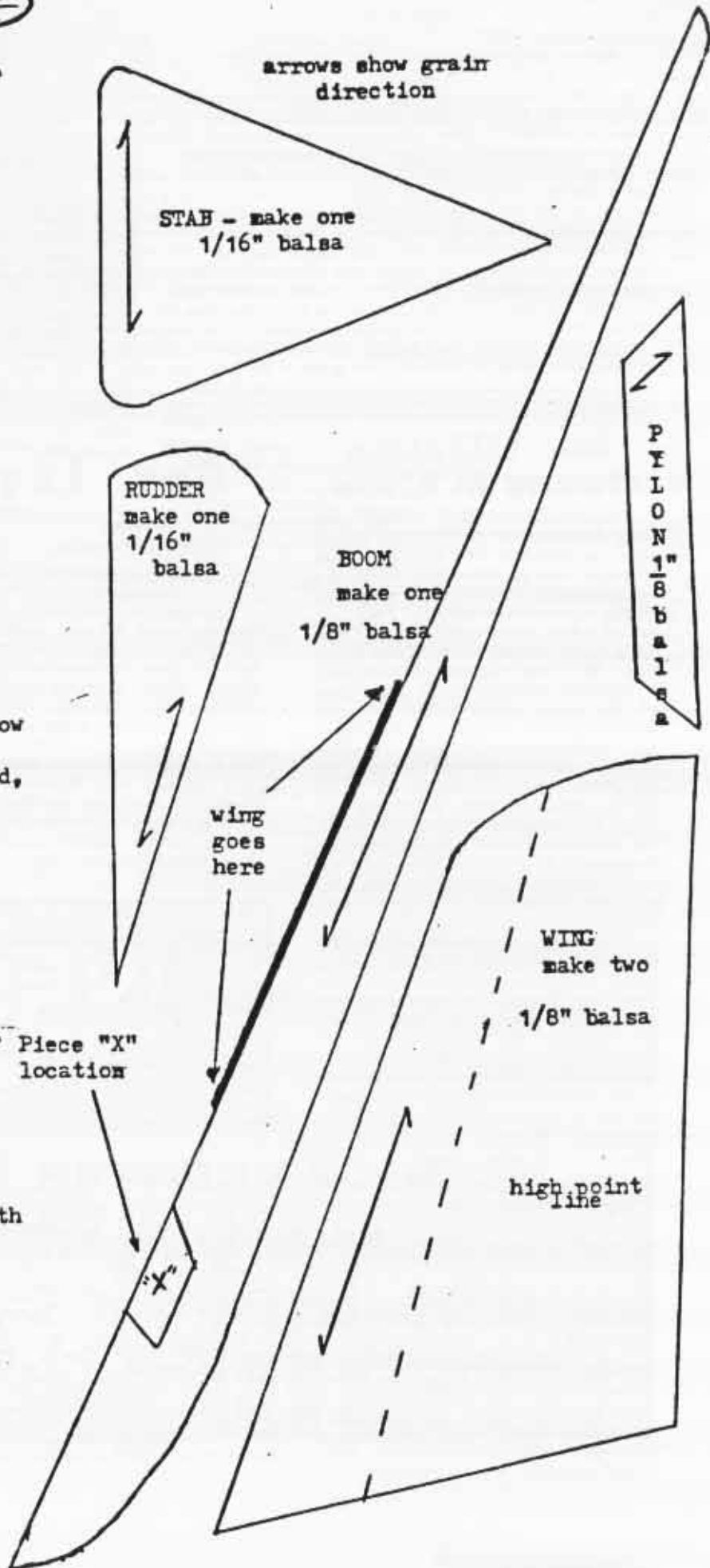
Begin by cutting out all parts. Round edges of rudder, stab and pylon. Sand an airfoil on wings, making sure you have a left and right wing. Bevel root edges of wings. Leave one wing flat on table, prop other wing tip up 2" and glue. This provides the right dihedral angle. Build a pod from 5" of BT-5, engine block, launch lug, recovery system (6" streamer) and pylon. CAREFULLY cut out "X" and glue to rear of pylon. Cover the hole in the boom with two  $\frac{3}{8}$ " x 2" pieces of  $\frac{1}{16}$ " balsa. Glue stab to rear of boom, leaving the last  $\frac{1}{8}$ " unglued. When dry, put a "shim" under the stab to raise the trailing edge up  $\frac{1}{16}$ ". This helps the Wasp pull out of dives. If you use too much, the model will loop under power, so be careful. Glue the rudder to the boom just under the stab. Cut a shallow "V" notch in the boom where the wings go, then check the fit. When satisfied, glue on the wings.

Check the fit of Piece "X". The glider should just barely stay on when held upside down. Sand "X" until you get to this point.

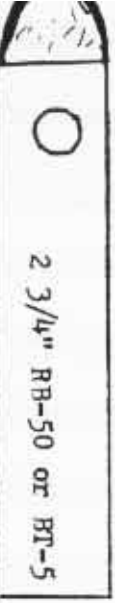
Trim the glider by adding clay to the nose. Add or subtract clay until a flat smooth glide is obtained. You can get a turn by putting clay on a wing tip, but you'll have to take some off the nose to compensate.

Recommended engines are the Estes  $\frac{1}{2}$ A3-2t and A3-2t. If you reduce all wood sizes a bit, you can also fly with the  $\frac{1}{4}$ A3-2t.

Mark B. Bundick  
1925 N. Hudson Avenue  
Chicago, IL 60614







2 3/4" RR-50 or RT-5

Launch Lug

1/8" balsa

Wing Dihedral - 1 1/2" under each tip

"box" of 1/32" plywood built to slide freely, but with a minimum of slop

1/8" x 1/2" spruce, 9 1/2" long

LAST 1/2" of stab trailing edge has 1/16" shim

"RERCEL"



A Slide-Wing Rocket Glider

Designed by George Purcell, 1971

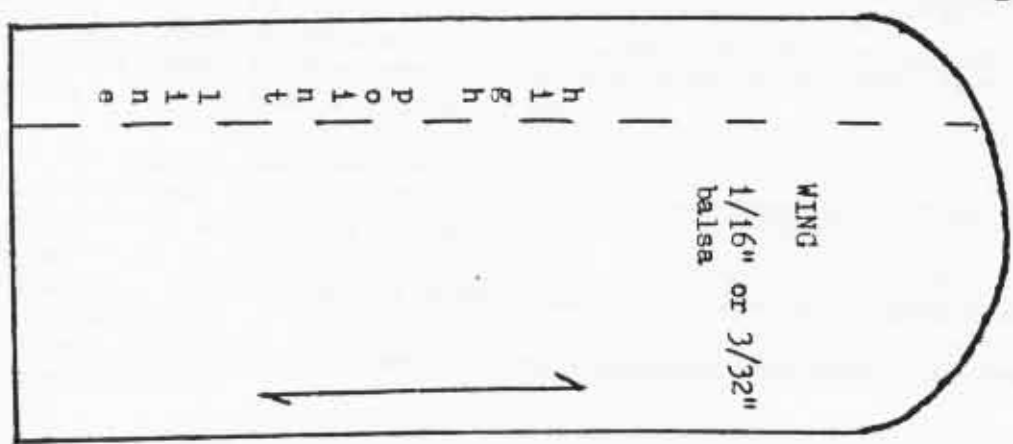
1/32" music wire fitting at front of box to hold small rubber band with knot in middle. Band pulls wing forward. Wing is held back during boost by thread or "Kuhn string" (CMR # SL-1) tied to music wire attachment and threaded through notches at front and rear of boom, then through exhaust holes in body tube.

Materials List

- 1/32" x 2" x 7" balsa
- 1/16" x 2" x 10" balsa
- 1/32" x 2" x 2" plywood
- 1/8" x 3/4" x 1 3/4" balsa
- 1/8" x 1/2" x 9 1/2" spruce
- 2 3/4" RR-50 or RT-5
- small balsa nose cone
- launch lug
- 1/32" music wire or paper clip

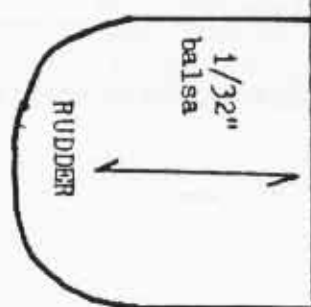
Engines:

- 1/4 A3-2t
- 1/2 A3-2t
- A3-2t



WING  
1/16" or 3/32"  
balsa

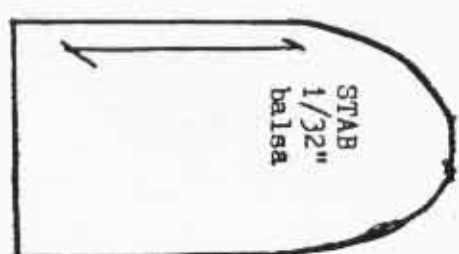
h i l l p o l l i n e



RUDDER

1/32"  
balsa

Arrows indicate grain direction



STAB  
1/32"  
balsa

CHICAGO, ILL.  
APR 19  
PM  
1984  
509

