

Estes Industries

Rocket Plan No. 12

March, 1983

SKY SLASH II

Winning Design

Estes Industries Boost-Glide Contest

by

Larry Renger



About the Designer

Larry Renger is a Senior in Aeronautical and Astronautical Engineering at Massachusetts Institute of Technology. A serious modeler for over seven years, he also collects the AAU model planes, and studied the skills of a modeler with a view to making this plan.

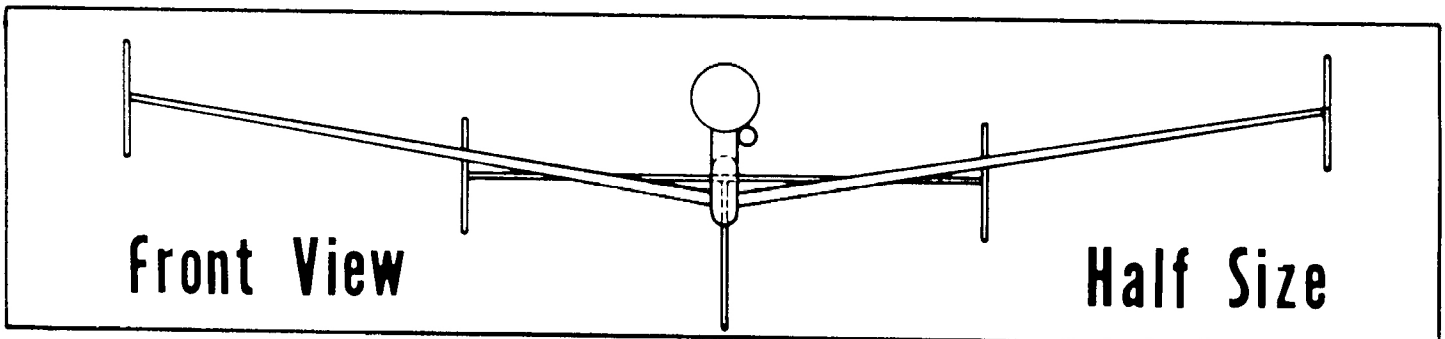


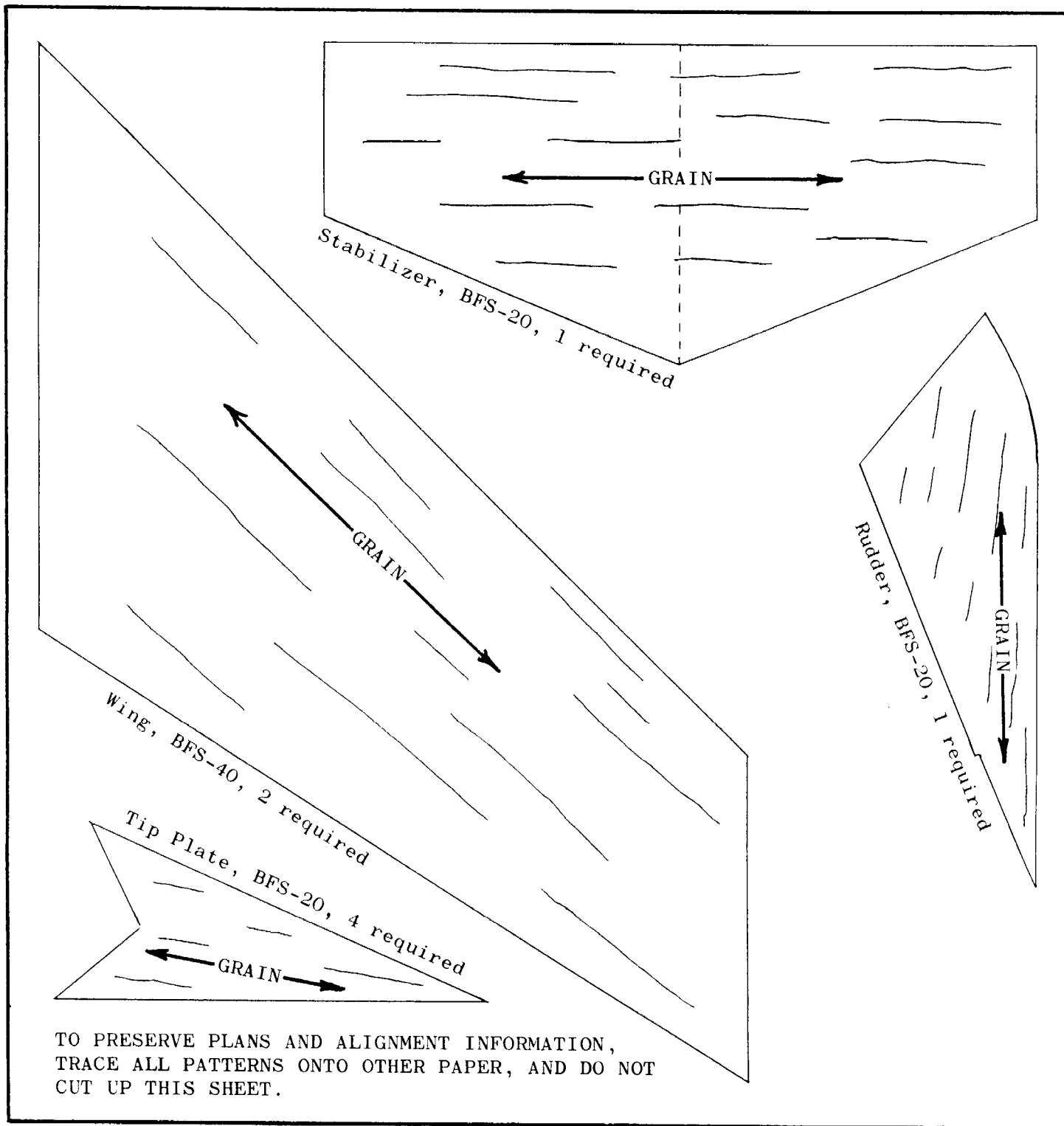
Parts List

- 1 Nose Cone BNC-20B
- 1 Sheet Balsa BFS-80
- 2 Sheets Balsa BFS-10
- 2 Sheets Balsa BFS-20
- 1 Body Tube BT-20
- 1 Launching Lug LL-1B
- 1 Nose Cone Weight NCW-1

Equipment Needed

- 1 Knife or Razor Blade
- 1 Bottle White Glue
- 1 Sheet Medium Sandpaper
- 2 Sheets Extra Fine Sandpaper
- 1 Pair Scissors
- 1 18" Straight Edge
- 1 Coping or Jig Saw





Launching Information

The Sky Slash II is launched vertically using an electric firing system. DO NOT launch the Sky Slash II at any angle greater than 30 degrees from the vertical, as this can result in the destruction of the model. Some launchers will require lengthening the leads to the micro-clips to allow attaching them to the ignitor. This can be done by cutting two 20 inch lengths of #18 wire, attaching micro-clips to one end of each, and gripping the other ends of the wires with the clips already on the launcher.

Assembly Instructions

This model is recommended only for the experienced modeler, as care and precision in the building are necessary for satisfactory results. The rocketeer who has previous experience with both boost-gliders and model airplanes is in the best position to build this glider.

Begin construction by tracing the patterns for the balsa parts onto the proper sized balsa sheets. Be sure that the balsa thickness is the same as that indicated on the plan sheet. Cut out the parts, being careful to run the wood grain in the direction required.

Sand the wings to the airfoil shown on the plans, and sand all other parts to achieve a smooth surface. Using a straight edge at least 18 inches long, mark the body for wing, stabilizer, and engine alignment. For this alignment, hold one end of the straight edge so that its edge is at the point on the rear of the body where the top of the stabilizer will come, run the other end of the straight edge to fall on the position for the bottom of the wing, and draw a line here for aligning the wing. Sand the 2 1/4" notch in the bottom of the rear of the body so that the notch's surface will run exactly on the line from the bottom of the wing to the rear of the body. Sand the upper forward part of the body so that the edge to which the engine holder tube is attached will be exactly parallel with the line from the wing to the stabilizer.

Turn the body piece upside-down and prop it in position so the wing attachment line is one inch from the surface of the table and so the line is exactly parallel to the surface of the table. Glue the wings in position, with the flat underside of the wing exactly on the line drawn previously, allowing the wing tips to rest on the table surface. While the glue on the wings is drying, assemble separately the complete tail section. Make sure that all portions of the tail are straight, with the rudder at a 90 degree angle to the stabilizer.

After the glue on both the wings and the tail has dried thoroughly, hold the tail in place against the body, and using the straight edge, check to be sure the wings and tail will fall exactly in line, and be sure that the forward upper surface where the engine holder tube will be attached is exactly parallel to the wing-tail line. Glue the assembled tail in place, checking to be sure that the alignment is still correct. If a wide, circular glide is desired, glue the tail assembly in place so that one tip is 1/8" higher than the other tip. After the glue holding the tail to the body has hardened, check the alignment again, then check to be sure the forward upper surface is still parallel to the wing-tail line. Glue the nose cone in the engine holder tube, glue the engine holder tube to the body, and glue the tip plates in position on the wings.

When all these glue joints have hardened,

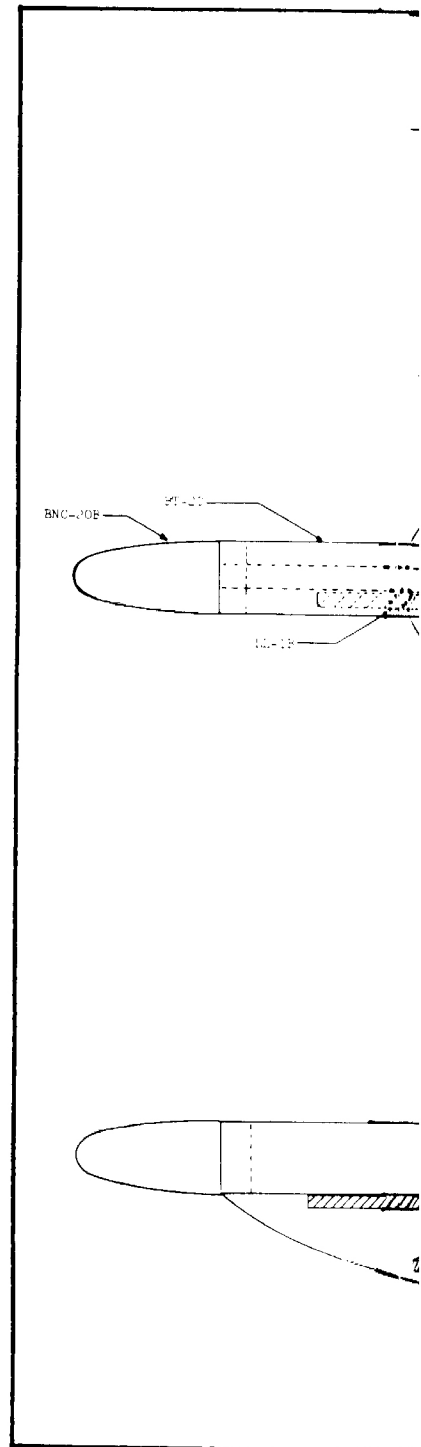
apply a glue fillet to all joints with the exception of the nose cone joint. Apply a light coating of white glue to the upper surface of the body for its entire length to protect the body from the exhaust gases. Glue the launching lug in place. A second fillet layer may be applied to the wing-body joint to give it additional strength.

Punch or cut one 3/16" diameter or several 1/16" diameter ejection pressure relief vent holes in the engine holder tube 1/8" back from the base of the nose cone. To check the positioning of the holes, place an engine casing in the holder tube, mark the casing where the rear of the holder comes, take the casing out, lay the casing against the tube with the mark next to the rear of the tube, mark the tube where the forward end of the casing touches it, and cut the hole 1/8" back of this point.

Before flying the Sky Slash II, balance it for glide by hand launching it and adding small amounts of weight (slivers of nose cone weight NCW-1) to the nose if the rocket stalls, or to the tail if the rocket comes in too fast. When the Sky Slash II is properly balanced, it should travel at least 20 feet forward for every foot of drop when hand launched lightly. Hand launched duration should average over four seconds for a well balanced model, although the maximum for a particular model will vary. The best way to get the best glide is to work on the balancing until the model feels right and appears to glide right, both of which are part of the modeler's skill gained only through practice. Generally the balance point for the glider will be in the region of the rear of the wing-body root joint.

The first flights on the Sky Slash II should be made with 1/2A6-2 engines if the glider without engine weighs less than 20 grams (3/4 ounce, determined by weighing on a balance; the science department at your school should have one) or with A5-2 engines if the rocket is heavier. Individual weights will vary with the amount of sanding, balancing weight, and paint. Generally, the lighter the glider, the longer the flight. For most sport flying, the 1/2A and A engines are recommended, as the Sky Slash II may go out of sight on the glide with larger engines. For contest use, the B4-2 engine is recommended.

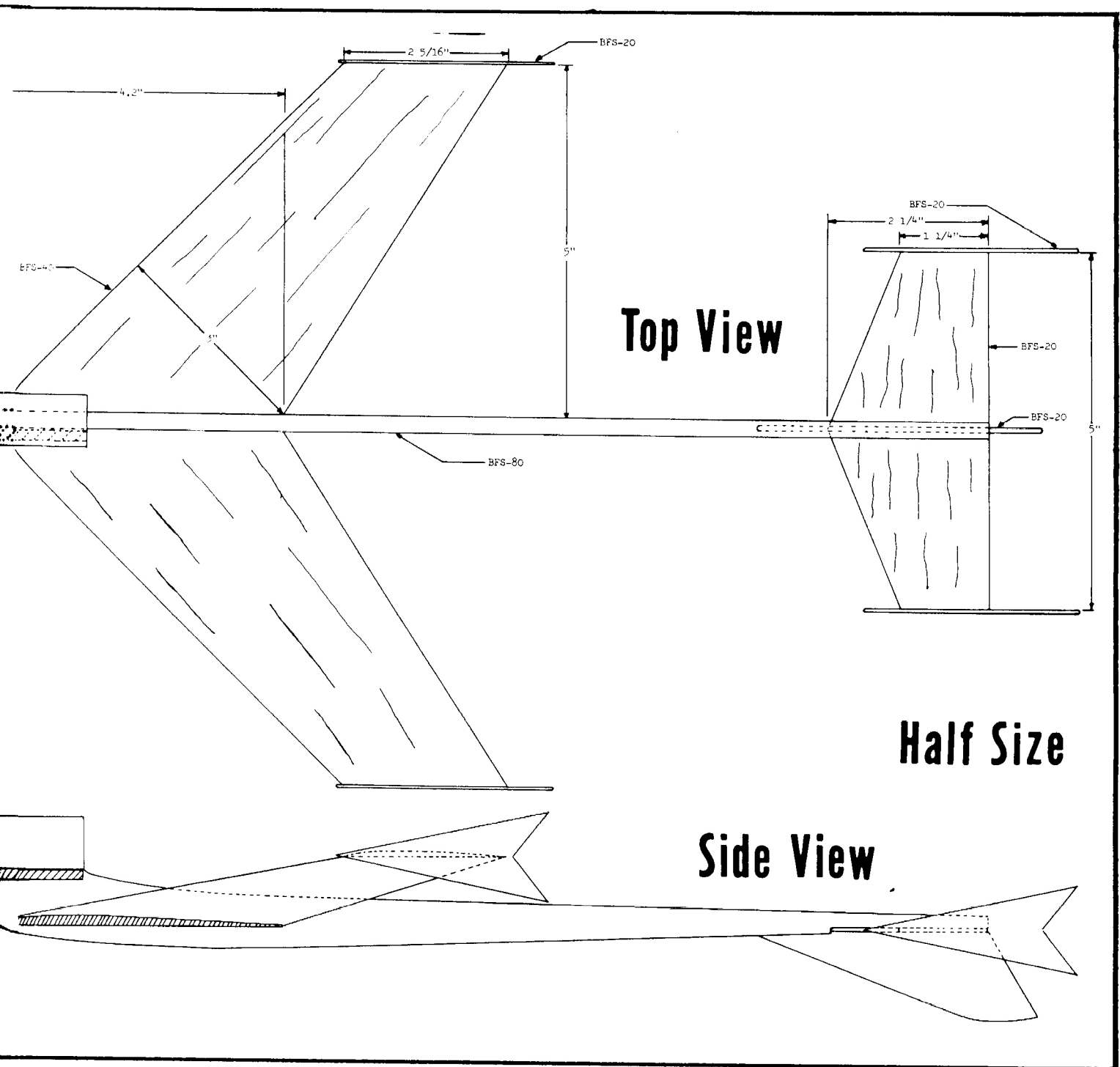
If the Sky Slash II fails to rise vertically on its initial flights, the alignment of the various parts should be checked carefully and corrections made if necessary. In addition, if one wing is heavier than the other, the glider may tend to turn in the direction of the heavier wing under power and in glide. If this is the case, the proper amount of weight added near the tip of the light wing will correct this. If there is much difference between the airfoils of the two wings, this may also cause a poor flight. As experience is gained in the use of this design, it will be possible to achieve better vertical flights and longer durations, as much of the performance of this rocket is dependent on the rocketeer's own skill.



SKY

Full Size





Y SLASH II

Design
by Larry
Renger

