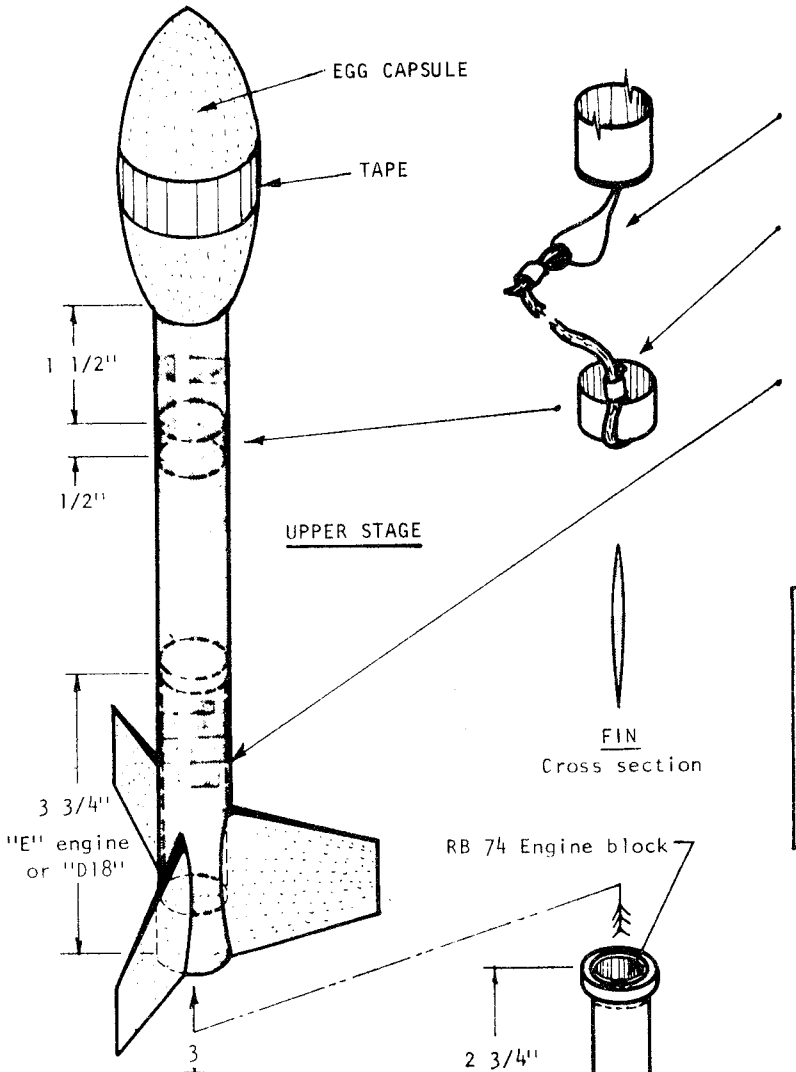
ELO

N.A.R. EGG LOFTER for

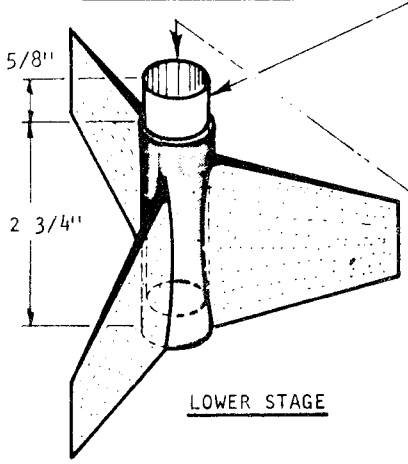
18mm and 21mm dia. engines



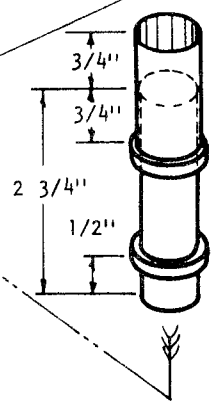
FIN
Cross section

18mm ENGINE MOUNT

FIN SPACING GUIDE



LOWER STAGE



18mm ENGINE MOUNT

ASSEMBLY INSTRUCTIONS:

Insert plastic egg capsule into end of 8" RB92 body tube and check fit. Capsule should fit snugly but not too tight. If loose, wrap with cellophane tape. See flying instructions for loading of egg.

Push 14" piece of 1/4" shock cord thru string in capsule. Cut a 1 1/2" piece of paper tape and remove paper backing. Wrap around shock cord loop while stretching rubber.

Wrap other end of shock cord around 1/2" anchor ring. Cut another 1 1/2" piece paper tape, remove paper backing and wrap around shock cord loop while stretching rubber. White glue 1/2" anchor ring 1 1/2" from top of body tube.

Glue 3/16" fibre engine block, using lots of white glue, flush with front edge of 3" RB90 engine mount. Allow to dry. Insert 21mm Dia. E5-6 engine (3 3/4" long) in mount. Smear white glue around inside of 8" body tube 2" from bottom with brush or "Q" Tip and push engine with mount into body until engine is flush with bottom of body tube. Remove engine.

At this point the upper stage is designed to hold FSI engines (21mm). Skip next paragraph if you want to fly only with (21mm) FSI engines.

To convert upper stage to standard engines (18mm), glue engine block inside and flush with end of 2 3/4" RB74 engine mount. Glue one 3/16" fibre ring flush with engine block end and another fibre ring 3/4" from opposite end. Apply a glue fillet around each ring and allow to dry. Check fit in body tube, then insert engine in assembly, smear glue around inside of body tube 2 1/2" from rear and push engine with assembly into body tube until end of engine is flush with body tube. Then remove engine

Sand fins to an airfoil shape. The front (leading) edge should be rounded while the rear (trailing) edge should be sharp like a knife. The root edge (part that glues to the body) should be straight and square. Sand the body tube lightly to provide a good bond for the fins. Center ends of body tubes for upper and lower stages in the circles of fin spacing guide and mark at the 3. Use a "V" notch of a drawer or door frame to draw a line from the mark parallel to the body. Glue 3 small fins on upper stage and 3 large fins on lower stage on this line flush with bottom of body. When dry, apply a glue fillet on each side of all fins.

Smear white glue inside 2 3/4" RB92 lower stage and insert 3" piece of RB90 tube into top of lower stage until 5/8" of RB90 tube protrudes. This acts as a coupler and 21mm. dia. engine mount.

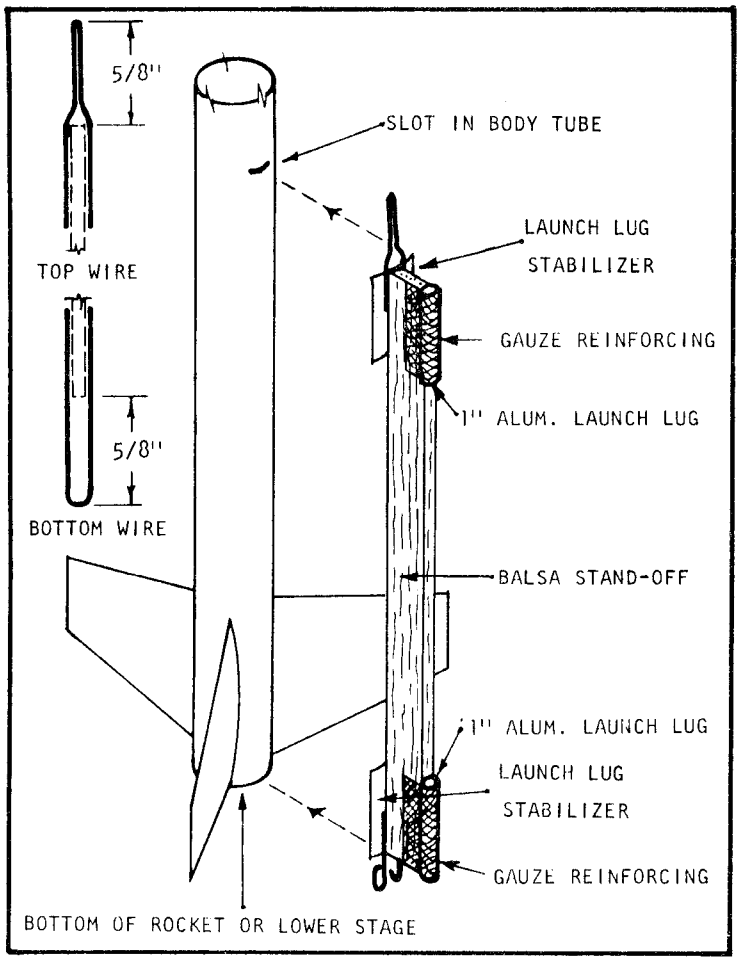
If you want to use only FSI engines (21mm) in the lower stage, skip the next paragraph.

To convert to standard engines (18mm), white glue one fibre ring 3/4" from the top and another fibre ring 1/2" from the bottom of the 2 3/4" RB74 engine mount. Apply a glue fillet around each ring. Glue the 1 1/2" RB77 coupler over the engine mount at the top so that 3/4" overlaps the mount. Allow to dry. Smear white glue around inside of lower stage tube 1/2" from bottom. Insert engine mount assembly from top and push until mount is flush with bottom of body tube.

Build pop launch lug (see Pop Launch Lug Instructions).

Construct parachute (see Parachute Instructions).

After rocket is completely assembled, sand body tube lightly to remove irregularities. Coat all surfaces with sanding sealer or clear dope. Do not get sanding sealer, clear dope, or lacquer type paints on egg capsule. Sand body tube lightly and paint with brightly colored paint.

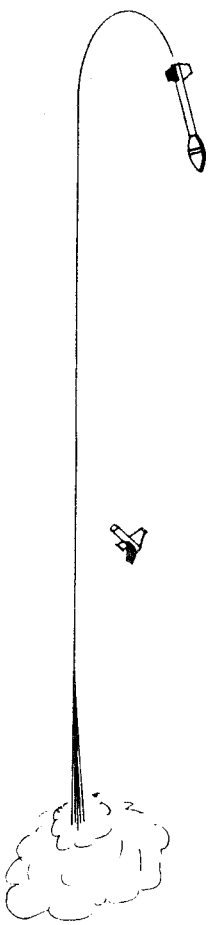


STAND OFF POP LAUNCH LUG INSTRUCTIONS FOR 3/16" ROD

Cut two pieces of wire 2 3/4" long. Bend one to fit top and one to fit bottom wire patterns shown at left. Glue two small 3/8" x 1" launch lug stabilizers to balsa stand-off and lay on flat surface so that retainers are on bottom and stand-off is on top. Place wires into junction of launch lug retainers and stand-off so that 5/8" protrudes beyond edge of stand-off. Add more glue until a good fillet is formed. Glue the two 1" pieces of aluminum launch lug at the top and bottom of the stand-off as shown. Reinforce with small piece of gauze and coat with glue. When dry, shape bottom wire to hook over bottom of rocket body tube.

Hook launch lug over bottom of rocket body tube, or lower stage, mark where bend of top wire intersects rocket body. Cut small slot to fit top wire. Bend slot out slightly to allow wire to be inserted. Two slots or two launch lugs of different lengths are required if bird is to be flown single and two stage. Bend protruding portion of top wire inward slightly so that it fits into the slot more easily. Insert top wire slightly into body tube, then hook over bottom and push into place. Adjust so that launch lug is snug but will come off easily when pushed on top.

The pop launch lug is always attached after the rocket is prepared for launching complete with engine, recovery device and nose cone installed. To use pop launch lug, slide lug over rod, slip a 1" piece of plastic tubing, or wrap top of rod with 2 or 3 turns of masking tape. Rod must be tight on launch pad. After rocket leaves pad the pop lug will remain on the rod. The rocket can be reattached to the lug without removing the lug from the rod.



FLYING INSTRUCTIONS:

The Elo is designed for the NAR Egg Lofting Event. However, any form of payload can be used as long as the total weight doesn't exceed the lift-off weight requirements of the engines used. The ELO can be flown single or two stage and can use 21mm dia. engines (Flight Systems) or 18mm dia. engines (Estes, Centuri, etc.) depending upon how it is built. The most powerful combination of engines recommended is a Flight Systems 21mm dia. D6-0 lower stage and an E5-6 or D18-6 upper stage. The upper stage can be adapted to use an FSI B3-4, C4-6, or D6-6, by cutting a 1" long section of expended engine and inserting it in the body tube before installing the regular engine. A special lower stage (Cat. No. C3a) is available for the D18-0. The total lift-off weight of the complete rocket ready for flight, including engines, must not exceed 200 grams (7 oz.) using a D6-0 lower stage. The best combination of 18mm dia. engines is a C6-0 lower stage and a C6-5 upper stage. The lift-off weight must not exceed 170 grams (6 oz.) Many combinations of engines can be used depending upon the altitude desired as long as the lift-off weights of the engine manufacturer are observed. Don't overload the bird and expect it to fly properly.

To prepare the ELO for flight, remove tape from around nose cone and place egg in the foam rubber lined egg compartment and replace tape. Attach parachute to cord loop on the egg capsule. Push flameproof wadding into body tube until it touches engine block. Fold parachute, put it into the body tube and replace egg capsule.

The launch lug furnished is for a 3/16" dia. launch rod. Because of the heavy payload, the 3/16" dia. rod is recommended to reduce rod whip.

Because of the interlocking staging system normally taping the two engines together with cellophane tape is not necessary. However, if the engines are not taped together the lower stage must fit snugly into the upper stage. If the fit is too loose, the stages will separate before ignition of the upper stage can be accomplished. The stages can be made to fit snugly by wrapping the coupler with cellophane tape.

Wrap the engines with masking tape to fit tight and load into upper and lower stages. Make sure that 0 delay engine with igniter is in lower stage and stage fits snugly. Attach pop launch lug by inserting into slot in body tube and hook over rear end of body tube. Put rocket on rod, then place a 1" piece of plastic tubing or wrap about two or three turns of masking tape around top of rod. Hook up electrical clips to igniter and fire. The bird should leave the pad smoothly and leave the launch lug on the rod. The bird can be put back on the rail without removing the launch lug from the rod.