A FEW FINAL TIPS

If you have built and flown boost-gliders before, you know they are tricky to fly. Their design is more complicated than a standard model rocket . . . so there are more things that can go wrong. Here are some tips to help you have more successful flights.

Do not fly on windy days.

Stand as far back from your launcher as possible, so you can follow the rapid flight easily.

Take one or more friends with you when launching . . . The more people there are watching, the more likely you can see where the glider lands.

For added visibility spray the entire glider with Kandy color, metal-flake or Dope. These lacquers are translucent and will still allow the pre-painted designs to show thru. These paints are very light and will not add too much weight to the model.

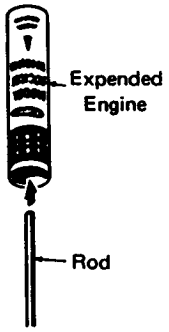
Be realistic . . . Boost gliders don't last forever. Eventually your glider will crash, sometimes for no apparent reason. We have designed the glider to be "frangible". This means that if it crashes, it will destroy itself rather than whatever it hits.

The glider is easily repaired. A good modeler can usually make his own repairs. Always test the glider by hand launching after making repairs, and after each launch.

Countless flights have proven the dependability of this design. If your model does not glide properly the problem is in your assembly . . . Not in the product.

We hope you have as much fun flying your model as we had designing it.

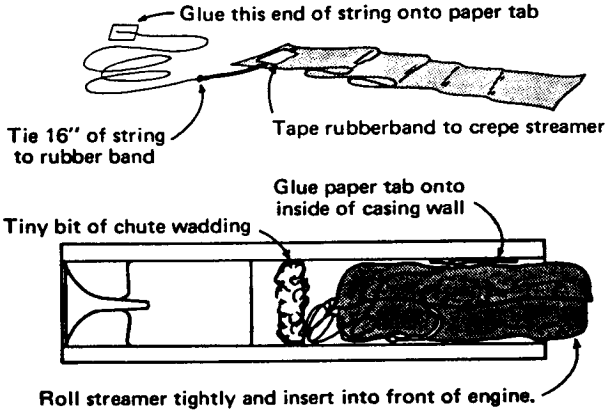
Avoid eye injury by capping the exposed tip of the launch rod when not actually launching! Follow the instructions and the Safety Code, and have many happy hours with Model Rocketry.



SPECIAL NOTE

When the model's engine ejects in flight the fuel is expended. The spent engine casing weighs less than one-half ounce, is aerodynamically unstable, and will tumble harmlessly to the ground.

However, rocketeers who participate in contests sanctioned by the National Association of Rocketry must fly by its rules. The NAR requires that ejected engine casings have a minimum of about 22 square inches of recovery streamer attached. Here's a simple way to modify your model to accept a streamer on the engine casing:



Centuri

CENTURI ENGINEERING CO., INC.
P. O. BOX 1988, Phoenix, Arizona 85001

HUMMINGBIRD

BOOST GLIDER

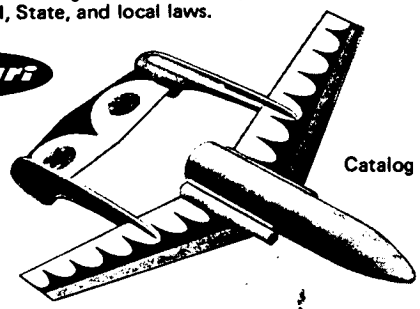
This little boost-glider is another of Centuri's new breed of fun rockets! The pre-colored, pre-cut parts go together quickly making this one of the easiest boost-gliders to build.

Designed primarily for fun and sports-flying, you can also hold competition events and flight duration contests.

While the boost-glider is quite easily assembled, it requires the same care in flight trim adjustments as any other boost glider. Be sure to follow the trim instructions and flying tips.

This rocket is designed to be launched only from standard remote-controlled electrical launch systems. Always use the recommended engines and recovery wadding. Comply with all Federal, State, and local laws.

Centuri



Catalog No. KF-2

MODEL ROCKETEER'S SAFETY CODE

CONSTRUCTION
My model rockets will be made of only lightweight materials such as paper, wood, plastic, and thin metallic foils, with the exception of payloads and engine holders made of wirelike material.

ENGINES
I will use only pre-loaded factory made model rocket engines in the manner recommended by the manufacturer. I will not change in any way nor attempt to reload these engines.

RECOVERY
I will always use a recovery system in my model rockets that will return them safely to the ground so that they may be flown again.

WEIGHT LIMITS
My model rocket will weigh no more than 453 grams (16 oz.) at liftoff, and the engines will contain no more than 113 (4 oz.) of propellant, as prescribed by Federal Regulations.

STABILITY
I will check the stability of my model rockets before their first flight except when launching models of already proven stability.

LAUNCHING SYSTEM
The system I use to launch my rockets will be remotely controlled and electrically operated, and will contain a switch that will return to "off" when released. I will remain at least 10 feet away from any rocket that is being launched.

LAUNCH SAFETY
I will not let anyone approach a model rocket on a launcher until I have made sure that either the safety interlock key has been removed or the battery has been disconnected from my launcher.

LAUNCH AREA
My model rockets will always be launched from a cleared area, free of any easy-to-burn materials, and I will only use non-flammable recovery wadding in my rockets.

BLAST DEFLECTOR
My launcher will have a blast deflector device to prevent the engine exhaust from hitting the ground directly.

LAUNCH ROD
To prevent accidental eye injury I will always place the launcher so the end of the rod is above eye level or cap the end of the rod with my hand when approaching it. I will never place my head or body over the launching rod. When my launcher is not in use I will always store it so that the launch rod is not in an upright position.

POWER LINES
I will never attempt to recover my rocket from a power line or other dangerous places.

LAUNCH TARGETS AND ANGLE
I will not launch rockets so their flight path will carry them against targets on the ground, and will never use an explosive warhead nor a payload that is intended to be flammable. My launching device will always be pointed within 30 degrees of vertical.

PRE-LAUNCH TEST
When conducting research activities with unproven designs or methods, I will, when possible, determine their reliability through pre-launch tests. I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launching.

FLYING CONDITIONS
I will not launch my model rocket in high winds, near buildings, power lines, tall trees, low flying aircraft or under any conditions which might be dangerous to people or property.

 IP-477-0972

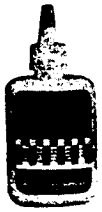
HOW DOES IT FLY?

This model utilizes the principle of front engine ejection . . . one of the simplest boost-glider techniques.

With the engine in place, the Center of Gravity (CG), or balance point, is ahead of the Center of Pressure (CP). The CP is the point at which all the air pressure forces seem to be concentrated. The engine's weight places the CG toward the front of the rocket while the large fins move the CP toward the rear. With the Center of Gravity ahead of the Center of Pressure, the model rocket will fly in a stable, upward flight path. The same concept is used in the design of archery arrows.

The engine's ejection charge fires at the peak of flight. Because the nose cone is glued on, the engine ejects and tumbles harmlessly to earth.

Now the Center of Gravity moves back very close to the Center of Pressure. The relationship of the wings, stabilizer and the small lift-tab can now provide a form of aerodynamic lift called "Flat-Plate Lift". If the model has been properly flight-trimmed before launch it will now settle into a graceful, gentle glide.



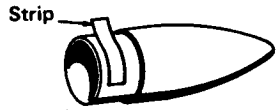
In addition to the parts supplied you will need glue. We recommend Centuri Superbond, or white glue.

Choose a glue whose bottle has a small spout, as shown here. This will simplify applying glue in corners.

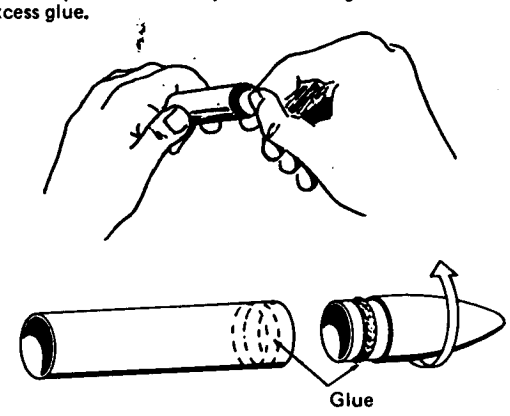
NOTE: Remove the die-cut pre-colored parts from their sheet only as you need each one. Remove them carefully to avoid tearing the fibre material.

DO NOT RUSH THE ASSEMBLY JUST BECAUSE THE MODEL GOES TOGETHER QUICKLY.

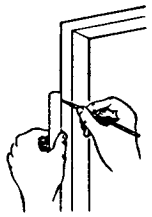
1 The plastic nose cone must be glued firmly in place to withstand the engine ejection charge in flight. Peel backing off small pressure-sensitive strip, and apply firmly to base of nose cone.

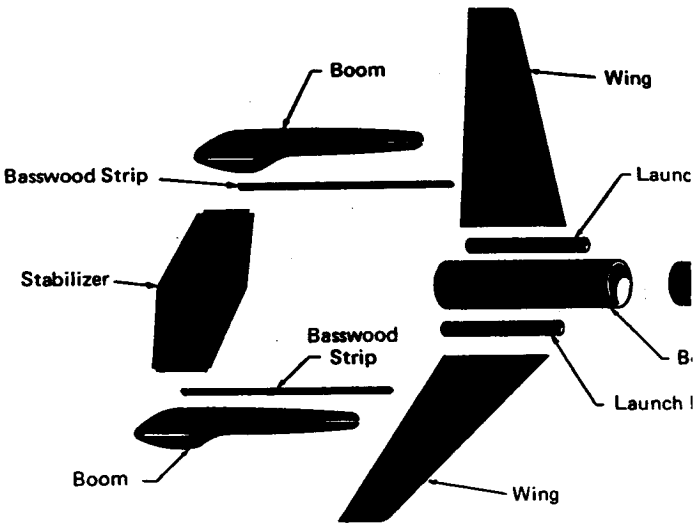


2 Smooth inside edge of body tube with finger nail to remove burrs, and test-fit the nose cone. Glue nose cone in place by smearing glue inside the body tube and on the nose cone base. Glue in place with firm, even twisting motion. Wipe away excess glue.

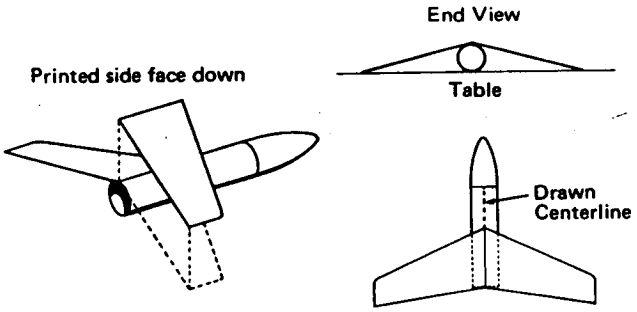


3 Hold the body assembly in any convenient straight groove (such as a door jamb, or partially open drawer) and lightly draw a center line for wing positioning.

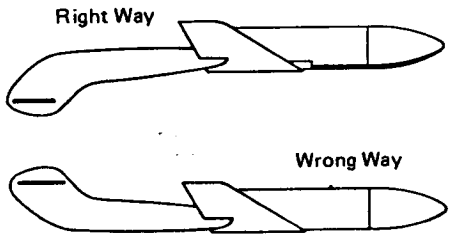




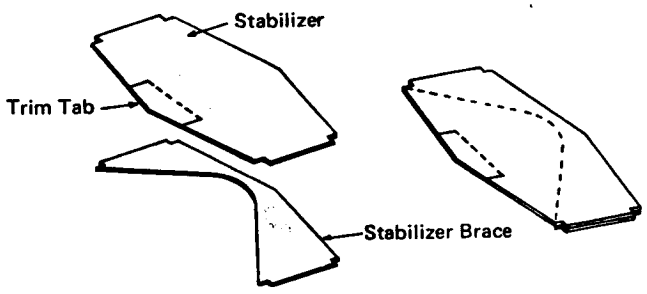
4 The "dihedral" or angled effect of the wings is accomplished this way. Run a glue bead along either wing on the end marked "Root Edge." Lay the body assembly on a flat surface and position the wing (face down) root edge along the tube's drawn line. Repeat with the other wing being sure to align all parts neatly.



5 Now you can study the tail assembly while the wings are drying. Note how the "boom" pieces also include a rudder shape. Be sure you assemble the model with the rudder downwards rather than upwards. The "boom" parts are marked "right" and "left", as you would see right and left sitting on the model (don't sit on the model!).



6 Smear a thin film of glue over the backside of the stabilizer brace. Position it firmly on the underside of the stabilizer. Line the parts up and hold until glue sets.

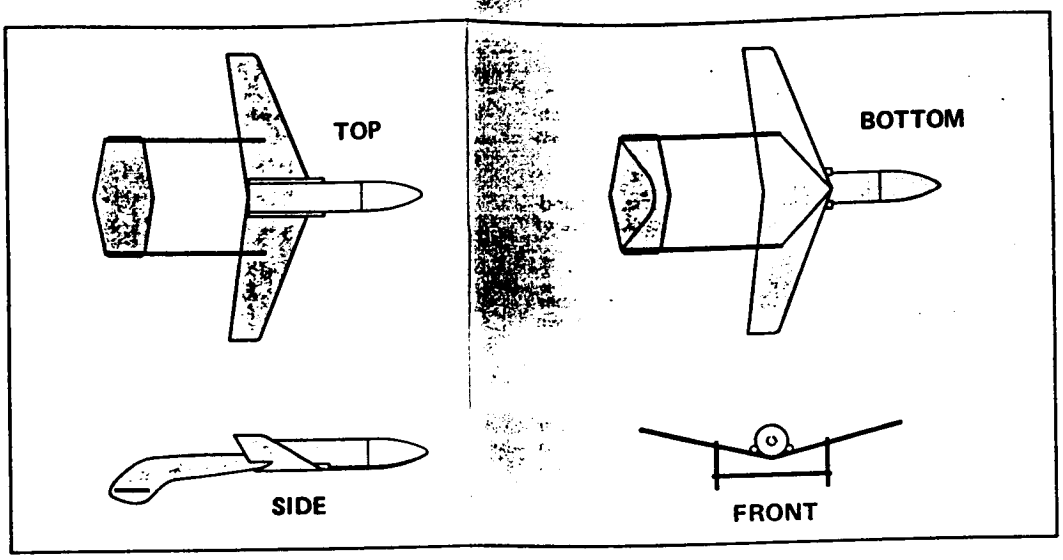


h Lug

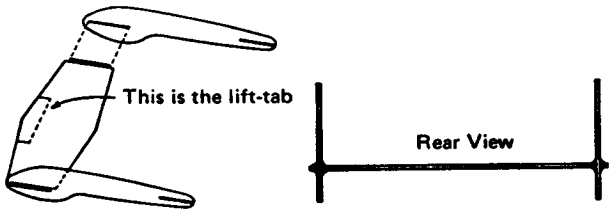
Nose Cone

ody Tube

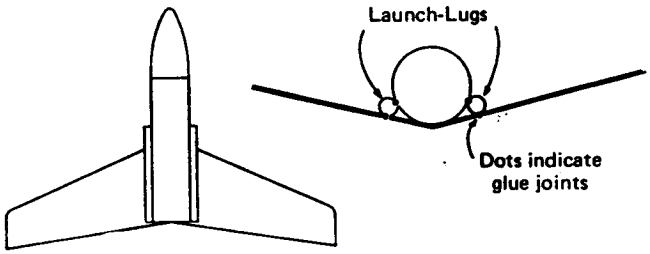
Lug



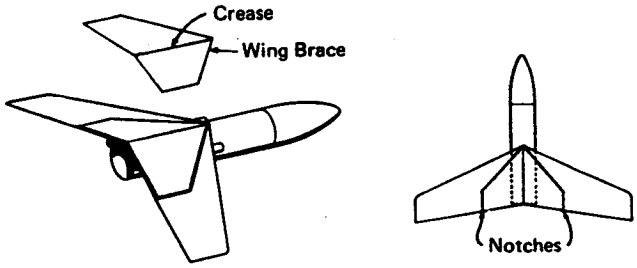
7 Slide the stabilizer tabs into their slots in the booms. Position the booms with their pre-coloring on the outside. Position the stabilizer with its lift tab at the rear. Apply small beads of glue on all four sides of each joint, and smooth into neat fillets with your finger. Don't use too much glue because it will not dry well.



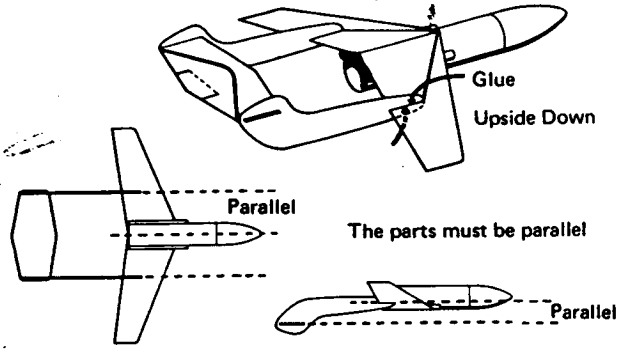
8 The two launch lugs will also reinforce the wing assembly. Lay the launch lugs in the wing body joint. Note how each lug touches a wing and the body at a certain place. Remove the lugs, apply glue at those places and re-position the lugs.



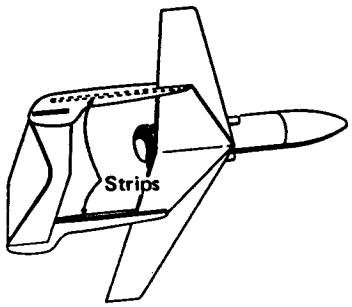
9 Fold the wing brace gently along the crease running down its center. Smear a thin film of glue on the backside of brace and position as shown, hold until set.



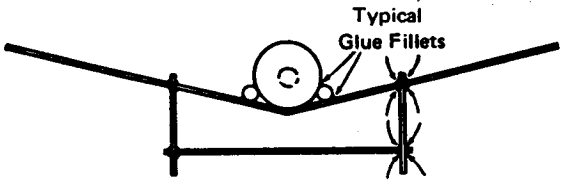
10 Slip the tail assembly and wing assembly together, using the notches. The notches in the booms should pass over the wing and the wing brace. Lay the model face down. Apply glue fillets on all four sides of each joint, like you did earlier with the stabilizer. Look at the model from different views to be sure parts are neatly aligned. THE MODEL WILL NOT GLIDE IF THE PARTS HAVE POOR ALIGNMENT!



11 Run a glue bead along one side of a basswood strip and position as shown on the inside face of a boom. Hold in place until the glue sets. Repeat with the remaining strip on the other boom. These strips provide the strength neccessary for the model to withstand lift-off stresses.



12 The fibre parts provide the light weight needed for gliding ability, but of course they cannot withstand a lot of abuse. You need to reinforce each glue joint with another fillet of glue. Use very fine beads of glue to avoid a sloppy appearance.



IMPORTANT NOTE:

The glue joints must be thoroughly dry before testing and launching. Allow at least one half hour for the glue to dry. Carefully check the glider from all views to be sure parts are properly aligned.

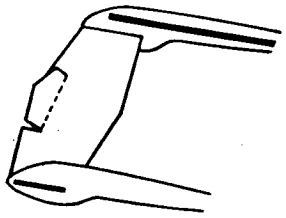
TRIMMING & PRE-FLIGHT PREPARATION

How well your glider flies depends largely on how well you balance (or trim) it before launch. You trim by hand launching your glider, watching it carefully, and correcting for excess turning, diving or stalling.

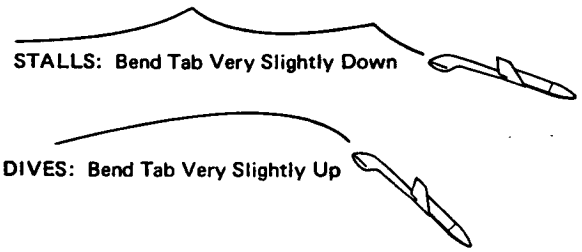
If you have ever built and flown a little 10¢ type of balsa hand-launch glider, you know what we mean by the importance of trimming.

A. Choose a time of day with little or no wind. Remember that this glider is very small and light, and can be blown topsy-turvy by strong winds.

B. Check the trim-tab to be sure it is flat and in line with the rest of the stabilizer. Find a clear area, (hopefully with soft grass) to hand launch your glider. Throw your glider briskly into the wind. If the glider stalls, bend the tab slightly downward and try again. If the glider dives, bend the tab slightly upward.

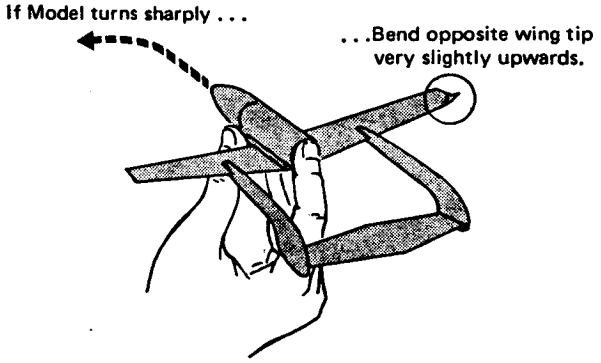


CAUTION: The tab should be bent only if neccessary, and then only slightly. If you have built the glider carefully, you should not have to move the trim tab at all.



C. Repeat this hand launching until the model is able to glide in a long arc. The glider must be thrown as you would throw a hand launch glider, so that it loops and sails for quite a distance.

D. If the model turns quite sharply to the left or right, you must compensate for turn by bending the opposite wing tip's back edge VERY SLIGHTLY upwards. Failure to correct sharp turns may result in the model spiralling into a crash landing . . . The model is fragile so it won't hurt anything it hits, but crash landings do shorten your model's life span!



E. The first time you ROCKET launch your model, you may see that its gliding ability is not as good as you expected from the hand-launch experiments. This is quite normal, and easily corrected. Our R & D staff finds the same thing happening with their test models of boost gliders. This is because a rocket-launched glider has a much greater distance to travel, and therefore needs more precise trimming. If your model loops over and crashes under power, your tab is probably bent too much.

F. The glider must be re-trimmed by hand launching before each rocket launch. This is because a hard landing can bend some parts slightly out of alignment.

FLIGHT PREPARATION

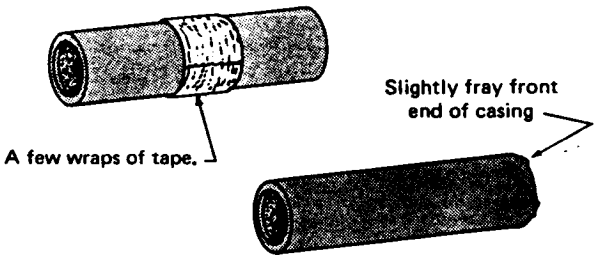
Igniters and complete installation instructions are included in "Engine Operating Instructions" which accompany all Centuri engines.

RECOMMENDED ENGINES

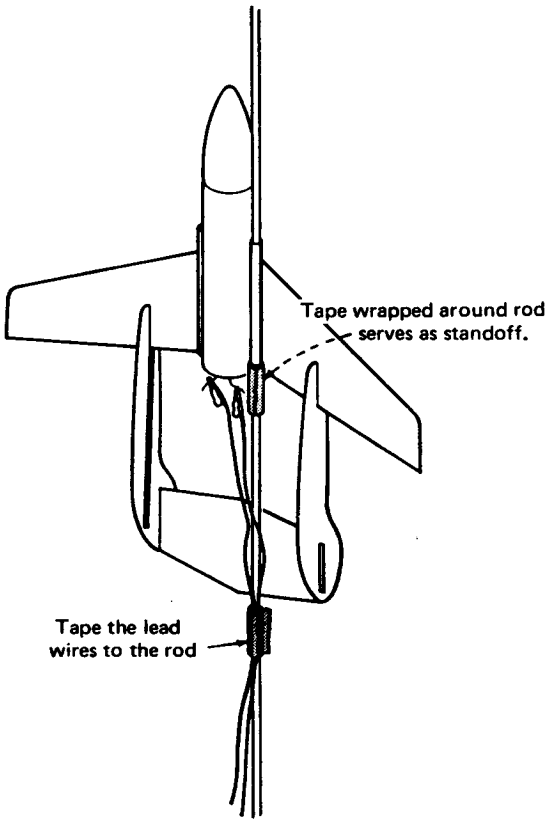
½A6-2 A5-2

We do not recommend the use of more powerful engines, because their greater power usually will put too much stress on the Model's air frame. This model is designed specifically for ½A6-2 and A5-2 engines only. Boost gliders for more powerful engines are also available from Centuri.

Prepare a recommended engine with an igniter. Insert the engine and check its fit. The engine should be able to stay in place without falling out because of its own weight. However, it should not be too tight a fit, or the nose cone might blow off by mistake. Friction fit the engine either of these ways:



Slip the model over launch rod, using either of the launch lugs. Rig the model as shown, to prevent the micro-clip leads from getting caught on the model lift-off.



WING BRACE (TRAILING EDGE)
STABILIZER BRACE (LEADING EDGE)
ROOT EDGE
RIGHT BOOM
Centuri
HUMMINGBIRD
STABILIZER (TRAILING EDGE)
HUMMINGBIRD
Centuri
LEFT BOOM
ROOT EDGE
© Centuri Eng. Co., Phoenix, Az. IP-478 / M-261


STABILIZER BRACE (LEADING EDGE)
ROOT EDGE
RIGHT BOOM
STABILIZER (TRAILING EDGE)
LEFT BOOM
ROOT EDGE