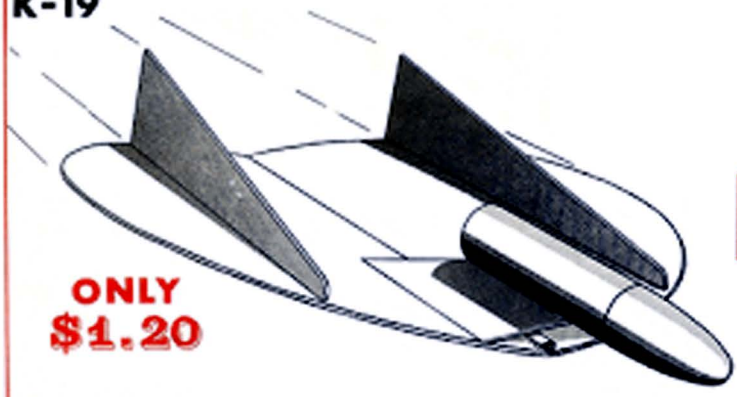
K-19



ONLY
$1.20

ASTRON INVADER!

Specifications

Length	11.8"	Body Dia.	.736"
Span	8.7"	Weight	.89 Oz.

ESTES INDUSTRIES, INC., Box 227, Penrose, Colorado

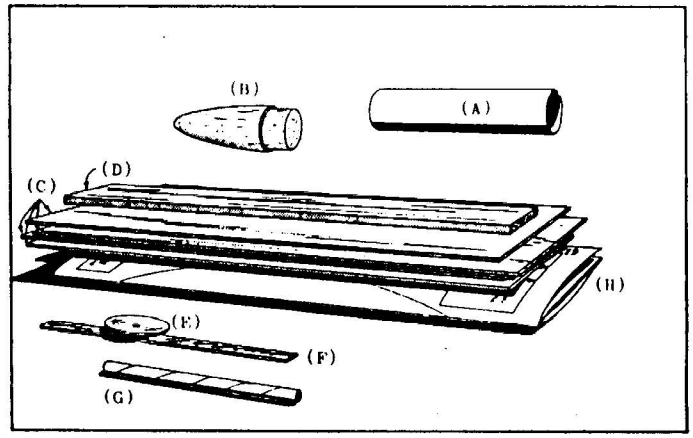
ASSEMBLY INSTRUCTIONS

Your Astron Invader rocket kit consists of the following parts as illustrated in the drawing at right:

(A) 1 body tube--Part #BT-20J
(B) 1 balsa nose cone--Part #BNC-20B
(C) 4 sheets balsa fin stock--Part #BFS-20
(D) 1 sheet balsa fin stock--Part #BFS-40S
(E) 1 nose cone weight--Part #NCW-1
(F) 1 balancing weight--Part #NCW-3
(G) 1 launching lug--Part #LL-2B
(H) 1 pattern sheet--Part #SP-19

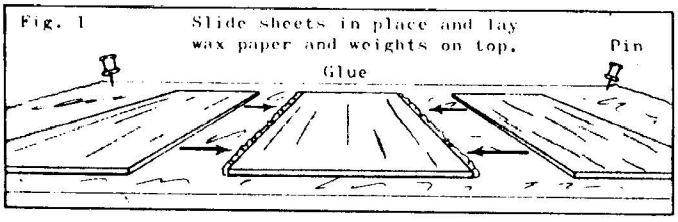
In addition to the materials included with your kit you will also need the following tools and supplies:

1) Waxed paper
2) Single edge razor blade or modelers knife
3) Scissors
4) Extra strong white glue
5) Ball point pen or pencil
6) Fine and extra fine grit sandpaper
7) Paint

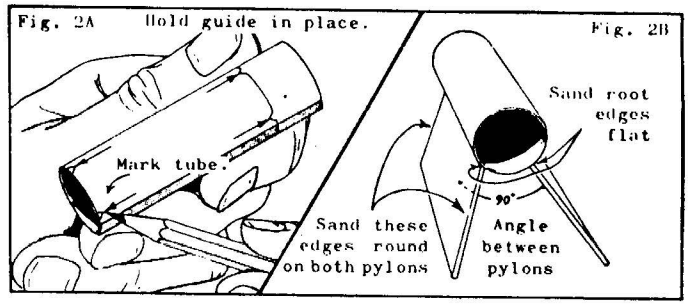


Read the entire assembly instructions carefully before beginning work on your rocket. Then start construction, following each step in order, checking off each step as it is completed.

☐ (1) Lay a 12" square sheet of waxed paper on a smooth, flat surface. Select three of the sheets of BFS-20 supplied that are most evenly matched in length and grain. Apply a liberal layer of glue to both side edges of one sheet of the balsa. Lay this sheet in the middle of the waxed paper and slide the other two sheets of BFS-20 against the edges of the first to form a square. Lay another 12" square of waxed paper over the balsa and place weights (books, tape dispenser, etc.) on top to hold the sheets flat while they dry.

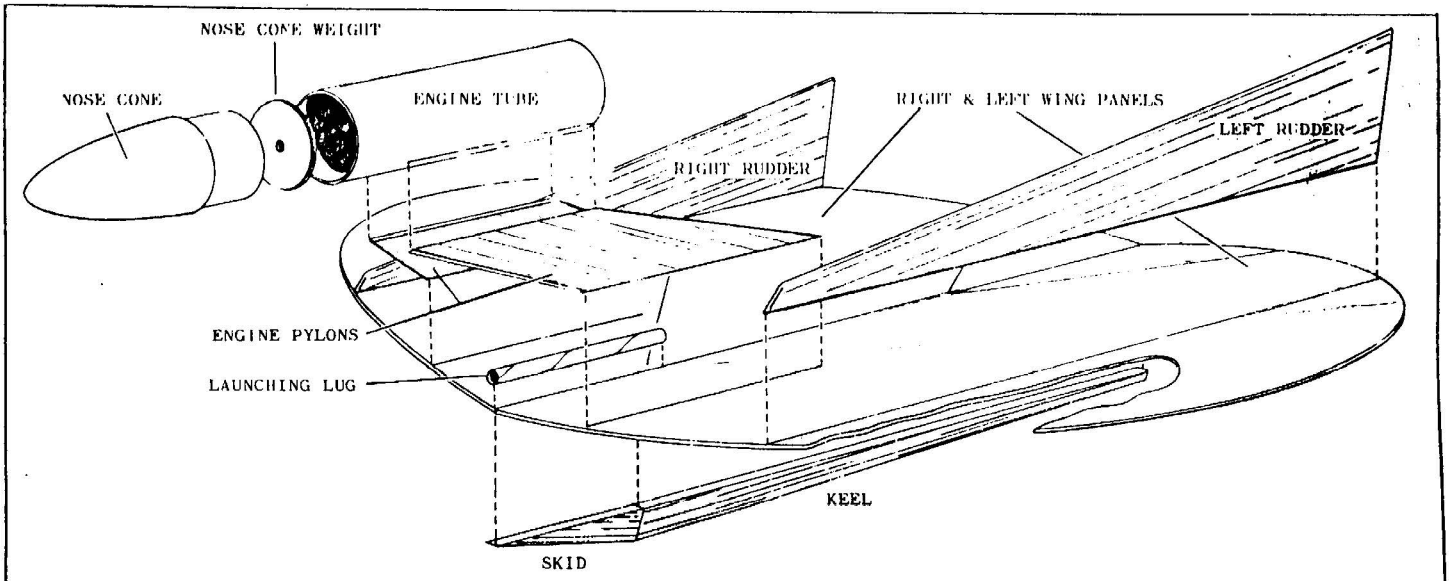


☐ (2) Cut out the tube marking guide, wrap it around the body tube and mark the tube at each of the arrow points. Cut out the pylon and rudder patterns. Position them on the remaining sheet of BFS-20 as shown and trace out two copies of each. Cut out the pylons from the balsa and glue their root edges to the tube as shown in fig. 2B. Glue the nose cone weight to the nose cone but do not glue the nose cone itself in place.



☐ (3) When the balsa sheets for the wing have dried remove the weight and waxed paper. Draw a straight diagonal line from one corner of the balsa square to the opposite corner. Draw a second diagonal line between the remaining corners, but make it only 1/2" long so it just crosses the first line to find the center of the sheet.

Reproduced here is a plan set, with some minor information missing, of a very early Estes kit. This was among the first items to be produced by Vern Estes. The kit, of course, is no longer available. This rocket model can be built in one evening, from scratch.



RELATIVE POSITION OF ALL PARTS OF YOUR ASTRON INVADER

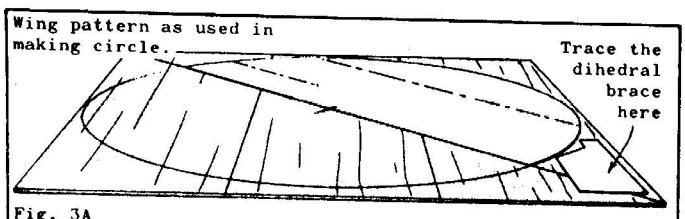


Fig. 3A

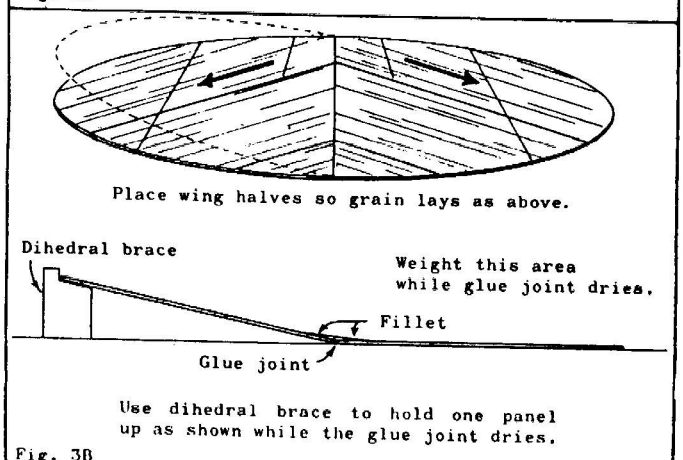


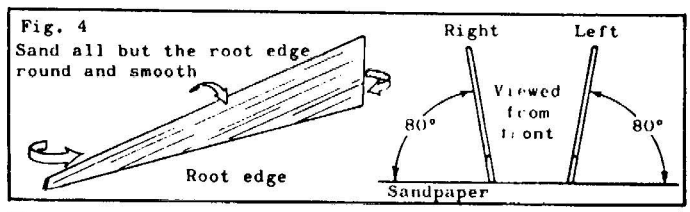
Fig. 3B

☐ (4) Cut out the wing pattern. Lay it on the balsa so the straight edge of the pattern is exactly on the diagonal line and the center mark on the pattern matches the center mark on the balsa. Draw around the outer edge of the pattern, shift the pattern around to the other half of the balsa, positioning it as before, and draw around the outer edge again to make an 8.8" diameter circle on the balsa. Cut out the brace pattern and trace it onto one corner of the left-over balsa.

☐ (5) Cut out the balsa circle and the dihedral brace. Cut the circle in half exactly on the diagonal line. Turn one half of the disc over so the grain of the two halves meets at a 90° angle as shown. Apply glue to the inside edge of one piece and place the other piece against it on the waxed paper. Support one wing tip 1-1/2" above the surface of the table with the dihedral brace. Place small weights over the joint between the two halves of the disc to hold the joint flat while it dries.

☐ (6) Apply heavy glue fillets to the joints between the pylons and the engine holder tube. Support the assembly horizontally while it dries. When the first glue on the center of the wing has dried apply a glue fillet to the joint. Keep the wing tip supported and the center of the wing weighted while this dries.

☐ (7) Cut out the rudders. Sand all edges of the rudders except the root so that they are smooth and rounded. Place a sheet of sandpaper on a flat surface and pass one rudder back and forth across it to bevel the edge at an 80° angle as shown. Bevel the root edge of the other rudder at the same angle but in the opposite direction.

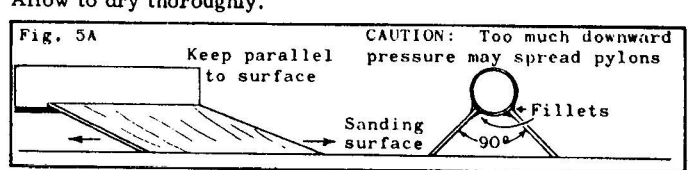


☐ (8) When the glue fillet on the wing has dried completely place the wing pattern on the wing with the inside edge of the pattern exactly on the joint between the two wing halves. Push a pin through the pattern into the balsa at the four points shown. Flip the pattern over, position it on the second wing and push the pin through the holes to mark the wing. Draw connecting lines between the pin holes on the balsa as indicated on the pattern.

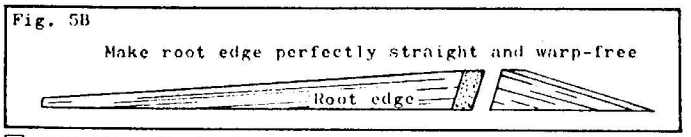
☐ (9) Apply glue to the root edge of one rudder and place it on the line on the wing so the bevel makes it lean out slightly to the wing tip. If it leans in the wrong direction, pull it up and put it on the other wing. Glue the second rudder in place. Make sure the fronts of the rudders are at the forward edge of the wing.

☐ (10) Glue the launching lug in place at the front of the wing joint.

☐ (11) Using a piece of sandpaper on a flat surface, sand a 1/16" wide flat edge on the bottom edges of the pylon. These edges must run exactly parallel after sanding so that engine alignment will be as nearly perfect as is possible. Glue the pylon-tube assembly in place exactly over the center of the wing at the front. While the assembly is drying prop the nose up so that the weight of the tube settles directly down on the joint. Allow to dry thoroughly.

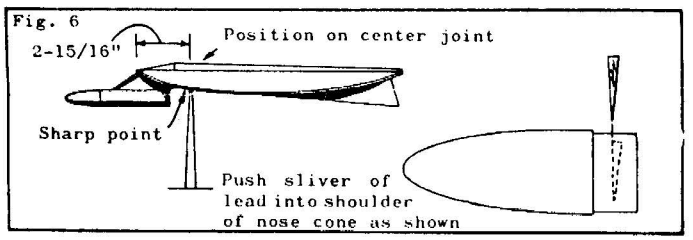


☐ (12) Cut out the skid and keel patterns, trace them onto the BFS-40 balsa stock and cut out the pieces. Check to make sure the root edge of the keel is perfectly straight. If it is not, sand it until it is. Glue the keel and skid in place on the underside of the wing.

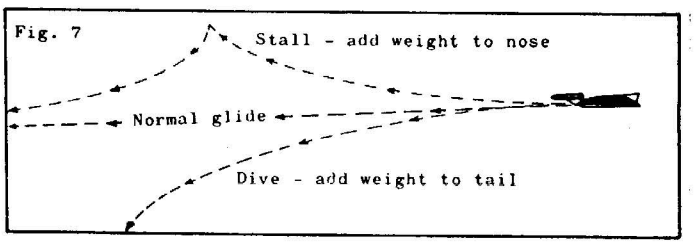


☐ (13) When the keel and skid have dried, apply a heavy glue fillet to all accessible joints. After the fillets are dry, check all surfaces to be sure they are perfectly flat, straight and free of warps. If a wing is warped the model will not fly properly. To correct warps, heat the surface over a 100 watt lamp and, while it is warm, straighten it out and hold it in position while it cools completely and hardens again.

☐ (14) Place the nose cone in the body tube. Check the balance point of the model--it should balance approximately 2-15/16" behind the front of the wing. If it balances ahead of this point, trim the nose cone weight slightly until the proper trim has been achieved. If the model balances behind this point, push small slivers of lead cut from the strip into the base of the nose cone as shown.



☐ (15) With the nose cone in place, test glide the model. There should be little or no wind when this is done. Holding it by the keel, toss it gently into the breeze and compare its flight with the illustration. If it stalls, add weight to the nose. If it dives or descends too rapidly, remove weight from the nose. When the right glide characteristics have been found, glue the nose cone in place in the tube.



☐ (16) A light finish is recommended for most boost-gliders. Experience has shown that too much paint or dope lowers performance. Enamel and fluorescent paints are best. After the finish is dry, test glide the model again. If its glide has changed rebalance it by adding pieces of strip lead to the nose or tail to correct it.

Engines

The only engines recommended for use in the Astron Invader are the 1/2A. 8-2, the A. 8-3 and the B. 8-2. Always make the first test flights with 1/2A. 8-2 engines. If the model shows good flight characteristics, the more powerful engines may be used. If good flights are not obtained with 1/2A engines, check balance and the alignment of the parts and correct them as necessary. Launch the Invader using a standard electrical launch system with a launching rod at least 36" long.

Launching Checklist

☐ -12- Install an igniter in the engine as directed in the engine instructions.

☐ -11- Place the engine in the model. It should be just tight enough to stay in place when the model is on the launcher, but loose enough that it will come out easily.

☐ -10- Remove the safety interlock or key from the launch control panel. (If a simple spring switch is used, install the protector around the spring.) Carry the key or interlock on the person of the launch control officer.

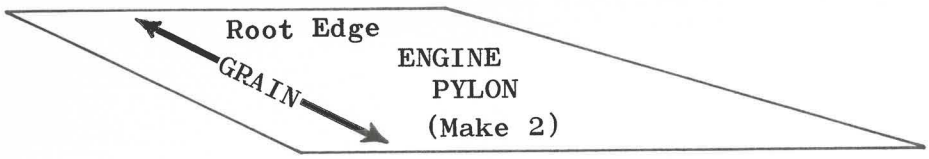
☐ -9- Place the rocket on the launcher. Check to be sure the panel is disarmed. Clean the micro-clips and attach them to the igniter.

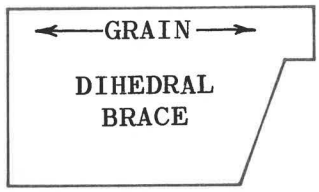
☐ -8- Clear the launch area, alert the recovery crew, timers and trackers.

☐ -7- Check for low flying aircraft and unauthorized persons in the recovery area.

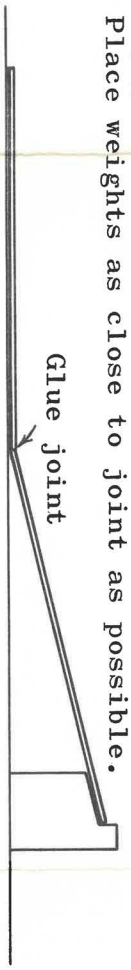
☐ -6- Arm the launch panel.

☐ -5- ☐ -4- ☐ -3- ☐ -2- ☐ -1- LAUNCH!



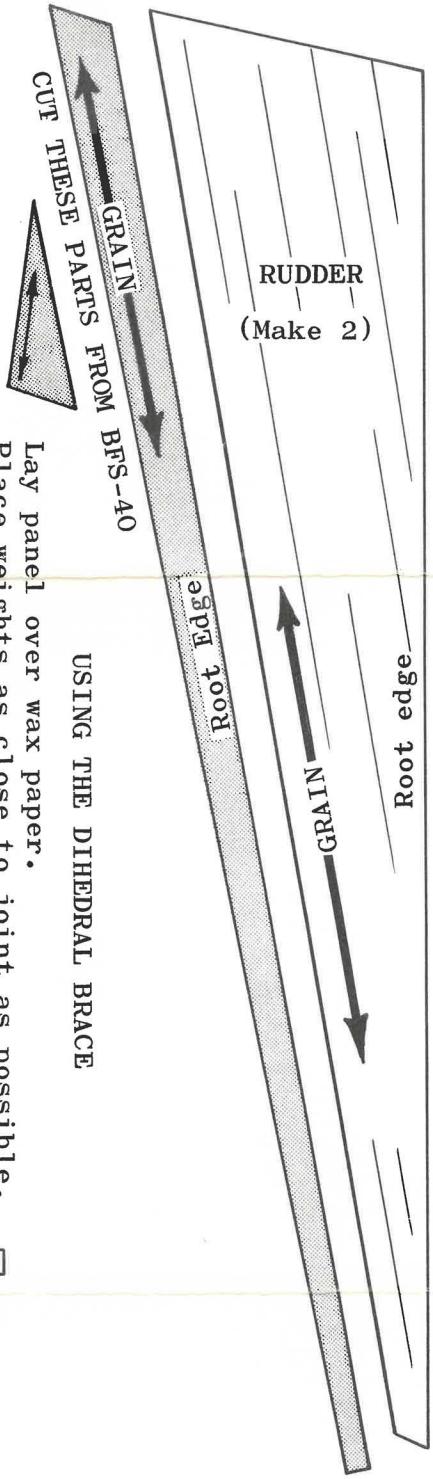


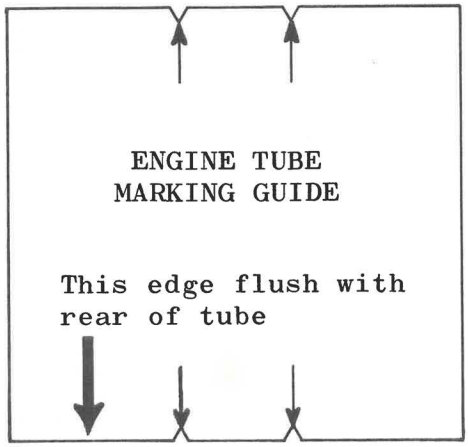
NOTE: Push point of straight pin through pattern at locations shown just enough to mark the wood beneath. Remove the pattern and connect the pin holes with a light line drawn on the balsa surface.



USING THE DIHEDRAL BRACE

Lay panel over wax paper. Place weights as close to joint as possible.





Astron INVADER

SP-19

PARTS LIST KIT N0. K-19								
Quantity	Description	Type	Number	Details1	Details2	Details3	Details4	Comment
1	PAPER BODY TUBE	BT-20J	30326	2.75" long	0.710" ID	0.736" OD	0.013" wall	
1	BALSA NOSE CONE	BNC-20B	70230	1.688" long	.736" dia.	.313" shoulder		
4	BALSA FIN STOCK	BFS-20	3164	1/16" thick	3" wide	9" long		
1	BALSA FIN STOCK	BFS-40S	3173	1/8" thick	1" wide	9" long		
1	NOSE CONE WEIGHT	NCW-1	2305	11/16" dia. with center hole	0.12 oz.			Lead Disc
1	NOSE CONE WEIGHT	NCW-3	2307	3" long	.25" wide	.02" thick	0.085 oz.	Lead Strip
1	LAUNCH LUG	LL-2B	2323	5/32" ID	1/8" rod	2-3/8" long		


ESTES
Your FREE KIT
Thank You for Your Order
K-19
ASTRON
INVADER!
ONLY $1.20
ESTES INDUSTRIES, INC., Box 227, Penrose, Colorado


ASTRON
INVADER!
Estes Industries Technical Report No. TR-7
FRONT ENGINE
BOOST GLIDERS

Images by Gerry Fortin