SATURN V

This is a real flying scale model kit of the famous SATURN 5 space booster with its APOLLO payload. Standing over 3½ ft. tall, this model is an accurately detailed 1/100th scale replica of the real, full-sized SATURN 5 (as tall as a 34 story building). Despite its big size, the model weighs under 13 ounces at lift-off. Using a three-engine cluster, it will reach altitudes of 500 feet.

This precision engineered kit uses many new materials and construction methods. New hollow core stabilizer fins are faster and easier to attach and finish, and will withstand 10 times as much landing shock as balsa. Formed plastic body wrappers include full depth corrugations and all external details. Its molded plastic APOLLO capsule is fast to assemble and finish.

It is very important that you read and follow each construction step exactly. Pay very careful attention to the type of cement or glue required in the various construction areas. There is only one correct way to build this model — our way, as shown in these instructions. Take your time and read the instructions carefully. It will assure you a finished model which will look great and fly well.

YOU WILL NEED THE FOLLOWING MATERIALS TO COMPLETE YOUR SATURN V.

A small bottle of contact cement is included in this kit for bonding the corrugated wrappers to the body. The contact cement is not a substitute for either wood or plastic cement, both of which are needed for construction of the Saturn 5. Model airplane cement is not recommended for use as a "wood glue" for this kit.

NOTE: NO ENGINES, LAUNCHING PLATFORMS OR FIRING DEVICES ARE INCLUDED IN THIS KIT.
A - ENGINE MOUNT

Note: Wood cement is used for all assembly in sections A & B.

1. Place a thrust ring against each engine tube in turn and mark the tubes at the top of the thrust ring.

2. Cement the thrust rings into the engine tubes, flush with the ends which were previously marked. Cut a short slit in each engine tube on the pencil mark.

3. Insert one end of an engine lock into the slit in each engine tube. Slip the mylar lock retainer rings over the tubes and cement in place at the respective distances shown.

4. Cement the engine tubes together, rotating the tubes so the engine locks will not give interference when the engine “cluster” is slipped into the exhaust tube.

5. Cement the gas seal in place on the top of the cluster.

B - BASIC BODY

6. Using the template ruler, mark the locations of the balsa bulkheads on the exhaust tube. Write the word “bottom” on the end of the tube as indicated on the template.

7. With a piece of paper wrapped around the tube for a guide, draw a line around the tube at each mark.

8. Using a stick, pencil, etc., place a generous bead of cement inside the exhaust tube at a point about 2” from the bottom end. Insert the main thrust bulkhead into this end of the tube.

9. Place the engine cluster into the tube and push forward until only 11/32” of the cluster projects from the end of the exhaust tube. This will position the thrust bulkhead at the correct depth of 2-13/32”. Remove the engine cluster immediately so it will not be accidentally cemented in place.

10. There are five balsa bulkheads in the kit. Four are made of 1/8” thick balsa, one of 3/16” thick balsa. Cement the 3/16” thick bulkhead to the bottom end of the exhaust tube.

11. Slip the four 1/8” thick bulkheads over the top of the exhaust tube and position on the pencil lines. Cement in place.

NOTE: In order for all details, paint patterns, decals, etc. to be in proper relationship, a reference point in the form of an accurate vertical line has been drawn on the three body tubes at the factory. These reference lines will be referred to constantly in subsequent assembly steps.

12. When the bulkhead—exhaust tube glue joints are thoroughly dry, push the “core assembly” into the main body tube. Position it so the bottom bulkhead is exactly 3-29/32” from the end of the body tube. Run a generous fillet of cement around the top and bottom bulkhead-body tube joints. Write the word “bottom” on the appropriate end of the body tube.
Double the 6" piece of red string, loop thru holes in one die cut ring and tie securely. Cement this ring to the coupler tube with the knot to the inside. Cement the other ring to the opposite end of the coupler tube.

Using a stick, pencil, etc. run a fillet of cement around the inside of both ring-tube joints.

Push the 3rd stage body tube into the coupler with the end of the tube extending 1/32" from the bottom of the coupler (red string projects from bottom of coupler). Rotate the tube until the reference line is lined up with the string. Run a fillet of cement around both body tube-coupler ring joints. Cement the disc (which was punched from the center of one of the rings) to the bottom of the body tube. This forms a pressure seal for the parachute compartment.

Carefully cut the 3rd stage reduction wrapper and its gluing tab from the printed cardstock sheet. Curl the wrapper with your fingers until, when released it holds the desired shape. Be careful not to crease the wrapper.

Temporarily secure the ends of the wrapper with masking tape. Make sure the ends are even at the top and bottom and are tightly butted together.

Smear cement on the gluing tab and place it on the inside of the wrapper joint. Position the tab 1/32" below the top of the wrapper, with a larger gap at the bottom. Press the tab down firmly, allow to dry and remove the masking tape.

Place the reduction wrapper over the 3rd stage body and slide it down until it fits over the top of the coupler. Draw a line around the body tube along the top of the wrapper.

Remove the reduction wrapper and apply cement on the pencilled line around the body and to the inside bottom of the wrapper. Replace the wrapper, fitting it firmly down over the coupler with the seam in the wrapper lined up with the reference line on the body tube.

Slip the third stage coupler into the top of the main body tube. If necessary, lightly sand the edges of the die cut ring to obtain a good slip fit. Any bind could cause improper parachute ejection during flight.

The LEM-SM (Lunar Excursion Module—Service Module) body is composed of parts similar to but smaller than those of the 3rd stage body. Assemble the LEM-SM stage exactly as you did the 3rd stage (steps 13-20) except the attachment string and gas seal disc are not required.

C - CORRUGATED WRAPPERS

IMPORTANT: The cement included with this kit is a contact type cement. It is the only type of cement that will permanently bond the plastic wrappers to the body tubes. If used incorrectly, it can damage the plastic parts. Follow these instructions carefully.

a. Be sure you have the wrappers turned face down before applying cement.
b. Brush cement on evenly over the back of the wrappers, making sure you have cement along all edges.
c. Do not brush cement into the detail depressions of the wrappers.
d. Apply cement to the body tubes exactly in the areas to which the wrappers are applied.
e. Allow the cement to dry completely before attaching the wrappers.
f. Position the wrappers exactly before allowing them to touch the body tubes.
g. Work from left to right, smoothing the wrappers onto the tubes with a firm, even pressure.
24 Be sure to orient the wrappers as shown before bonding to the bodies. Some of the wrappers look almost the same upside down as they do right side up.

25 Using the template—ruler, lay out the wrapper locations on the main body tube.

26 Cut the tracing guide from the template cutout sheet and wrap around body as indicated. Using this guide, draw lines around the body on the previously located marks.

27 Apply contact cement to the bottom portion of the body tube and to the back of the 'lower 1st stage wrapper'.

28 Press the left edge of the wrapper onto the body tube exactly on the reference line and carefully wrap around tube.

29 Using the die cut edges of the plastic wrapper as a guide, cut out the four areas of exposed body tube between the tail fairing locations.

30 Apply the 'inter—tank wrapper' per above instructions. Check carefully against illustration (step 24). It's easy to get this one upside down.

31 Before applying cement, position the 'inter stage wrapper' accurately on the body tube and draw around the projecting details. When applying cement, make sure you cover the flange around the top of the details. Bond to the body, again starting on the reference line.

32 Apply the 'upper 2nd stage wrapper' in the same manner as the first three.

33 The 'reduction wrapper' covers the 3rd stage paper reducer. Use the seam of the reducer as a starting point for applying the reduction wrapper.

34 Before applying cement, wrap the lower third stage wrapper around the body, positioned on the reference line and butted against the reduction wrapper. Draw a line around the top of the wrapper, remove, apply cement, and bond in place.

35 Place a mark at a point 11/32" from the top of the 3rd stage body tube. Position the top edge of the 'upper 3rd stage wrapper' on this mark. Holding the wrapper tightly around the tube, draw a line along the top and bottom of the plastic. Before cementing in place, check carefully against the illustration in step 24.
Note: Wood Cement is used for assembly in this section.

36 Included in this kit is a 24" long piece of halfround basswood used to make sections of the systems tunnels that lie between the corrugated wrappers. Before cutting the wood apart, sand lightly with very fine (#600) sandpaper. Place the halfround against the top of one of the tunnel sections molded into the 'lower 1st stage wrapper'. Mark the halfround where it intersects the tunnel section of the 'inter-tank wrapper'. Cut the halfround and cement in place between the molded sections of tunnel. Repeat this process for the tunnel portion between the inter-tank and inter-stage sections of the body and for equivalent areas on the opposite side of the body. Cut and fit the last piece of halfround between the tunnel sections of the 'inter-stage' and 'upper 2nd stage wrappers' (one side only).

37 The rectangular tunnels on the 3rd stage body are cut from the two short pieces of stripwood enclosed. Cut the wood to the shape shown, sand lightly with #600 sandpaper, and cement to the body with the tops (and bottom of one) positioned in the flat areas on the wrappers.

38 Cut a 1/8" long slit in the LEM–SM body, just above the paper reducer. Insert the wire hook from the inside, with the loop protruding thru the slit. Cement a scrap of paper behind the wire to hold it in place.

39 Cement the LEM–SM stage into the top of the third stage. Be sure to line up the reference lines.

40 From the 3/32" thick sheet of balsa, cut two pieces 1/4" wide by 1" long. Seal and sand the balsa, then cement to the two mylar launch lugs. Slip the launch lugs over a 3/16" diameter launch rod, "apply cement to the backs of the balsa strips, and cement to the body tube with the right hand edge of the balsa on the reference line. Check to see that the launch rod does not touch any of the detail parts. If it does, adjust the position of the launch lugs accordingly. Allow the cement to dry thoroughly before removing the launch rod.

*If you do not have a 3/16" x 36" launch rod, you should purchase one now. You will need it for launching the Saturn 5. The standard 1/8" launch rod is too light for a ship this large.
Note: Plastic cement is used for assembly in this section. Do not use contact cement for cementing these parts.

41 Place each fin half on a piece of medium (#320) sandpaper. Sand the backs of the fins until the die cut flange thickness is about half as thick as it was.

42 Apply cement to one fin half. Press a matching fin half against it and line up the edges. Hold the pieces together until the cement begins to set. Repeat on remaining fins.

Note: Before completing the next step, allow fins to set for 8 hours. The cement must be THOROUGHLY dry.

43 Carefully trim away most of the flange from around the fins. Finish the flange removal by sanding the edges of the fins with #600 sandpaper.

44 Cut out the triangular shaped fin opening bordered by a recessed groove on the top of each tail fairing. Make several light cuts rather than one heavy one.

45 Cut away the contoured extention at the bottom of each fairing to form a curved base which corresponds to the curve of the body tube.

46 Cut the flange from around the base of the fairings. From the template sheet, carefully cut the fairing trim guide. Turn one fairing upside down and trim away small amounts of material from both sides.

47 Check the fairing against the guide, continue to trim away small amounts of material until both sides of the fairing base match the guide. Place the fairing on the body and check the fit. Any slight irregularities will be covered with a fillet of cement (step 52). Repeat these two steps on the remaining fairings.

48 Cut the fin positioning guide from the template sheet. Line the guide up on the body and mark the fin position with a pencil. Repeat for remaining fins.

49 Apply cement to a fin and press onto the body wrapper in the pencilled position. Cut the fin alignment guide from the template sheet and slip over the bottom of the fin. Align the guide exactly on the curve of the body tube. This will position the fin to a true 90° angle to the opposite axis. Set aside to dry, then repeat process for remaining fins.

50 When fins are thoroughly set, run a fillet of cement around each fin body tube joint. Set aside to dry.

51 The fin opening in the tail fairings will have to be trimmed to fit exactly over the fins. Trim the opening of one fairing, check the fit by placing over fin. Trim a little at a time, checking the fit, until the fairing slides down far enough to seat on the body. Cut and fit each fairing to a particular fin.

52 Run a fillet of cement along the fin—fairing and fairing—wrapper joints of each of the four fairings. Set aside to dry.
F - ENGINE NOZZLE UNIT

Note: Use wood, plastic or contact cement as indicated.

53 Using wood glue, cement the five engine core tubes into the die cut nozzle rings.

54 Lightly sand the back of each nozzle half to reduce the flange thickness to about half its original thickness.

55 Trim away the flange at the top of each nozzle half and cut out the top of each main nozzle tube.

56 Apply contact cement, in the areas shown, to the inside of two matching nozzle halves and to a core unit.

57 Press the core unit into one nozzle half. Run a bead of plastic cement around the flange of the nozzle and set the other nozzle half in place. Press the nozzle halves together and hold until cement begins to set. Repeat this procedure on remaining nozzles. Allow the assemblies to set for eight hours, then carefully trim away the flanges with an X-Acto knife.

58 Using wood glue, cement the nozzle spacer tube to the die cut nozzle bulkhead. Center the spacer tube between the holes in the bulkhead.

59 Insert the core tubes into the holes in the bulkhead and push forward until the tops of the plastic nozzles fit against the bulkhead. Rotate the four outside nozzle units so the fuel injection tubes point toward the center nozzle. Rotate the center nozzle so its fuel injection tube points toward one of the outside nozzles. Run a fillet of wood glue around all five core tube—bulkhead joints.

60 From the 3/32" thick balsa sheet, cut a strip ¾" wide by 2-3/4" long. Trim the ends for a snug fit inside the spacer tube. Run a bead of wood cement around the top of the center core tube and push the balsa strip down until it rests on top of the tube. Cement the balsa to the inside of the spacer tube. Before the cement sets, line up the center nozzle so that it projects from the bulkhead at a 90° angle. Cut and trim strips of balsa to fit between the spacer tube and the core tubes of the outside nozzles. Cement the strips to the spacer and core tubes, checking the vertical alignment of each before the cement sets.

G - APOLLO CAPSULE ASSEMBLY

Note: Use plastic cement for this section.

61 Cut, do not break, the tower and capsule parts from the plastic runners. Cement one full and one partial tower section together, making sure the 'X' members are angled to the inside. Cement the support ring to the center of the two 'X' members. Cement the other full and partial section together, allow glue to dry, then cement to the previously assembled section. Make sure the assembly is squared up and set aside to dry.

62 Cement the matching escape nozzle halves together to form two sub-assemblies. Enlarge the slots, if necessary to socket the two sub-assemblies together. Cement the completed nozzle assembly into the tower skirt, rotating the nozzles so they extend at an angle of 45° to the socketing holes for the tower legs.
Cement the tower legs into the holes in the Apollo capsule. Cement the tower skirt onto the top of the tower. Slip the mylar escape rocket body over the shoulder on the tower skirt and socket the nose cone into the top of the escape rocket. Set the completed capsule onto the LEM–SM body, but do not cement in place.

**H - RECOVERY SYSTEM**

64 Attach the 22” shock cord to the attachment string on the bottom of the 3rd stage. Tie in a firm triple knot.

65 Tie the 16” piece of white string around the shock cord at a point 15” from the anchor. Now loop the shock cord around the string to form a double knot.

66 Tie the string to the snap hook at a point on the string 13” from the shock cord knot.

67 Assemble the 20” parachute according to instructions printed on the margin of the chute material. Tie a loop in the free end of the shock cord and fasten the ends of the parachute shroud lines to it.

68 When the snap hook is attached to the wire loop in the side of the LEM–SM body, it angles the tower assembly upward and protects it from initial impact during the recovery. When the model is displayed, the snap hook is unfastened and the hook and string are packed, out of sight, into the chute compartment.

69 The two 18” long shock cords are fastened to the half circle kraft paper anchor ring. Tie both in a loose knot, but with a firm triple knot.

70 Slide the shock cord loops together in the middle of the anchor ring. Place a generous amount of wood cement on the back of the anchor ring and fasten to the inside wall of the main body tube, 2” down from the top. Smear cement over the anchor ring—body tube joints for added strength.

71 Assemble the two 24” parachutes. Tie loops in the free ends of the shock cords and fasten the ends of the shroud lines to them. Fold and pack all parachutes, rigging, etc. into the chute compartment preparatory for painting.
PAINTING

Our models here at Centuri were painted with Krylon flat black and flat white aerosol spray cans. Careful masking was required to obtain the correct paint pattern. The models were oversprayed with Testors Dullcote, a clear flat spray, to kill the decal shine and preserve the finish.

If you do not wish to mask the model, you may spray the basic white and brush paint the black areas. In any case, do not use regular lacquer base paints, either spray or brush type. The lacquer will attack and melt the plastic wrappers and tower. If you are in doubt about the paint you wish to use, try it first on the piece of scrap plastic enclosed in the kit. If the paint softens or crinkles the surface, do not use it on the model.

MATERIALS

Flat black and flat white paint in aerosol spray cans for basic body.
Flat black and flat white paint in small bottles for touch up and small details.
Silver paint in small bottle for fins, details, and engine nozzles.
Testors Dullcote for a clear flat finish coat.
Paint brushes – #0 or #1 round and ¼” flat.
Masking tape – 1/8” and 1/2” wide.

74 Spray the white paint in several light “dust” coats. In this way, the paint will not build up in ridges along the edge of the tape. When the paint is dry, carefully remove the masking tape. Touch up any overspray areas or irregular separation lines with flat black or flat white paint and a small brush. At this time, paint the escape rocket nozzles flat black. The silver areas of the rocket should be shiny in contrast to the rest of the body. Since the Testors Dullcote tends to flatten and darken the silver paint, the decaling and final spraying steps must be completed before painting the silver portions of the ship.

75 Apply all decals except the fin letter decals and the small United States decals that go on the Service Module. The paint pattern locations and the template ruler will aid on positioning the decals. Follow the directions on the back of the decal sheet for proper application.

76 After the decals have been applied, allow 1 hour for the moisture to evaporate from the decal surface, then spray the entire rocket with a couple of light coats of Testor’s Dullcote. Allow 30 minutes drying time before proceeding.

77 The areas so designated in figure 72 are painted silver at this time. The body details and fins are best done with a brush, outlining the area with a small brush and filling in with the ½” brush. The engine nozzle unit may be either brush or spray painted.

Study the painting diagram for location of paint pattern changes. The external details will help pinpoint exact color change lines. Before painting, wipe the rocket with a slightly damp cloth to remove oily fingerprints.

Spray the body first with flat black paint, completely covering all areas where the black paint is shown in the diagram. We realize this is contrary to the standard practice of painting the lightest color first; there are, however, two very good reasons for doing it this way:
1. It is much easier to mask around the projecting details than to mask off the details themselves.
2. In the case with Krylon (and most paints we’ve experimented with) the black paint does not peel when the masking tape is removed, while the white paint has an occasional tendency to lift.

After allowing the paint to dry overnight, you are ready to mask the black areas. The accompanying illustration shows a few masking techniques used on the Saturn V.

a. A typical section of the interstage wrapper shows how small pieces of masking tape are cut and applied around projecting details. Mask around all edges with 1/8” tape, making sure it is pressed firmly to the body. Fill in large areas with ½” tape as required.

b. Mask along the center of the horizontal separation ridges formed into the plastic wrappers.

c. Mask along the top outside edge of the corrugation for vertical separation lines. Press the tape down firmly along ridges formed by the wrapper—body tube joints.

d. Mask the edges of the reduction wrapper with 1/8” tape, carefully stretching it to match the contour of the wrapper.
Temporarily remove the Apollo capsule. Cut out the silver self-adhesive Service Module wrapper, remove the backing material and apply the wrapper to the body, using the wire hook as a reference point.

Before cutting the R.C.S. nozzles from the plastic runners, paint as shown.

Cut the nozzle positioning guide from the template sheet, wrap around the Service Module and mark the nozzle locations.

Carefully cut the nozzle units from the runners and touch up the cutoff points with black paint. Using a sharp object, punch small holes in the S.M. body on the four nozzle location marks. Insert the cementing lugs of the nozzles in the holes. Line up the nozzles and apply plastic cement to the cementing lugs where they protrude inside the body tube.

Apply the United States decals to the S.M. wrapper in the positions indicated in figure 72.

Cut the fin decal guide from the template sheet. Apply the fin letter decals with the aid of this guide.

Press the clay nose weight firmly into the cavity of the Apollo Capsule. Replace the capsule on the S.M. body. If necessary, wrap a short piece of tape around the base of the capsule to socket it snugly into the S.M. tube. DO NOT cement the capsule into the tube.

FLIGHT PREPARATION AND LAUNCHING

The following items will be required to fly the Saturn V.*

1. Engines: 3 B4-2's for altitudes of 300-400 feet.
   or: 3 C6-5's for altitudes of 500-600 feet.
2. Sure Shot Igniters (Centuri IG-12)
3. Parachute Powder (Centuri PDR-17)
4. Flamproof Wadding (Centuri PW-19)
5. Clip Whip/Less TIR-52 (Centuri ECW-1A)
6. Heavy Duty Launcher (Centuri LIA-100)
7. Firing Panel (Centuri EFC-2 or EP-612)

*See your local hobby dealer first. If he cannot supply the materials, they may be ordered direct from Centuri.

Read TIR-52 thoroughly before wiring the engines. Remove the dummy nozzle unit from the base of the rocket and set aside. This unit is for display only and cannot be used in actual flight. Set the "live" engine cluster unit on your workbench and insert the engines with igniters in place. Wire up as indicated in TIR-52. Apply short pieces of masking tape to the cluster unit as shown and slip the unit into the exhaust tube. Use as much tape as required to obtain a good snug fit. This is important, since the engine's ejection charge could push a loose fitting cluster out the bottom of the tube instead of pushing the upper "stage" from the top of the tube.
Insert a doubled layer of chute wadding into the chute compartment. Sprinkle the lower stage chutes with chute powder, roll the parachutes and place in the compartment, making sure the shock cords are not tangled.

Attach the snap hook to the wire hook of the upper section. Apply chute powder, roll the upper stage parachute, insert into the compartment and slip the coupler into the main tube. Make sure the string does not cause a bind in the slip fit joint of the two sections. It may be necessary to rub a little parachute powder on the coupler to obtain a fairly easy slip fit.

Connect the Clip Whip to the outer engine leads and lower the rocket onto the launch rod.

Connect one micro-clip to the Clip Whip lead. Wrap a piece of masking tape loosely around the other micro-clip to act as an insulator. Connect this micro-clip to the center engine leads. Connect the firing panel as the instructions accompanying it indicate. Check for continuity and you are ready for countdown.

Note: A calm day is best for flying. While the Saturn V will fly in a fairly stiff wind, the mass of this rocket provides enough wind resistance to lower the attainable altitude by 25%. This rocket was not designed to be a high flying ship. More flight design emphasis was placed on the realistic slow liftoff features so characteristic of the real Saturn.

Should you have any questions or wish to make any comments regarding this kit, please address your card or letter to:

Centuri Engineering Company
R & D Department
P. O. Box 1988
Phoenix, Arizona 85001
SATURN V PAINTING DETAILS
(Figure 72)
A. Engine Mount.

Note: An asterisk (*) signifies the use of cement or submerge bonding adhesive, etc.

1. Place a thrust ring against an engine tube and push a pencil through the tube along the length of the engine tube for the other two engine tubes.

2. Cement the thrust ring into the engine tube with the pencil which is traversing through the tube. Insert a short stick in each tube at the pencil mark.

3. Insert one end of an engine in the tube and attach a short engine tube to each engine. Drive the second tube through the engine tube from the end, and by hand, the third tube from the end.

4. Cement the tubes together, secure the engine in place as shown, and then spot weld under the engine mount to stiffen the engine tube.

5. Cement gas seal in place on top of engine.


6. Wrap the template, plier, and body lengthwise with a piece of paper. Write the wire on the end of the tube intended on the template.

7. From a piece of paper, wrap around the tube to form a guide, insert the tube and wrap around the tube on several marks.

8. With the end of a pencil, draw a semi-circle on the end of the tube to locate the middle point of the body. Draw a circle on the end of the tube immediately as it will not be accidentally cemented in place.

9. There are five holes in the body on the side. From the inside, one is the outlet; "removed" from the bottom to the bottom of the valve body.

10. Slip the outer body bushing over the top of the valve body, securing the top of each bushing ten with the pencil marks and cement in place.

11. The finished assembly will look like this.

Note: The pencil for all details, print patterns, lengths, etc. to be inserted between the pencil, as a reference point in the drawing or a technical line, has been drawn on the body, the body, and the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body, the body.
14. The second stage (upper) is made up of two steel rings (2.5 ft x 0.25 in), one 2.5 ft long, two 1.25 ft long, and a short piece of hard string. Double the string, leave three holes in one edge and one hole in the other edge. Tie the string to the upper ring and knot to the inside. Cement the other end in place and let dry.

15. With the end of a pencil, run a bead of cement around the inside of both ring joints.

16. Feed the third stage (small tube) (3.5 ft x 0.25 in) into the upper stage, and fasten it to the shoulder (plug, with the bottom of the upper stage) (rud). A bead of cement around the top of the upper stage. Tie the string to the inside of the small tube and to the bolted end to the abide.-back to the bottom of the tube. This will serve as a gas seal for the parachute compartment.

17. Carefully put the third stage (reducing washer) and the reducing tube from the plastic washers. Cover the washer with your finger, and when placed, it holds the three stage, to the card and to the bottom of the tube.

18. After making some temporary access, make sure they are all out of the tube and let dry.

19. Fix cement on the inside of the reducing joint. Fix cement the bolt into the top of the reducing joint to the reducing joint, also fix cement into the bottom of the tube. After the cement is dry, remove the plastic tape.

20. Place the reducing joint over the third stage (using the small tube). Slide it down until it butts the reducing joint. Place a bead of cement on the body tube around the top of the reducing joint.

21. Remove the reducing, apply cement to the bottom inside of the reducing, and on the reference line on the body tube. Replace the reducing, sliding it down over the reducing joint, and hold secure with the reference line on the body tube.

22. The L.E.M.-S.M. ( lunar equipment module- service module) body is composed of three flat rings (x2.5 ft x 2.25 ft), one equal flat (3.5 ft x 1.5 ft), and 1.25 ft long) and two body tubes (1.25 ft x 0.25 in) and one L.E.M. adhesive washer. Assemble the L.E.M. body exactly as you did the third stage body. Before the attachment string and gas seal are not required.
23. Important: The cement enclosed on this lot is a perfect type cement. It is the body type cement that will permanently bond the plastic wrapper to the body tube. Under certain conditions, it can attack and melt the plastic tube. Follow these instructions carefully.

a. Be sure you have the wrapper turned face down before applying cement.

b. Place the cement on, evenly around all edges and across the middle of each wrapper.

c. Spread the cement on the longitudinal depressions of the wrapper.

d. Apply cement to the body tube exactly in the same spot where the wrapper will be applied.

e. Allow cement to dry before connecting the wrapper to the body tube.

f. Position the wrapper exactly before allowing it to touch the body tube.

24. Be sure to moisten the wrapper around the binding to the body. Fasten wrapped cloth around the body tube on the previously located mark.

25. Use thetemplate rule to lay out the wrapper location on the main body tube.

26. With a piece of paper wrapped around the body, cut a guide, taking care around the body tube on the previously made marks.

27. Apply Vaseline cement to the bottom portion of the body tube, and the back of the bottom stage wrappers.

28. Place the left-hand edge of the wrapper onto the body tube exactly at the reference line and carefully wrap around the tube.

29. Using the five gill bottom edges of the wrapper,apan guide, cut and the bone, placed areas of the body tube, between the tail finning location.

30. Apply the pattern, make wrappers in the same manner. Check carefully against step 24. This pattern may be to get inside done.

31. Before applying cement, wrap the inter-stage wrapper around body tube, and draw a line around the projecting details. When applying cement, make sure you have a film of cement on the gill, above the top wrapper details and of the area of the body tube. When making the wrapper to the body, draw price too hard against the projecting details.

32. Apply the top and inter-stage wrapper in the same manner as the first three.

33. The reduction wrapper covers the same area and development of the 3rd stage. Use the chart of the reduction area, starting point for applying the reduction wrapper.

34. Wrap the bottom 3rd stage wrapper around the body tube, against the reduction section. Draw a line around the top of the wrapper. Apply cement and place it into the body as previously outlined.
35. Measure down and mark 36" (96) from the top of the 3rd stage body tube. Place the top edge of the upper 3rd stage wrapper on this mark. Hold the wrapper around the tube and draw a line along the top and bottom of the wrapper, apply cement and gather in place. Check carefully against the illustration in step 1. Use a similar wrapper that has already been the same height down.

2. Body Details

36. Included in the kit is a hinged piece of balsa wood - 2" long. This is used to form the bottom of the bottom section that lies between the Perforated wrapper. Before drilling any coupling, stand the wood lightly with but few (8) pinheads. Place the stopper against the top of one of the plastic tunnels mounted into the bottom 3rd stage wrapper. If you applied the wrapper exactly on the dotted line, a vertical slot on the side of the wrapper should be directly above. Mark this position. Then, if necessary, either lower the stopper or raise the plastic. Drill the wood on the mark and cement in place between the two tunnel sections. Another section of balsa must be fitted between the side flange and center stage wrapper. On this piece, there is no need to form a hollow. Draw the body over, and apply the side tunnel sections to the other side. One segment of balsa must be cut and cemented below the center stage and top 2nd stage wrapper.

37. The paper label, bound in the 3rd stage, are cut from the hinged piece of balsa wood included. Cut the wood to the dimensions shown, and press lightly with 8000 sandpaper. Cement the label in place with the tops in the small area provided on the perforated wrapper.

38. Cog the 3rd stage body tube into the top of the 3rd stage. Be sure to line up the reference lines.

39. Cut a 90° slice in the side of the 3rd stage body, just above the Perforated wrapper. Insert the wire loop, from the inside, with the loop protruding through the side. Connect a pull tag should require the wire to be held in place. This wire forms an attachment point for a portion of the parachute rigging.

40. Turn the 90° sheet of poly and two pieces 2½" wide by 3½" long. Fold the poly and bend diligently. Connect the two lengths back to the bottom, stand flat. Loop the launch loop over a 3½" steel bolt, and apply cement to the bottom of the paper. Stand flat and cement to the balsa body tube. With the right hand edge of the loop on the reference line. Check to see that the balsa body tube and bend, any of the details, are allowed. Cement the balsa body tube. Add any additional details. Use the 9½" launch loop to further this large on ship.
E. Fin and Fairing

Note: Miter plastic cement is required for assembly of parts in sections 41 & 42. Do not use contact cement for assembling these parts.

41. Place each fin half on a piece of medium sandpaper (100 grit) and rub back and forth several times to round down the flange, bevel the edges in the corners, round the edges of the flange, and facilitate removal of the flange in steps.

42. Apply cement to one fin half. Press matching half against it and lay up the joints. Hold the parts together until the cement hardens to set. Repeat on the remaining fins.

Note: Before completing this next step, allow the joints to dry. Press the sandpaper and sand the edges to blunt and blend with the plastic and remove any excess. Wash for the plastic to completely harden.

43. Carefully trim away most of the flange around the fin leading edge joint, leaving a small amount of plastic just inside each edge of the flange, loudly against the body tube.

44. Cut along the body tube edge. Round the edges of the flange, leaving a small amount of plastic just inside each edge of the flange, loudly against the body tube.

45. Place the fin over the paper, position on the body tube, and check the fit. Lightly trim or sand the edge of the fin to ensure it fits exactly into the body tube. Repeat steps 44-45 for the remaining fins.

46. Cut along the body tube edge. Round the edges of the flange, leaving a small amount of plastic just inside each edge of the flange, loudly against the body tube.

47. Apply cement to one fin half. Place the other half in the proper position on the body tube and check the fit. Lightly trim or sand the edge of the fin to ensure it fits exactly into the body tube. Repeat steps 44-45 for the remaining fins.

48. Use the fin positioning guide from the template sheet. Place the guide on the body tube, level against the bottom of the fin, and check the fit. Trim the edge of the body tube, leaving a small amount of plastic just inside each edge of the body tube.

49. Apply cement to one fin half. Place the other half in the proper position on the body tube and check the fit. Lightly trim or sand the edge of the fin to ensure it fits exactly into the body tube. Repeat steps 44-45 for the remaining fins.

50. Run a fillet of cement around each fin. Release the parts, let set, and dry.

51. Place a second fin half on the fin and slip it down against the body tube. Apply cement inside the cavity of the fin and carefully press the body tube. Repeat the procedure. Apply the cement inside the cavity of the body tube.

52. Apply a fillet cement along the base of the fin and cement it to the body tube. Run a fillet of cement along the fin body joint and around the base of the fin. Repeat the above steps on the remaining fins.
11. Painting

Painting the outside generally is a very important step toward the final overall appearance of the model. One procedure which is particularly helpful is to paint with high-quality enamels. We need that white first black to achieve a dense appearance more or less in keeping with that of the prototype. The first paint base, other than black, is (1) they may be different, do not use flat bases before (2) they are often used, smooth, and by soft, fluff, or (3) the details of a certain color, and then be followed by the main color, the base color, and to make the painting job more pleasant to finish.

White and yellow are the best colors. However, sprayed small paintings will not do, because they are in cases can be mixed with the base color, and even more so, the painting is not available as if you didn't. Instead, use a high-quality enameled finish. Enamels that are used for the painting in various colors, a small piece of gray plastic is included with the kit. The painting is then done on the plastic, applying it to the board. Both paint and plastic are mixed with enamel or in batches and sprayed runs. These are available at most hobby shops.

Spraying and marking provide a smooth finish. However, you may touch up the model after painting. In addition to the base finish, you may add the color used for the fins and other portions of painting and finishing your model.

When there are painted portions, there may be color changes across the constricted areas. To avoid this problem, the final job of the painting. Fill the small portions in the model with a mixture of white gesso and acrylic. Use by painting the second color over the gesso. As you apply the second color, the second color, with a brush, and then by painting the entire area, the second color is also used.

If you use the recommended method of painting, the base, the black, and in all areas, the effects shown on the drawing.

We realize this is part of the normal practice of painting a kit. However, there are two very good reasons for doing it this way. (1) It is much easier to touch up, and (2) the painting, as well as the painting technique, is a very different way than the top of each, the detail, themselves.

(3) If the coat with yellow (and sometimes other painting method) the black, and white mixed with gesso, the white has a tendency to lift occasionally.
I. Decals.

"The painting diagram shows the location of all the decals. The United States and U.S. decals can be installed in place, fairly easy, with careful planning and application. The position of the decals is shown on the shipping compartment. The decals are placed with the aid of the template and the template sheet. There are areas on the template where the decals are to be placed, with the aid of a masker, to prevent air bubbles and ensure a smooth finish. After the decals have been applied, the top can be painted with a clear coat, followed by a coat of wax."

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53. Cement the fine engine case tubes into the cut nozzle holes.

54. Trim away the flange at the top of each nozzle hole and cut out the top of the main exhaust tube.

55. Apply contact cement to the inside of the nozzle housing and to the cone of each of the areas above.

56. Place a cone unit into one nozzle half. Mix a batch of contact cement and apply the flange of the nozzle and set the other nozzle half in place. Press the cone between the tubes until cement has been worked up, removing any excess cement.

57. Secure the space tube to the cone unit with cement. Secure the space tube between the cones in the butterfly.

58. Insert the space tube in the holes in the butterfly, and secure the space tube with contact cement. Press the space tube up against the flange. Apply the contact cement to the flange, and press the space tube up against the flange. Press the space tube up against the flange and secure with contact cement.

59. Cut a strip of paper from the enclosed sheet. 1/4" wide x 3-1/4" long, to cover the small pieces of paper. Secure the space tube with contact cement. Secure the space tube to the cone unit with contact cement.

60. Tower Assembly.

61. Use the plastic model, secure one bulb inside and have partial cone lap to make the X members about the size of the other half. Partial lap together. Cement the tower together, and cement the X members of the structure. Count the two sides together, and make the tower unit. Secure the tower to the cone unit with contact cement. Secure the tower to the cone unit with contact cement.

62. Secure the tower to the space tube in the cone unit. Secure the space tube assembly to the main header tube.
L.E.M. REDUCTION WRAPPER
SATURN V & SATURN 1-B

GLUING TAB

1 inch

CUT OUT CAREFULLY
SATURN V
THIRD STAGE
REDUCTION WRAPPER

GLUING TAB

1 inch

CUT OUT CAREFULLY