

'SUPER SCALE' SATURN V

1/70th the size of the real rocket!

A FLYING MODEL ROCKET KIT



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This is a 1 /70th scale flying model rocket kit of the Saturn V. This is the vehicle that launched Apollo 11 that first placed man on the moon. You can build it as a real flying rocket, or just for display. Either way, you'll end up with a fantastic model that you'll be proud to show off to your freinds.

Apogee Components also produces the Saturn 1B also at 1/70th scale. Both models are superbly detailed and offer the scale model rocket enthusiast challenging and enjoyable construction.

The instructions in this kit are unique. It is our goal to make the instructions entertaining and jam packed with tidbits of interesting information -- so that you'll enjoy the building experience as well as launching the rocket. It is also our goal to teach you the important "techniques" required in building complex model rocket projects. You'll learn a lot more by "watching" that you ever could by "reading." So in the end, you'll be better assured and more confident that you'll complete this awesome project.

This is a SKILL LEVEL 5 kit! This is the highest rating; indicating that this model is extremely challenging to build. Apogee Components recommends that you watch each video carefully; noting not only the methods shown, but also the techniques shown. This includes subtle things like how to hold the parts as you are assembling them. It is this type of stuff that will make all the difference in the ease of construction. We also recommend purchasing the other "How-To" video books from Apogee Components; so that you will understand the process of building this complex model rocket.



PARTS AND BUILDING SUPPLIES

Before you begin assembly, locate and identify the parts listed below. If any part is missing you should contact Apogee Components before proceeding. In addition to the parts included in the kit, you will need the following:

ADHESIVES

Several types of adhesives and glue are required. This is because there are several different porous and non-porous materials used in the model. The bonding of some material combinations has specific adhesive requirements. You will need a good aliphatic glue (in the videos, you'll hear it called wood glue, or white glue), both thin and thick cyanoacrylate adhesives, rubber cement, and liquid plastic cement. Spray adhesive is required for positioning the embossed paper wraps to the rocket. It isn't to bond them in place, but just to hold them in position while you glue down the edges. This adhesive is available in an aerosol spray. It is very important that you carefully read the instructions on the side of the can.

You will also need the Fix-It Epoxy Clay. This can be purchased directly from Apogee Components.

TOOLS

The following are the suggested minimum tools you will need to construct your Saturn V.

Aluminum Angle - for drawing straight lines along the body tube. You can buy long extrusions from building supply warehouse stores, and cut off a 2 foot length.

Pencil

Metal ruler

A sanding block or sanding "Tee," along with fine and course sandpaper. You'll also need

some fine "wet/dry" sandpaper for sanding the paint primer smooth.

Small and large paint brushes

Hobby knife with lots of new replacement blades

Masking tape (buy the expensive stuff - it's worth it on a project like this one).

Transparent tape

Wooden stick - to apply glue deep in the body tubes.

Small teflon tube to use as an applicator wick for thin CyA adhesive

Scissors

Cuticle Scissors that has a curved tip

Tweezers

Razor saw

Large Paper Clasp (2) - used to hold balsa parts together while the glue is drying.

Sponge-backed sanding pads (optional)

Diagonal wire cutters

Single-edge razor blade

Carpenters wood filler (sometimes called "Fill-N-Finish")

Plastic or rubber gloves - used when working with epoxy.

Fine-tip black permanent marker (Sharpie Brand works good)

"Liquid Masking Medium" (Micro-Scale brand from purchased from hobby stores works fine)

PAINT

Sandable spray primer paint (2 big cans)

White spray paint

Black spray paint

Silver spray paint

SOLVENTS

Rubber cement thinner

Rubbing Alcohol

Continued on Next Page...

Optional Building Materials:

During the construction of this rocket, you'll be given optional steps that can be used to strengthen the parts of the rocket. This includes making additional centering rings to stiffen up the transitions on the rocket. To make these rings, you'll have to supply your own lightweight cardboard. We recommend the lightweight cardboard; such as that you can get from an empty breakfast cereal box.

What is CyA glue?

In the instructional videos, you'll hear the term "CyA" glue. It is also called "CA" glue, "instant" glue, or "Super" glue. It is all referring to the same stuff -- "Cyanoacrylate Adhesive." This is a type of glue that sets up and hardens very quickly. You buy it from a hobby store. Do not buy the "super glue" or "crazy glue" from a department store. Those brands use so much filler in them that they are not as strong or as pure as the CyA glue bottles found in hobby stores.

CyA glue does come in a variety of viscosities: from water thin, to very syrupy thick. For this rocket, you should get a bottle of the water-thin variety and a bottle of the extra thick. When you buy the water-thin variety, also make sure you buy extra teflon applicator tube. This thin tube will allow you to place the CyA glue in the right spot without using too much.

Be very very careful with CyA glues. Adult supervision is always recommended, as well as safety glasses. Any splatter of the thin variety into your eyes will instantly glue them closed. Seek medical attention immediately.

Why Videos? Why Not Just Use Regular Printed Instructions?

You may have already searched the box looking for a set of printed instructions. Please don't call me asking for a set. There are none. All the instructions are in video form on this CD-ROM.

This video format is perfect for a complex project like this kit. I'll be able to show you how to put together the model, so that you will end up with a awesome looking rocket. You'll be learning a lot of new techniques that you've probably never even heard of before.

You'll also learn how to correctly use the hobby tools. This is important. You'll see that we're not using some exotic tools. We're using basic tools, but using them to perform some really complex tasks.

I know what you're thinking about the video book: "My computer is in one room, and my building area is in another. I don't want my computer to get loaded up with dust, glue, and paint speckles." My answer is: "Well, DUH!"

I don't expect you to move your computer into the same room as your rocket building area. I purposely made each of the videos short, so that you could remember what was shown in them during the time it takes you to walk from your computer room to the building room. If your attention span isn't long enough to remember the step; you should

probably consider taking up a new hobby. Building complex rockets like this one is time consuming. It does require patience and focus, and paying attention to detail.

My main reason for choosing this video format is that I have a lot of experience watching modelers build rocket kits from printed instructions. They either ignore the written text, or they don't comprehend the step or the illustrations. Either way, the model gets ruined.

With the video format, you'll see how to perform the step, and what the outcome should look like. It will be like you have your own personal expert looking over your shoulder and guiding you through the complex process. You'll gain the confidence you'll need to tackle complex operations. You'll have that confidence because you'll have seen how it is done. That makes all the difference in the world...

So I am confident that after you have completed this model, you will feel that this was the coolest set of instructions you've ever seen. You'll probably end up calling me up and asking me to create more video instructions for designing and building rockets. I don't mind. Please email me and tell me how great your rocket turned out.

Which short-cuts will speed the assembly of the rocket, and which ones will help you destroy it?

Obviously, this is a difficult model to put together. You're probably thinking that it is going to take a long time to assemble. It is after all, a Skill Level 5 project, and the videos alone total over 4 hours of viewing time.

You're probably already plotting out different ways to increase the speed at which you can put this model together. There are some short-cuts that you can take that will help speed things along, and there will be some things that you should avoid. If you take the wrong short cuts, you're going to ruin parts of this model. Fixing those ruined parts are going to take a lot longer that it would have taken had you followed the steps listed in the videos.

Here are the suggestions I have for speeding things along. A lot of time during the construction of this rocket, you'll be waiting for glue to dry. This is time consuming. There are many steps that can be done in parallel, so that while you're waiting on glue to dry in one step, you can be working on a different section of the model.

The model is built in four major sections, and these can be built in parallel workflow. These are:

1. The First & Second stages, which are both located on the big diameter tube.
2. The display nozzles
3. The big corrugated transition and the 3rd stage. These are built as one unit.
4. The upper section of the rocket, which includes the LEM transition, SM, and Apollo capsule.

It is possible to break these major sections down even further and work on some steps at the same time. But to avoid confusion, I wouldn't recommend it.

What Should You Avoid Doing?

Don't skip over viewing the videos just be-

cause you think you know what is going to be performed in any given step. For example, if you don't tape down the vacuum form wraps before you attempt to glue them to the tube, there is a strong likelihood that you'll glue them on crooked. I know... I've made that mistake.

During the creation of this set of video instructions, I was simultaneously building 3 different rockets. I'd start by trying the step using different techniques. The techniques that worked best were filmed and are included in these instructions. You have to trust me... I've tried a lot of other techniques, and if they didn't work, they aren't shown here.

Take my advice... FOLLOW the instructions as shown. If you deviate from them because you feel that your techniques have worked well for you on other projects, you will destroy this model.

Just because you don't see you're favorite techniques shown in the videos, doesn't mean that I didn't try them. I have tried them. They don't work well!

This is a unique model that is unlike anything else you've ever built. Your trusted methods may not work here. If you want to try them, do so at your own risk. I recommend building one rocket my way, and then buying a second one to try your own techniques. I know my way works, because you'll see them in the videos.

Finally, if you do follow these instructions, you will have learned a lot of new skills. But the most important one that I hope you pick up is how each part is test-fitted to the rocket before it is glued down. Test fitting is crucial, and most people will skip this part. If it doesn't fit exactly right, I'll show you how to correct it. As a master modeler, you'll need to know how to adjust parts as necessary. It is a skill that you can use on any other rocketry project that you decide to tackle.

STEP #1: Identifying the tools and the parts used in the engine mount assembly.



Eng Mount Tools and Parts.mov

Instructions: Click on the box above to start the movie playing.

STEP #2: Engine Mount Assembly - Gluing the gussetts to the large centering rings.

In this video, you'll see the initial construction of the engine mount. This kit is unique in that it uses gussets on the centering rings to provide extra strength. This technique is very strong, and you will find that it is capable of handling very high power rocket motors. There is no need to swap out the cardboard rings for plywood!



Eng Mount Assembly Part 1.mov

Instructions: Click on the box above to start the movie playing.

STEP #3: Engine Mount Assembly Part 2 - Adding notches to the forward centering ring to allow the shock cord anchor to pass through.

In this video, you'll see how to cut notches in the forward engine mount centering ring. This will allow the shock cord anchor to pass through the centering ring so it can be tied to the engine mount tube.

You'll also install the engine block into the back end of the engine mount tube. The depth that

you'll position the block is determined by the longest rocket motor you will be using in the rocket. For rocket motors shorter than this, you'll need to supply your own spacer tube that will be positioned in front of the motor.

Finally, you'll glue the forward centering ring to the front end of the engine mount tube.



Eng Mount Assembly Part 2.mov

Instructions: Click on the box above to start the movie playing.

STEP #4: Engine Mount Assembly Part 3 - Anchoring the shock cord to the engine mount tube, and attaching the aft centering ring.

The shock cord anchor is glued to the front end of the engine mount tube. It is important that this cord be securely attached.

You'll also be attaching the aft centering ring to the engine mount tube. If you want to add a engine hook, you can do it at this point. Note: There is no engine hook supplied in this kit, as

we'll show you another method to hold the engine into the rocket. But some people like engine hooks, so we've designed the aft centering ring to allow one to be used. You can make your own engine hook from music wire. Directions for this are given in our book: ["Model Rocket Design and Construction."](#)



Eng Mount Assembly Part 3.mov

Instructions: Click on the box above to start the movie playing.

STEP #5: Making the thrust rings for the engine mount assembly.

We'll now make two thrust rings for the engine mount assembly. These are used to provide additional strength to the centering rings. They help transfer the thrust loads from the engine mount tube, to the walls of the big diameter tube.

You're next question is probably: "why are we making these rings? Why didn't you provide them the right size?" The answer is that it would have

cost significantly more to create a special metal mold the correct size to wind the paper rings. Eventually, if we sell enough of these kits, we'll be able to afford the tooling expense. But in the meantime, you'll have to cut and splice them yourself. Besides, this is a good skill to have in case you ever decide to modify or build a custom rocket.



Making Thrust Rings.mov

Instructions: Click on the box above to start the movie playing.

STEP #6: Installing the engine mount into the main body tube.

After all the glue on the engine mount assembly is dry, you're now ready to install it into the big diameter tube.



Eng Mount Assy Part 4.mov

Instructions: Click on the box above to start the movie playing.

STEP #7: Constructing the big tube couplers

This step will show you how to construct the two big tube couplers that will fit into the big tube. The first coupler will be the shoulder that fits on the **transition piece** between the 2nd and 3rd stages of the Saturn V. The other coupler will be used for

the **plastic nozzle assembly** that fits into the base of the rocket. We'll make them now, even though they won't be used until later; so that the glue has a long time to dry.




Big Couplers.mov

Instructions: Click on the box above to start the movie playing.

STEP #8: Cutting out the vacuum form wraps for the big diameter tube.

There are five big long wraps that fit on the big tube. After identifying them, you'll cut them out of the plastic sheets. Be sure to use a very sharp (brand new) hobby knife. You don't need to cut all the way through the plastic. Just score it lightly, and when you flex it back and forth, the plastic

will snap along the score line. Just use a lot of patience, as this is a very tricky step. Do NOT cut out the other wraps or vacuum form parts yet (that are not shown in this video). There are different techniques that are needed for those particular parts.



Cutting out wraps.mov

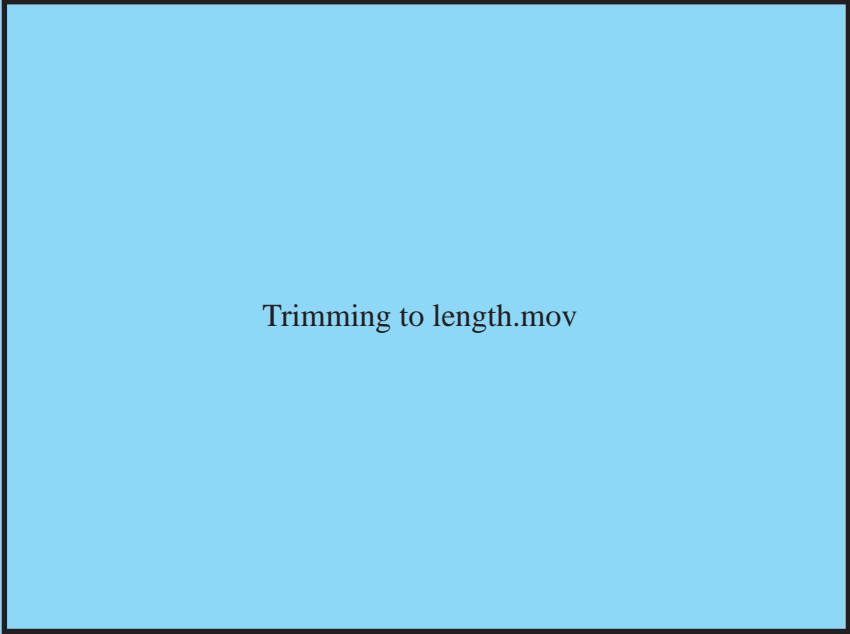
Instructions: Click on the box above to start the movie playing.

STEP #9: Trimming the vacuum form wraps to length.

After the vacuum form wraps have been removed from the plastic sheets, you still need to trim them to the proper length. This video will show you how to measure and cut the wraps to properly fit the big tube.

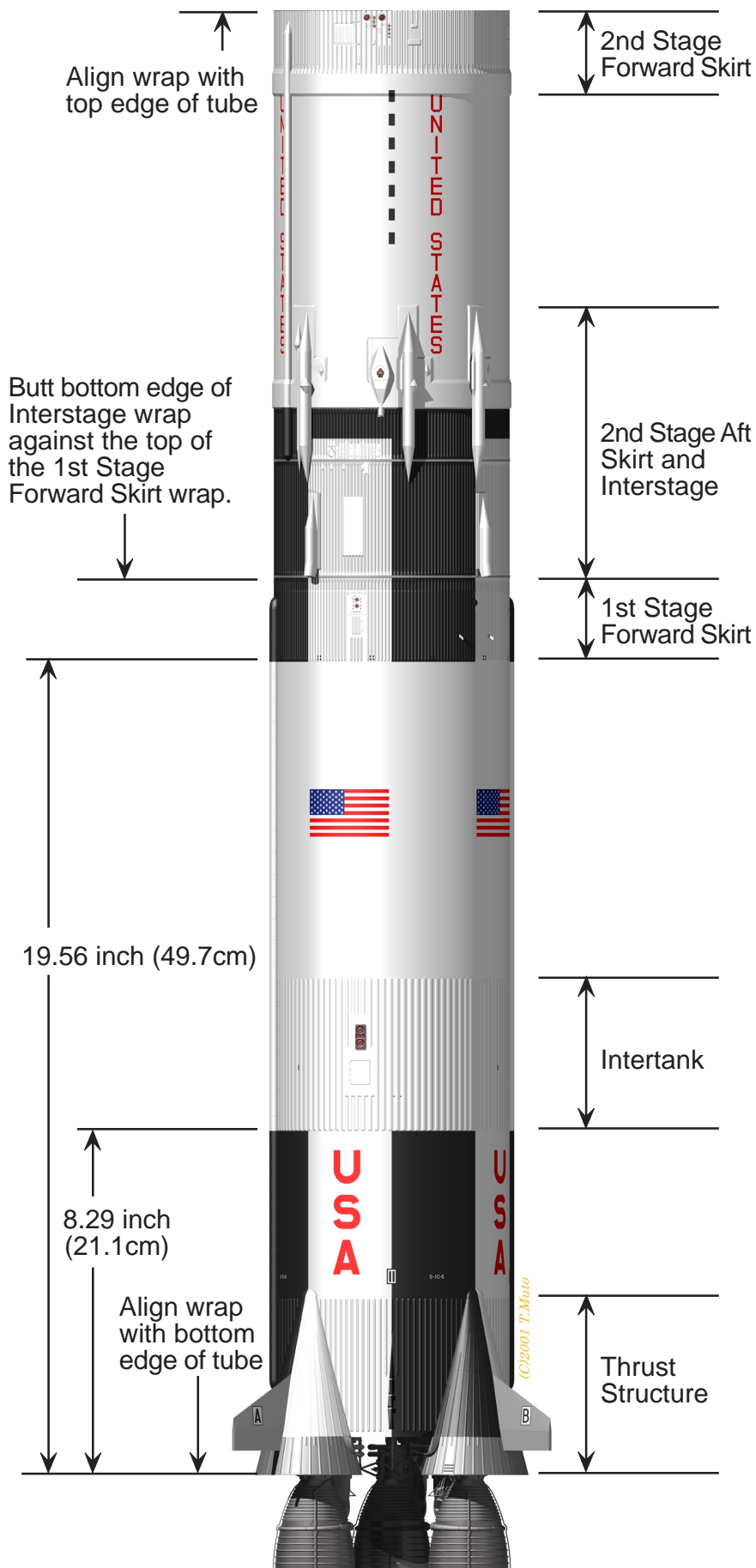
We designed the wraps to hide the seams as

much as possible. The one wrap that has the most visible seam is the interstage wrap (see the next page for the names of each wrap). I highly recommend trimming this one last. By doing this, you'll have gained maximum experience in the technique before you get to this wrap.



Trimming to length.mov

Instructions: Click on the box above to start the movie playing.



Step # 10: Identifying the vacuum-form wraps, and their positions on the main body tube.

Use the illustration here to identify the five vacuum form wraps that are placed on the big body tube. **DO NOT GLUE** them in place yet. We'll position them all on the tube first before we start gluing them down. See the next step for orientation details.

STEP #11: Orientation of the Thrust Structure, and the Intertank wraps on the big tube.

In this video, we'll start positioning the wraps on the big tube. The Thrust Structure wrap is applied first, since it will dictate the orientation of the other wraps.

You will be drawing several lines on the body tube. Always use a pencil. The video shows a pen

being used, but that is only so that you'll be able to see the line in the movie. If you use a pen, the ink will be dissolved by the thinners in the paint, and will bleed upward to the surface of the rocket. But a pencil line will be neatly hidden once you paint the rocket.



STEP #12: Placement and orientation of the 1st Stage Forward skirt, the interstage, and the 2nd Stage Forward skirt wraps on the rocket.

As we designed this kit, we wanted to hide the seams where the edges of the wraps come together. This will make the finished model much better looking.

Unfortunately, by doing this, we've made it a

little more complicated to orient the wraps around the perimeter of the tube. As you will notice in the video, the edges of the wraps are staggered. Pay close attention to the video so that you get all the wraps in the proper location.



Wrap Orientation Part 2.mov

Instructions: Click on the box above to start the movie playing.

STEP #13: Preparing to glue down the wraps: Installing an applicator tube into the CyA glue bottle.

Before you can glue the wraps down against the tube, you'll need to install a small teflon tube into the bottle of "thin" CyA adhesive. You can purchase these small tubes from any good hobby store. I highly recommend using the applicator tube, because it limits the amount of glue that can be applied to the parts, and it gives you better con-

trol on where the glue is applied. If you skip this step, you will likely ruin the wraps. Gluing down the wraps is probably the trickiest part of the entire building process, and they are easily ruined if you become impatient. Work slowly, and don't use much glue!



CYA applicator.mov

Instructions: Click on the box above to start the movie playing.

STEP #14: Gluing down the vacuum form wraps

I cannot stress enough how important it is that you use extreme care when gluing down the wraps. If you use too much CyA glue, you'll soften the plastic, and cause it to tear. Fixing a tear is very difficult (see the video on final surface prep prior to painting for some advice).

If you are unsure about using this method, see the "Alternate" method of attaching the wraps on [the next page](#).

When we apply the wraps to the tube, we only want to glue down the edges; not the entire surface of the wrap. If glue gets past the edge and under the surface, your wrap will look bad.

We want to let the wicking (capillary action)

of the glue do all the work. Basically, you'll put a drop of glue next to the wrap, and it will spread out and quickly wick along the edge of the plastic. Then we'll put another drop further along the tube, and again the thin CyA will wick along the edge. NOTICE: I did not say that the CyA will wick "under" the plastic. It should only seal down the edge of the plastic.

If your wrap is not tight up to the tube, the CyA will not follow the edge, and will get underneath. That would be bad. So remember to keep stretching the plastic as shown in the video.

Work slowly! After you get the proper technique, you'll gradually be able to work a little faster.




Attaching_Wraps.mov

Instructions: Click on the box above to start the movie playing.

STEP #14A: Alternate method of attaching the vacuum form wraps.

We added this extra step to help people that have difficulty attaching the vacuum form wraps using the glue method. This method does require some extra patience, but it is a little more tolerant of builder skill level.



alternate_glue_method.mov

Instructions: Click on the box above to start the movie playing.

STEP #15: Initial assembly of the removable bottom section.

We're going to skip mounting the fairings on the big tube until after the display nozzle section is finished. This is because the display nozzle section will be used to hold the tube circular so that it can't be deformed when adding the fairings. If we should happen to deform the tube when adding

the fairings, then it will be very difficult to insert the display nozzle section later.

For this procedure, we're going to use one of the coupler rings that we slit and spliced together in [Step #7](#).



Nozzle_Assembly_1.mov

Instructions: Click on the box above to start the movie playing.

STEP #16: Assembly of the plastic display nozzles

In this step, we'll glue together the halves of the plastic display nozzles. Just be careful not to use too much of the plastic model cement.



Nozzle_Assembly_2.mov

Instructions: Click on the box above to start the movie playing.

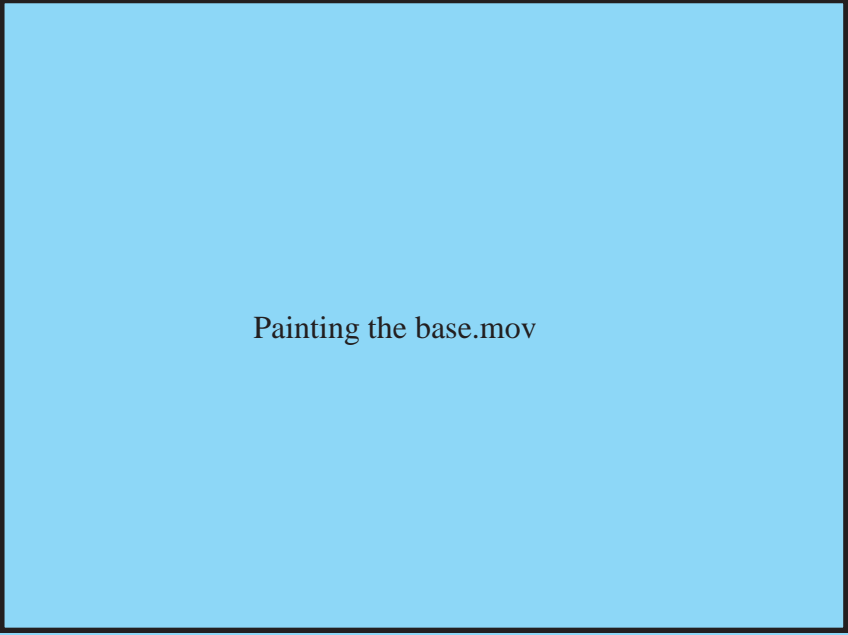
STEP #17: Painting the plastic display nozzles.

In this video, we'll be painting the base of the rocket, as well as the plastic display nozzles. Besides primer paint, you'll need silver and white spray paint.

Notice the painting technique. The paint is applied in very light coats. The spray can is constantly in motion, so that we never apply too much

paint in one location. This avoids paint runs and sags.

For additional tips on spray painting models, I recommend the video book: *Building Skill Level 1 Model Rocket Kits*. You can [click here](#) to get more information about this product.



Painting the base.mov

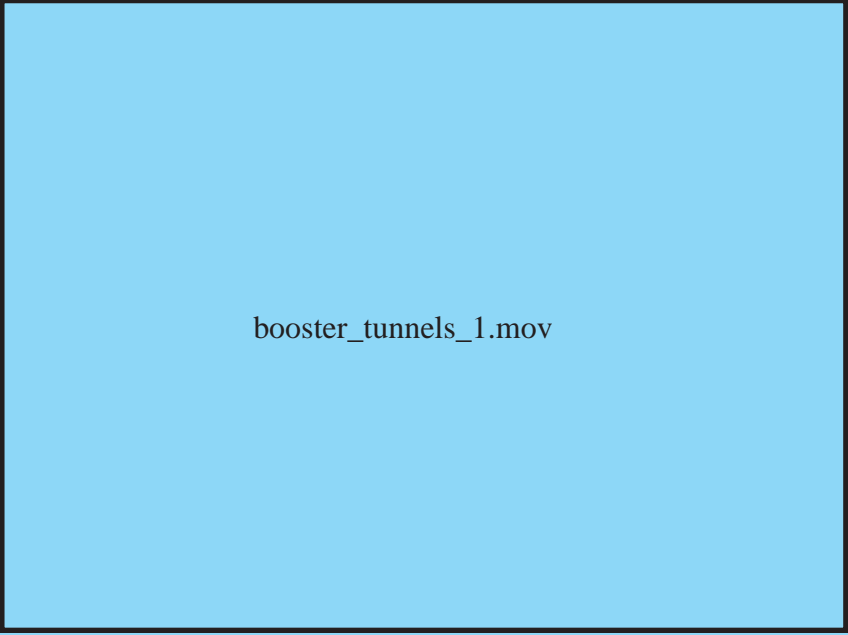
Instructions: Click on the box above to start the movie playing.

STEP #18: Shaping the balsa wood tunnel covers for use on the first stage.

In this video, we'll be cutting the balsa tunnel covers to length, and then shaping the ends using sandpaper and a sanding block.

After you're done shaping the ends, be sure to

check the length of the parts before going on to the next page. If your tunnels are too long, just go ahead and trim them down and then reshape as necessary.

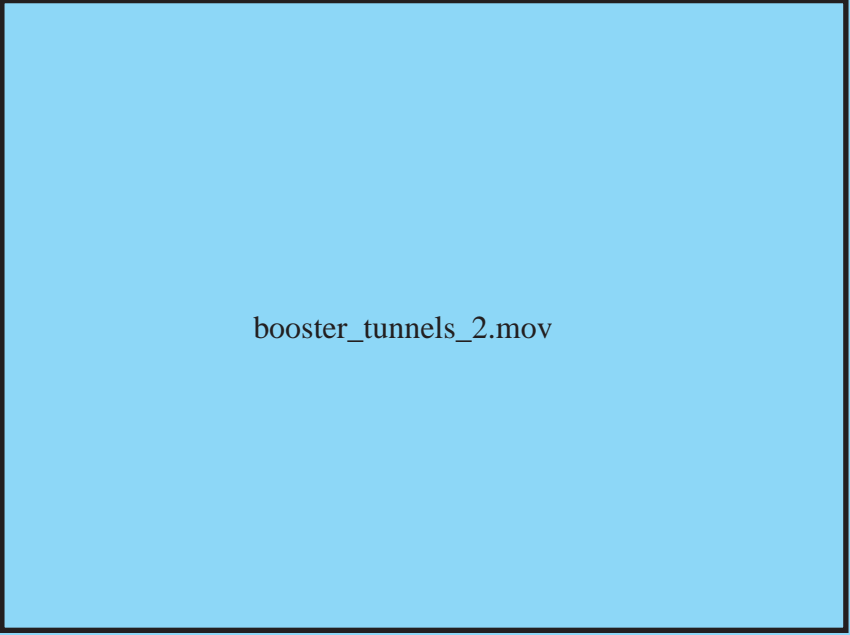


booster_tunnels_1.mov

Instructions: Click on the box above to start the movie playing.

STEP #19: Sanding and sealing the tunnel covers.

This step is pretty straight forward. We'll be sealing the balsa tunnel covers with Elmers' Carpenters Wood Filler, which has been thinned down with water. You can buy this filler putty at any hardware store. A small tub will last you for many many models.

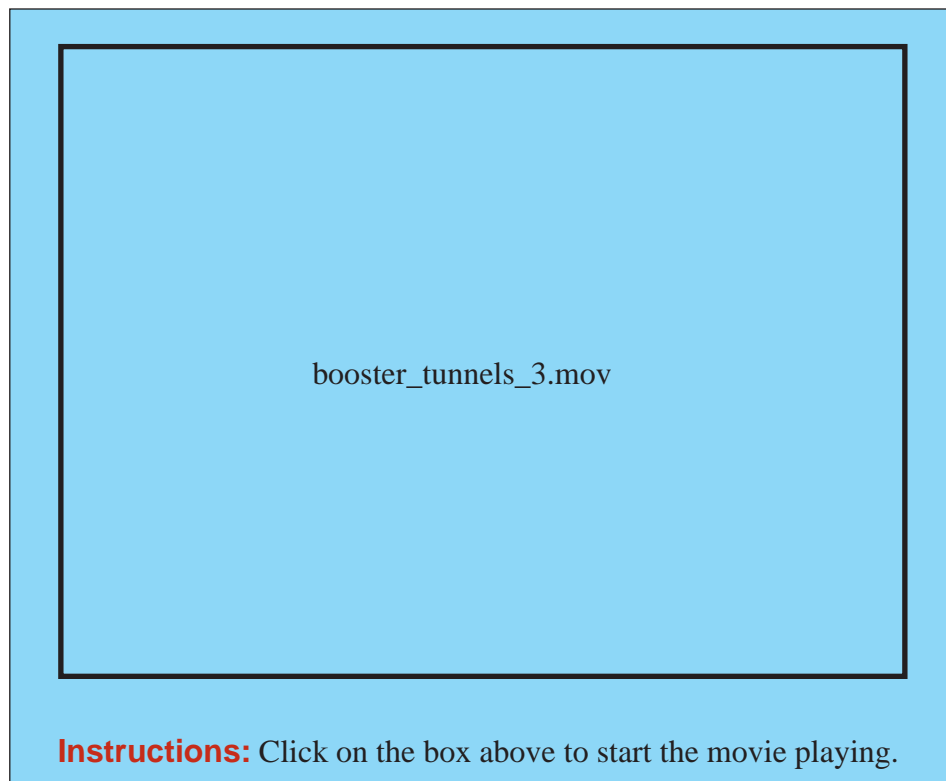


booster_tunnels_2.mov

Instructions: Click on the box above to start the movie playing.

STEP #20: Cutting the 2nd stage balsa tunnel cover to length, and shaping the end.

After completing the cutting of the 1st stage tunnel covers, this step will be real easy. Just take your time and shape the end so it looks nice. Also, after completing this step, go ahead and sand and seal it with the wood filler, just as you did in the last step.



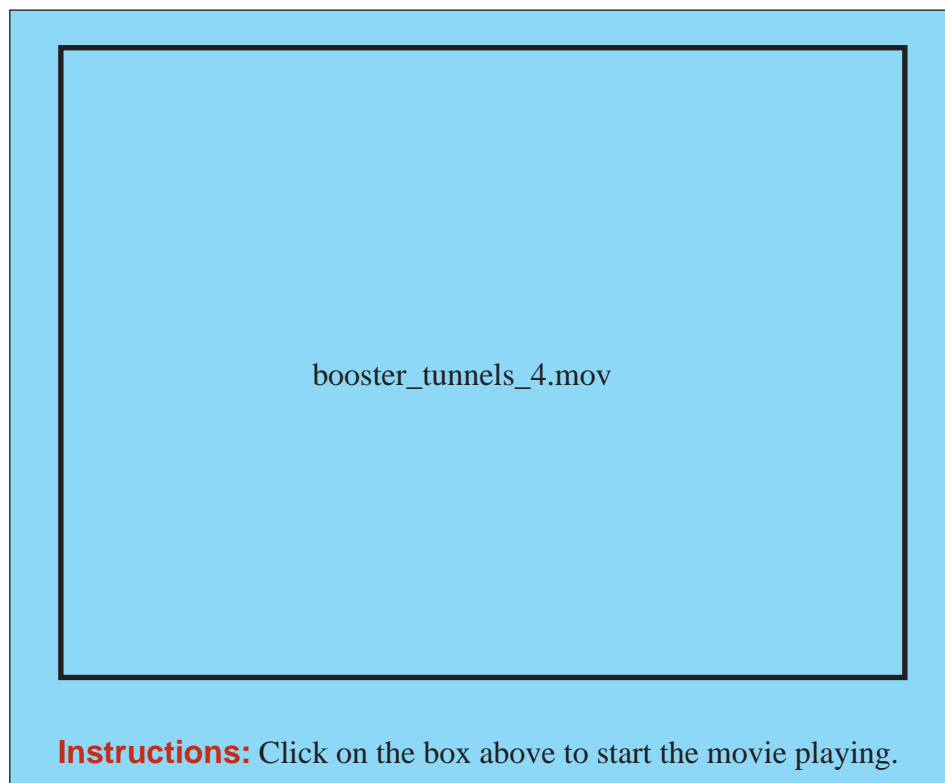
STEP #21: Attaching the tunnel covers to the first stage.

Prior to beginning this step, I encourage you to paint the tunnel covers with primer paint, and sand them smooth. the primer will help you to see any defects in the tunnel covers. These defects are much easier to fix before you glue the tunnel covers to the rocket. If you find any defects, use the wood filler to fill any depressions in the tunnels, and then sand them smooth as shown previously.

One of the reasons that we didn't glue the en-

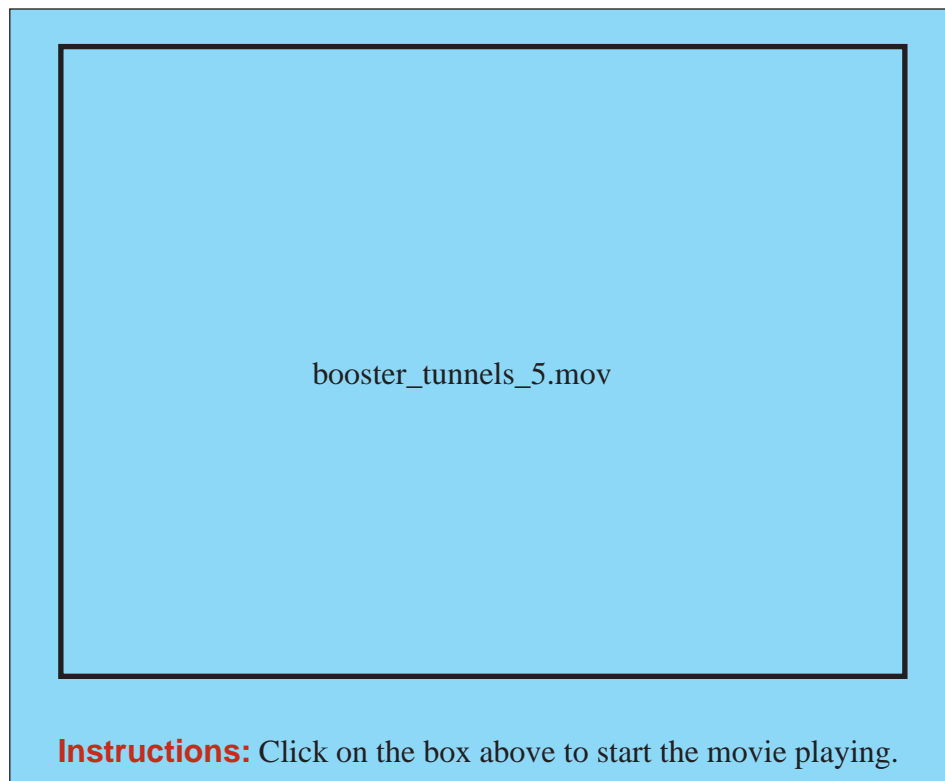
tire surface of the vacuum form wraps against the tube is because I told you that we'd be removing sections later. Now is that time.

In this step, we'll be removing portions of the InterTank wrap that prevent the tunnels from laying flat against the tube. If you didn't follow the previous recommendations on gluing the wraps down -- you'll find that this step is going to be really difficult.



STEP #22: Gluing down the 2nd stage tunnel cover

This step is easier than the previous one, because you only have one tunnel to glue down. Just be sure to take your time cutting away the portion of the 2nd stage forward skirt wrap. Making the curved cut into the vacuum form can be a little tricky.



STEP #23: Attaching the launch lugs to the 1st stage.

If you don't intend to fly your rocket, you may omit this step.

In this video, we'll cut the launch lug and the wood stand-off piece in half and carefully glue them to the proper location on the 1st stage.



Launch_lug_installation.mov

Instructions: Click on the box above to start the movie playing.

STEP #24: Assembling the fairing braces

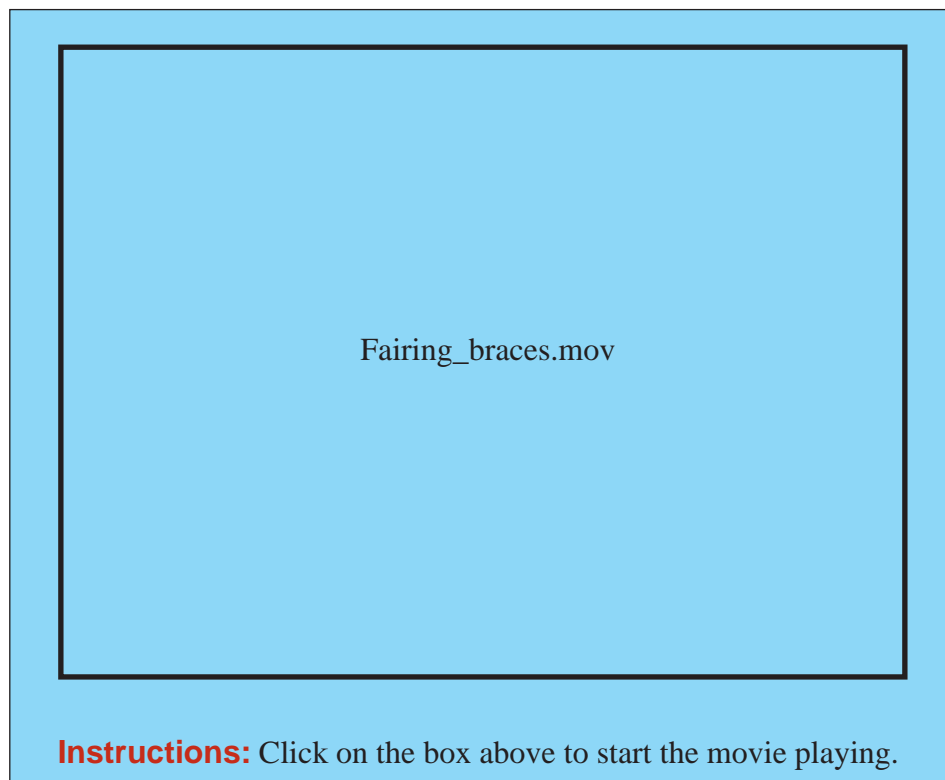
We've held off on installing the fairings on the first stage until this point. The reason is that the fairings are delicate, and we didn't want to damage them while working on other areas of the 1st and 2nd stages.

In this step, we'll assemble the fairing braces, and get them ready to glue to the rocket,

If you haven't already done so, complete the construction of the [display nozzle section](#). That section will be inserted into the aft end of the tube to hold the tube in a circular shape.

As we glue down the fairing braces, it is important that we don't deform the tube. In this step, it is real easy to force the tube to conform to the fairing braces. This would make the tube non-circular, and then it will be difficult to insert the display nozzles later.

Expect a few gaps under the curved section of the braces. These can be filled in later with epoxy clay, or wood filler. That step will come later. For now, ignore any gaps, so that the tube remains perfectly circular.

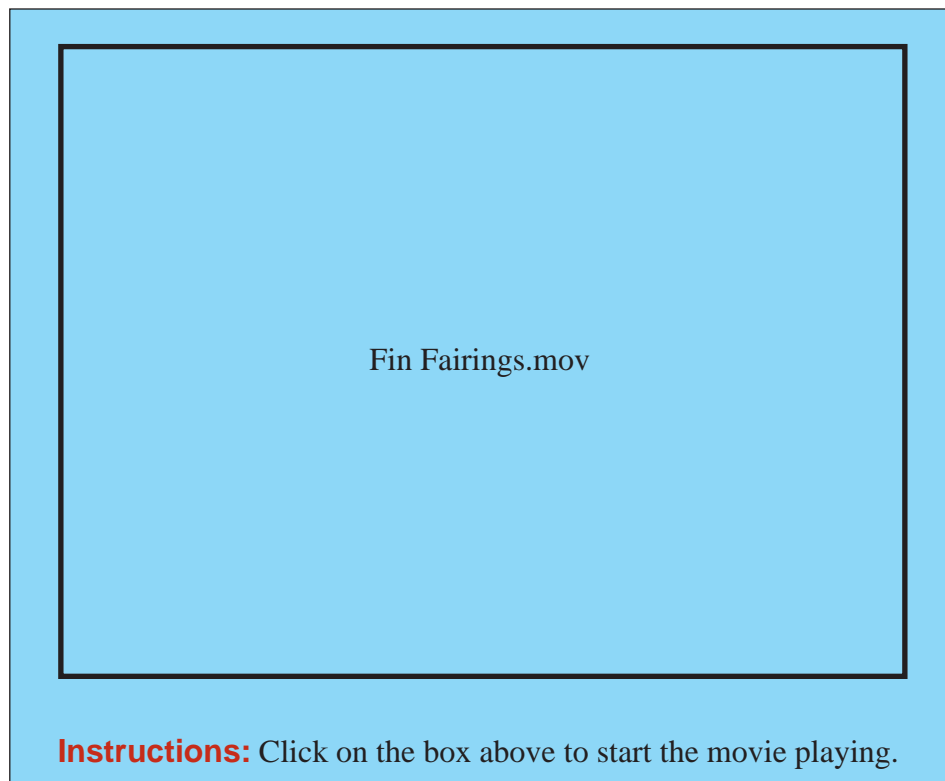


STEP #25: Cutting out the vacuum-form fin fairings.

Cutting out the vacuum-form fin fairings is a little more tricky than cutting out the wraps. Instead of using a hobby knife, we'll be using a scissors. Make sure the scissors has a curved tip (like a cuticle scissors). This will make it easier to follow the complex curves of the fairing.

We have found that manufacturing the

vacuum-form fairings are the most difficult item in the kit to make. Some kits will have some reject parts in them. Just discard the fairings that have folds (webbing) in them; and use the good fairings. All kits will have four good fairings included.



STEP #26: Cutting slots in the fin fairings.

In this step, we'll cut slots into the fin fairings. We'll do it now before the fairings are attached to the rocket, because it is easier to cut the slots from the back side of the fairing.



slots_in_fairings.mov

Instructions: Click on the box above to start the movie playing.

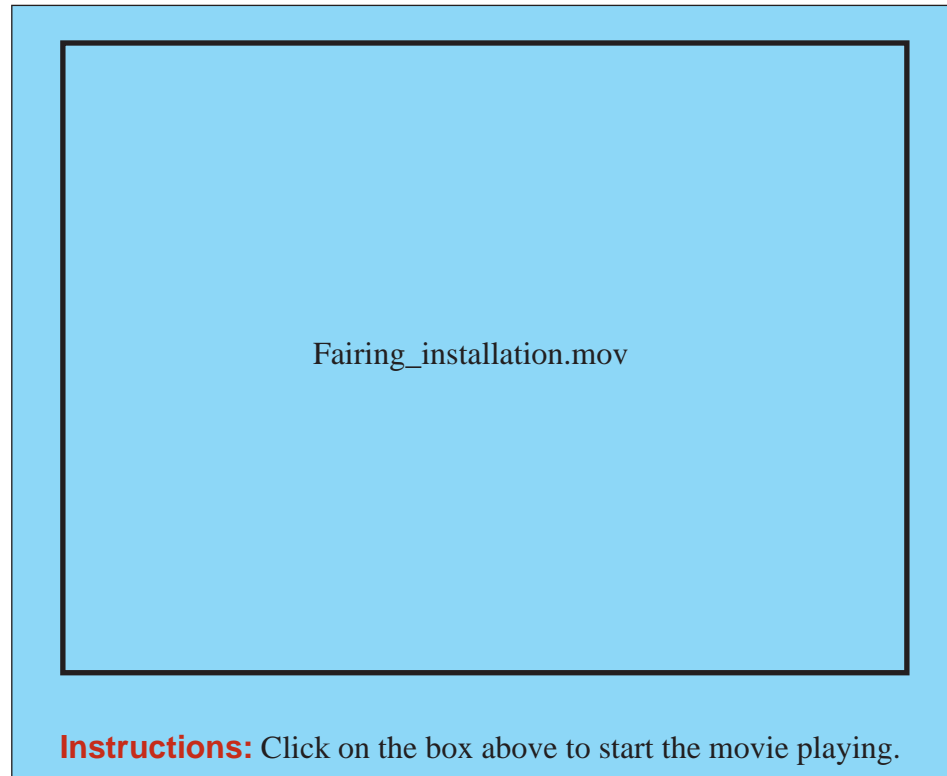
STEP #27: Attaching the vacuum-form fairings to the 1st stage.

WARNING: Do not dismiss the technique shown in this video that shows how to install the fairing. I've tried many other methods, and this is the simplest and gives the best results.

This video clip shows how to install the fairings. The key to attaching them is the Fix-It Epoxy clay. It allows you to reposition the fairings and to fill any gaps that may be present.

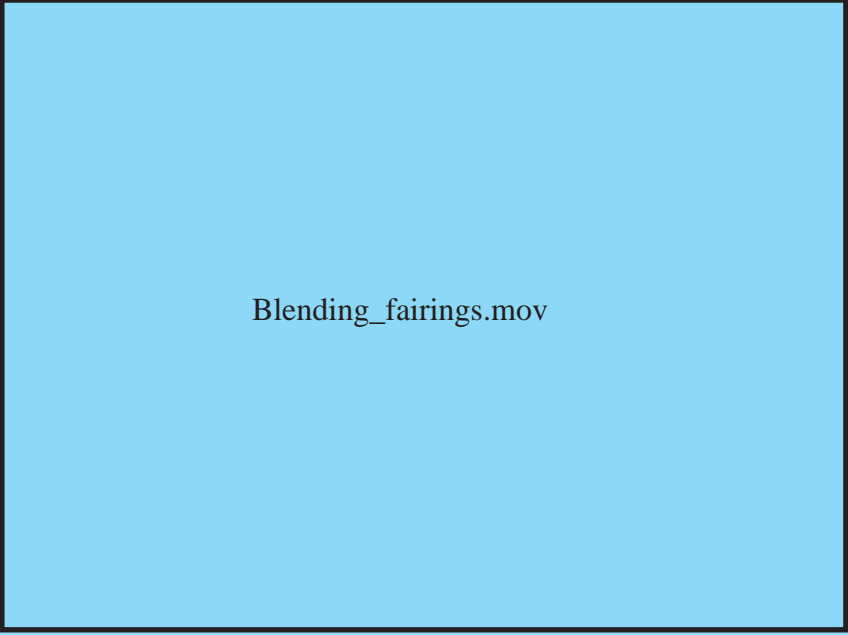
Optional step: It is possible to strengthen the fairings by applying a thin layer of the Fix-It epoxy to the inside of the parts. If you do so, you need to apply it at the same time as you install the

fairings. When you install the fairings, the shells need to be flexible so that they can be formed to fit your particular rocket. So don't allow the epoxy to harden before installing the fairings. Note: adding the epoxy clay will change the CG of the rocket. So use the epoxy clay sparingly. The amount you need to apply to the surface needs only to be thinner than a dime. Once it hardens, your fairings won't deflect at all. This technique is not shown in the video; because it is not necessary to the construction of the model.



STEP #28: Filling any voids around the edges of the fairings.

In this step, the fairings are already installed, and the epoxy clay has hardened. You'll now use the epoxy clay again to fill any voids where the edges meet the tube. This step takes a little bit of time to do, but if you are patient, the results are fantastic.



Blending_fairings.mov

Instructions: Click on the box above to start the movie playing.

STEP #29: Installing the display nozzles

The display nozzles can be test fitted into the 1st stage at this time. You'll need to sand the edges to make it fit, as the video shows. Afterwards, set the display nozzle assembly aside until you've painted the rest of the model.



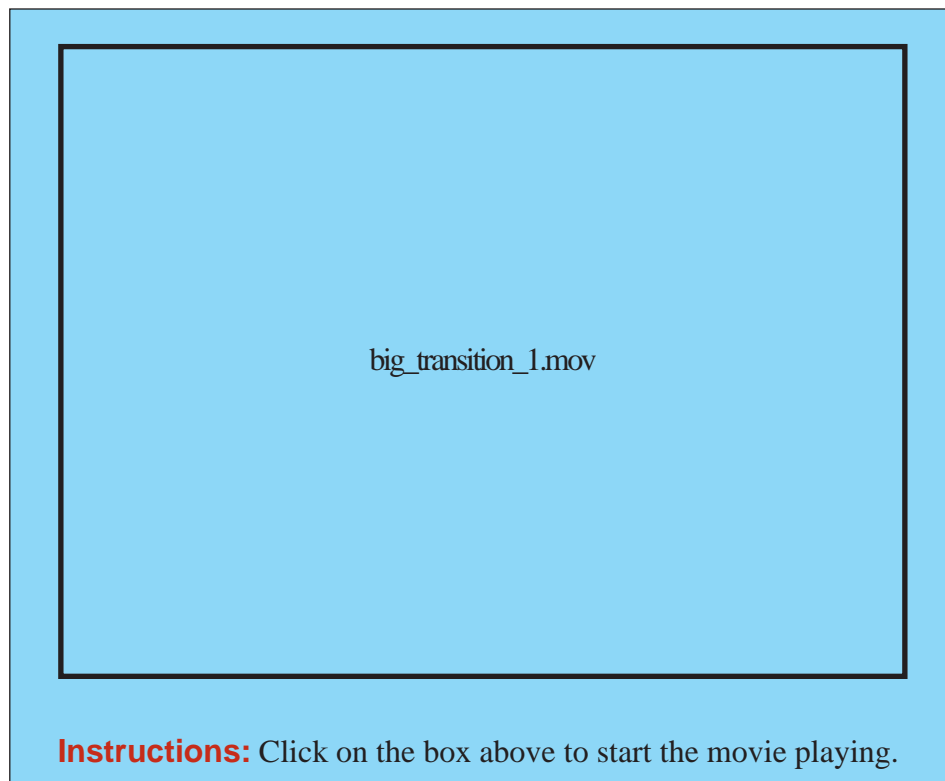
Display_nozzle_install.mov

Instructions: Click on the box above to start the movie playing.

STEP #30: Creating the shoulder for the 3rd stage

The 3rd stage and the big transition are one part in this kit. In this step, we'll be assembling the shoulder section that allows the unit to fit on top of the big tube.

As you perform this step, pay particular attention to aligning the centering rings as neatly as possible. This will make the next few steps to be performed easier.



STEP #31: Sanding and sealing the edges of the shoulder rings.

To make the transition fit into the big tube easily, we'll need to sand down the edges of the rings that stick over the edges of the coupler tube. We'll also seal them with thin CyA glue to keep the lay-

ers of paper from coming apart.

When you're done with this step, check to make sure the should piece fits easily into the big tube. Sand it as necessary to make sure it does fit.



big_transition_2.mov

Instructions: Click on the box above to start the movie playing.

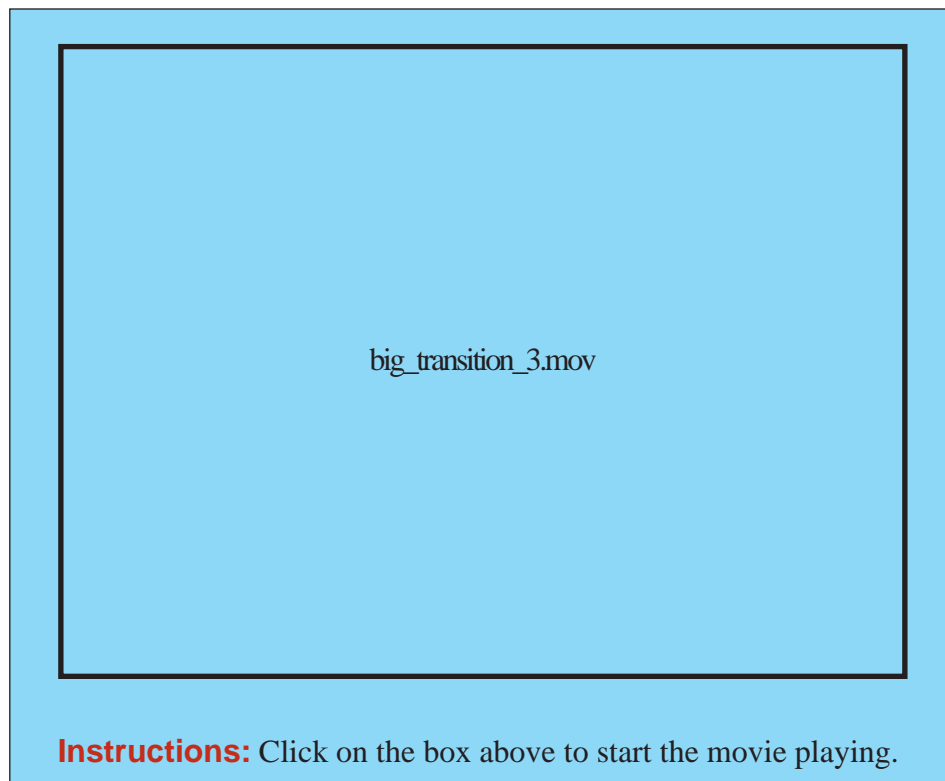
STEP #32: Assembling the internal transition piece

NOTE: **WATCH** the video before performing this step. The pattern sheet has a slight error, and this video will show you how to correct it.

The big transition is actually made from two

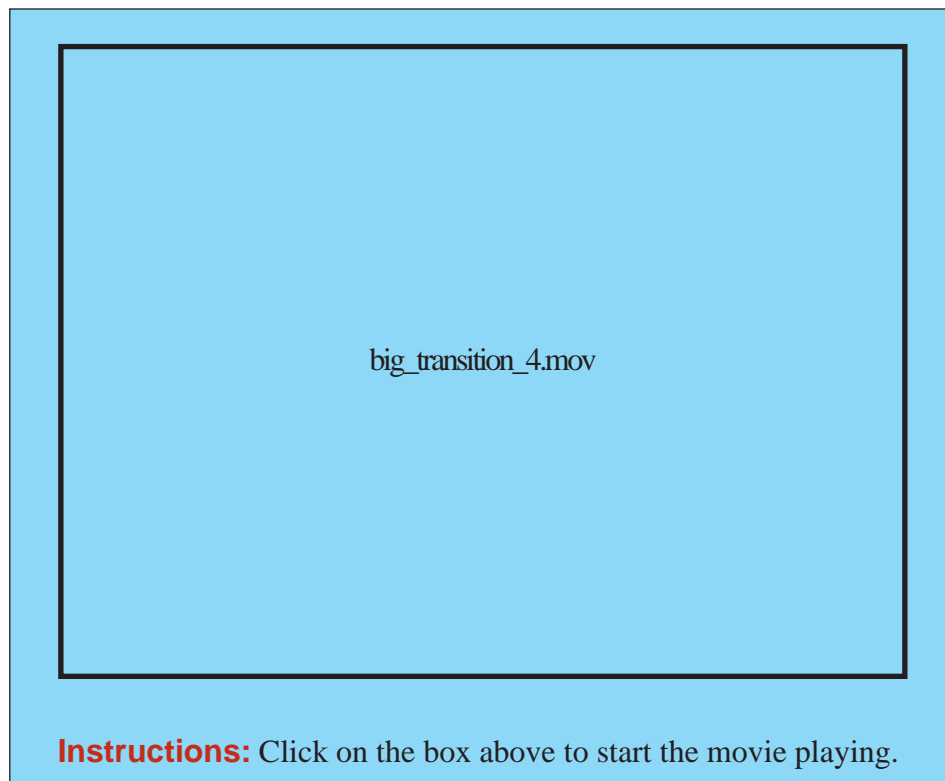
layers. The inner layer provides stiffness to the vacuum-form wrap that is installed later.

In this step, we'll cut out the internal wrap, and adjust its fit so that it will be correctly positioned on the tube. It is not glued into place until the next step.



STEP #33: Gluing down the internal transition piece

In this step, we'll glue down the internal transition piece. It is glued down using thin CyA glue.

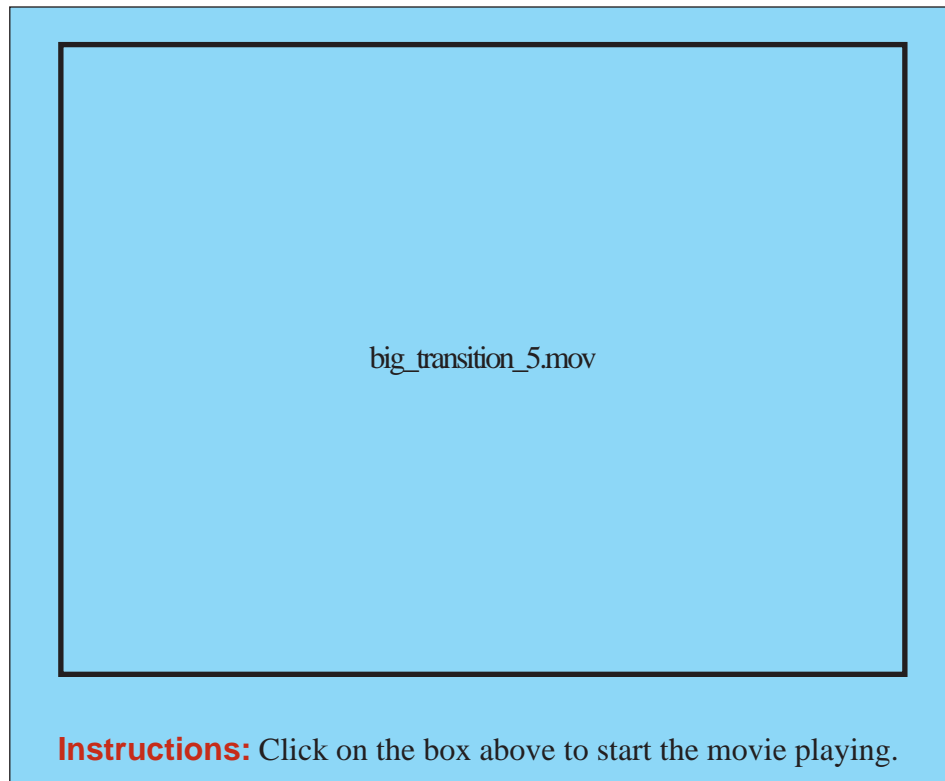


STEP #34: Cutting out the transition section vacuum form wrap.

Unlike the other flat vacuum form wraps, the wrap for the transition section does not contain a lip to help you guide your knife blade. The instructions in this video will show you how to properly cut out this wrap. Take your time,

and always use the a very sharp hobby knife.

In the next step, we'll trim the ends of the transition so that it fits neatly over the top of the internal transition piece.



STEP #35: Installing the corrugated wrap on the transition.

In this step, I'll show you how to properly fit the vacuum form transition wrap on the rocket, and how to trim the ends for a perfect fit.

Then, I'll show you how to glue it down to the model.

Finally, in this step, you'll add a cardboard disk to the back end of the shoulder. Without this disk, the model won't be able to deploy the parachutes. So it is important that you complete this step if you intend to fly your rocket.



big_transition_6.mov

Instructions: Click on the box above to start the movie playing.

STEP #36: Cutting out the wraps for the 3rd stage

The two wraps for the third stage are contained on one vacuum formed sheet. This sheet also contains the tunnel covers that are positioned on the third stage.

You'll begin by separating the pieces. The tunnels will be cut in the next step, so just set them aside for now.

Cutting out the two wraps for the third stage

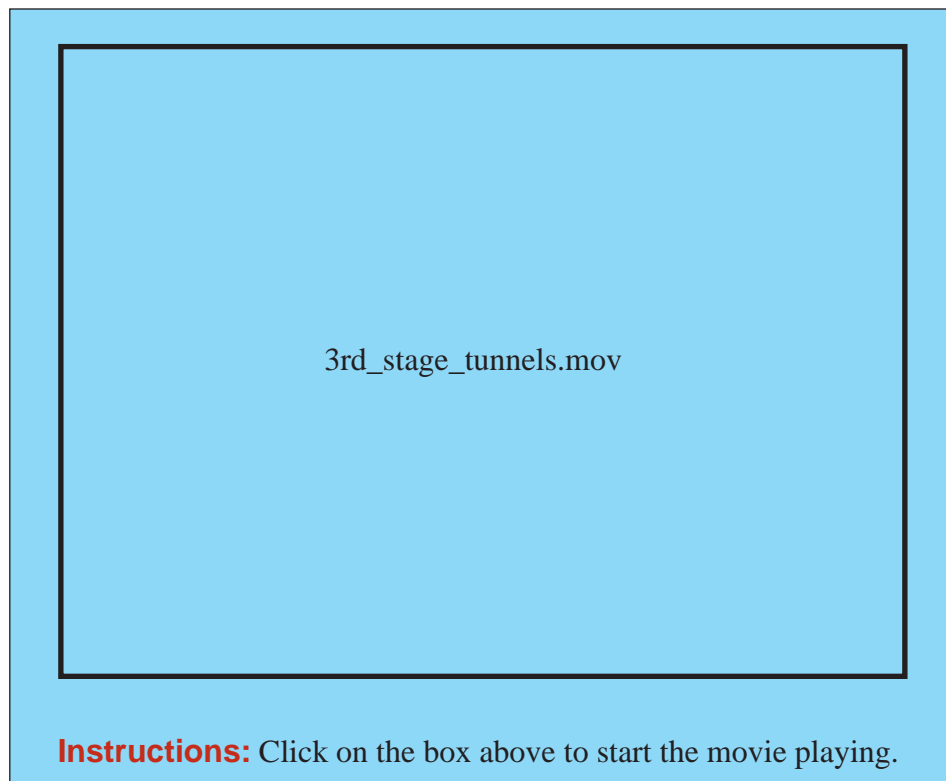
is only a little more difficult than the wraps used on the big tube. This is because the wraps have big details close to the edges. In the video, I'll show you how to tilt the wraps as you cut them so that your knife edge is always pressing the wrap down against the table. This makes it easier to control the direction of the blade.



STEP #37: Cutting out the 3rd stage vacuum form tunnels.

The tunnels on the 3rd stage are trimmed out of the sheet in this step. We want the edges of the tunnels to be nice and straight when we glue them down to the tube a little later. So we're going to fill them with the Fix-It epoxy

clay, and sand down the edges and the bottom. Even if your trimming job isn't the greatest, it is still possible to end up with a near-perfect part!



STEP #38: Installing the 3rd stage vacuum form wraps.

In this step, I'll show you how to correctly position the 3rd stage vacuum form wraps. You'll also see how to trim them to length, and

finally how to glue them down to the tube.

Of all the wraps on the rocket, I think that these are the easiest to glue down.

Installing_3rd_stage_wraps.mov

Instructions: Click on the box above to start the movie playing.

STEP #39: Installing the cast details and tunnels on the 3rd stage.

With the vacuum form wraps installed in the last step, we can now glue on the tunnels and the other cast resin details onto the rocket.

You do have an option here... You can wait to install the OMS pods onto the rocket after it has been painted. This will make it easier to

mask the rocket for painting. Also, the OMS pods are painted a different color, so you can paint them prior to installing them. I do recommend doing this; but in this step, I wanted to show you where they are positioned.



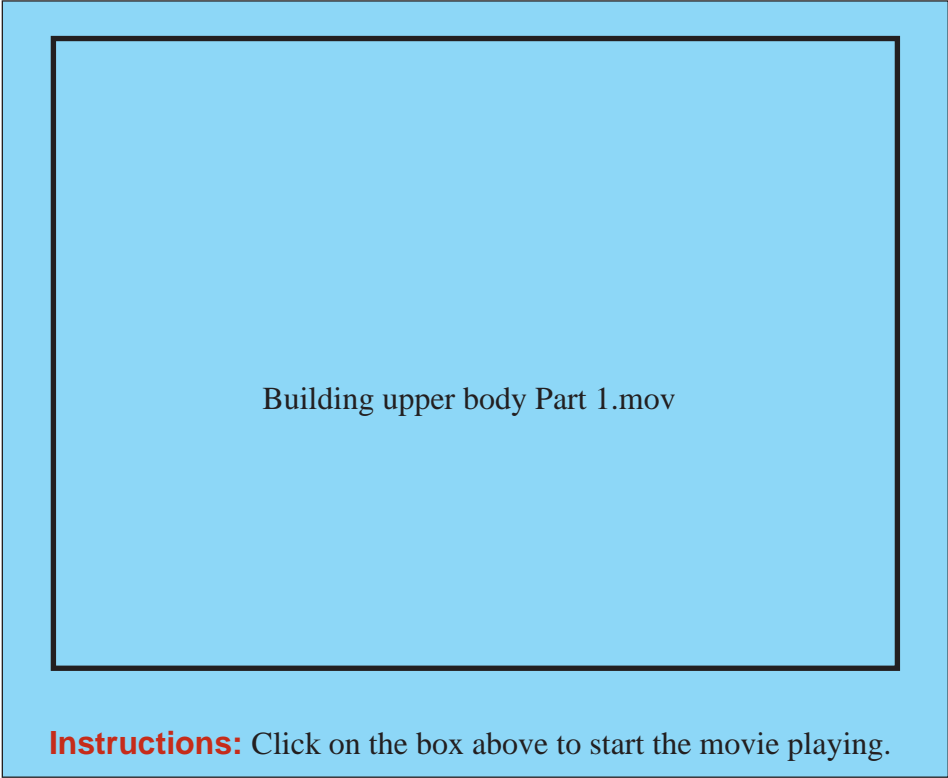
Install_3rd_stg_details.mov

Instructions: Click on the box above to start the movie playing.

STEP #40: Building the upper portion of the Apollo rocket -- Part 1.

In this step, you'll start the assembly of the upper portion of the rocket. You'll start by notching the aft centering ring to accept a shock cord anchor. This is optional on the Saturn V rocket, but is required on the Saturn 1B model. Then you'll glue this ring to the service module body tube.

The measurement described in the video is 1/4 inch.

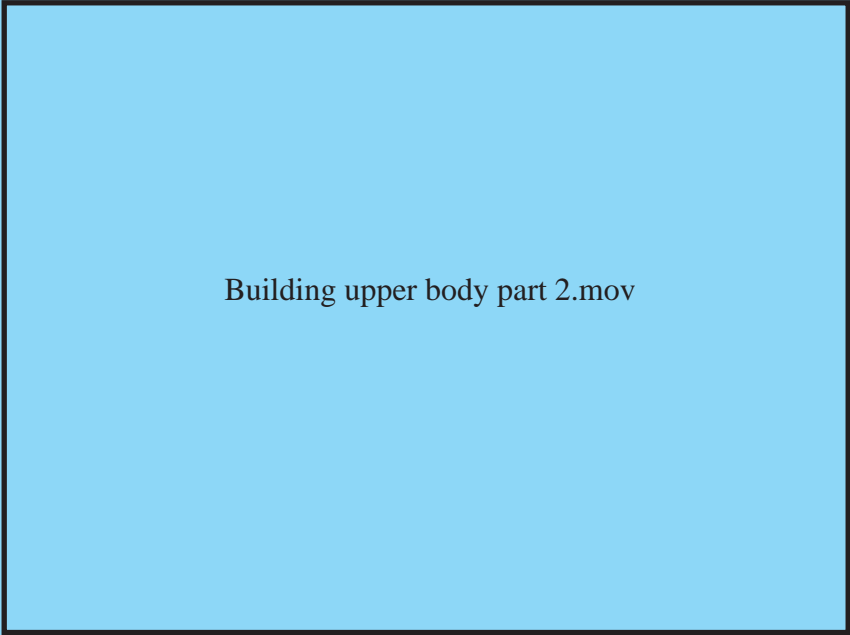


Building upper body Part 1.mov

Instructions: Click on the box above to start the movie playing.

STEP #41: Building the upper portion of the Apollo rocket -- Part 2: Creating the shoulder for the LEM transition.

This is another procedure where you'll be slicing a tube to create a internal tube. This short tube will be used as the shoulder on the LEM transition section. You'll be finishing this step by gluing the other centering ring to this shoulder piece.

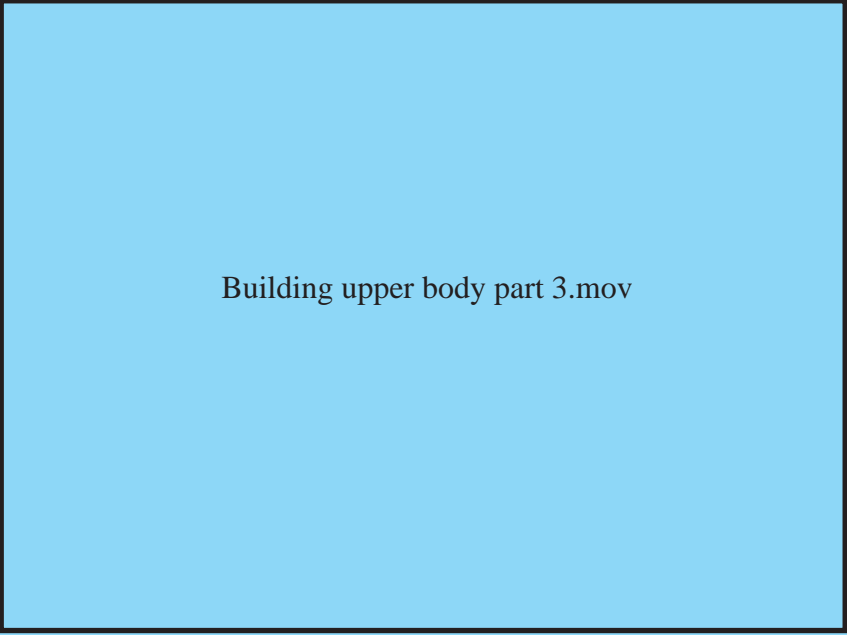


Building upper body part 2.mov

Instructions: Click on the box above to start the movie playing.

STEP #42: Building the upper portion of the Apollo rocket -- Part 3: Installing the shoulder on the LEM transition

You'll now install the shoulder on the LEM transition assembly. Then you'll sand the shoulder for a proper fit into the S-IVB stage of the Apollo rocket.

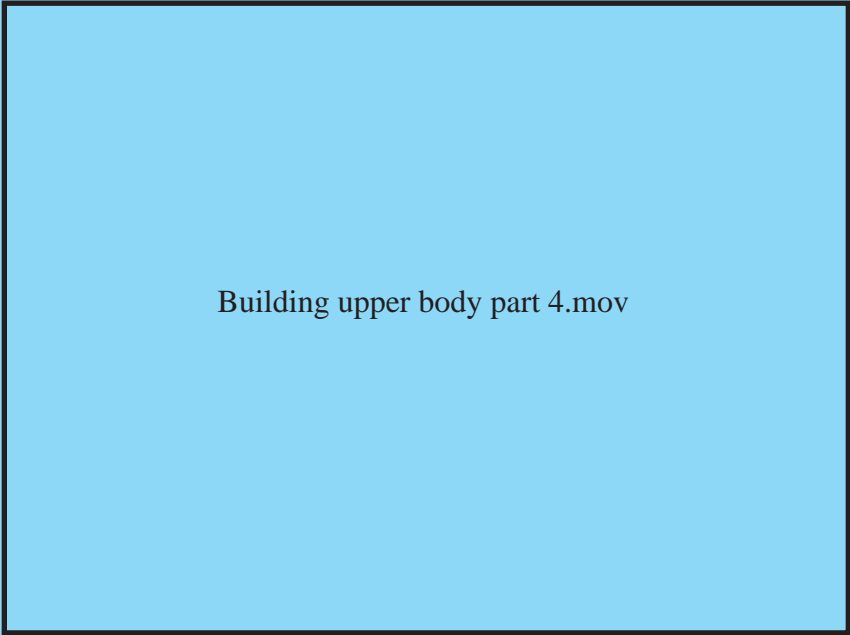


Building upper body part 3.mov

Instructions: Click on the box above to start the movie playing.

STEP #43: Building the upper portion of the Apollo rocket -- Part 4: Initial assembly of the LEM transition section.

The LEM transition section can now be cut out and put together. This step shows you how to make the transition so that it retains its perfectly circular shape.

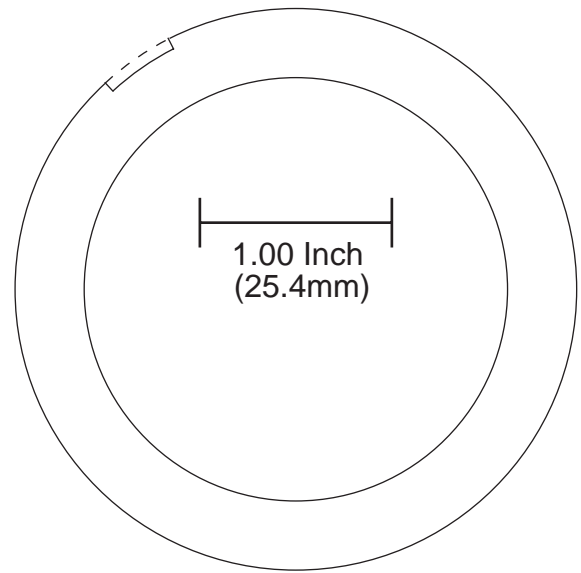


Building upper body part 4.mov

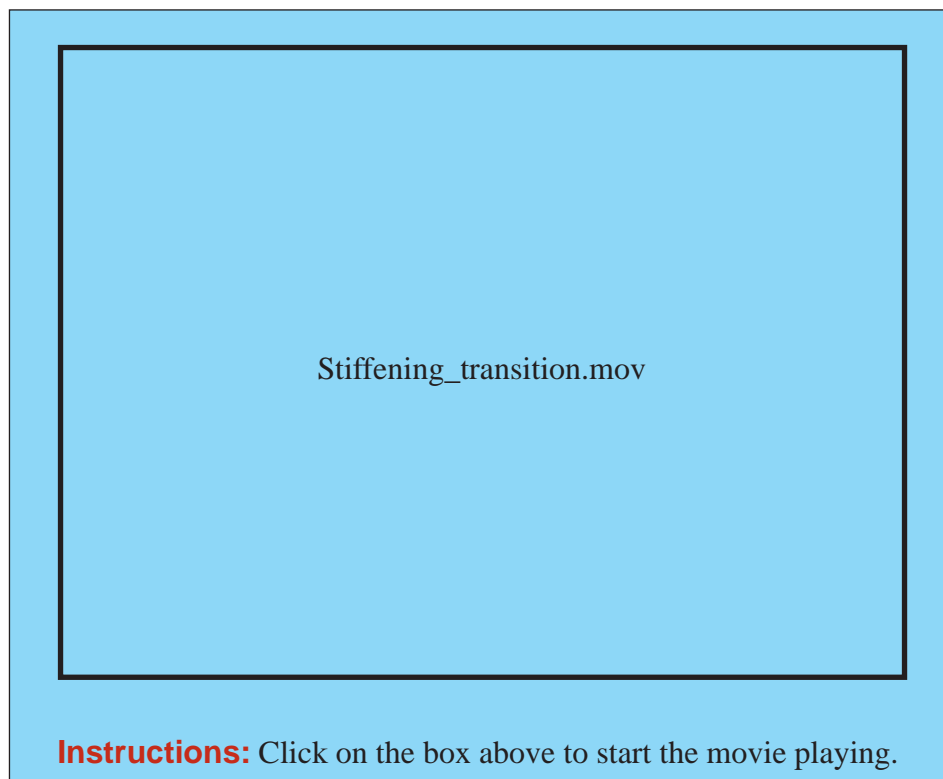
Instructions: Click on the box above to start the movie playing.

STEP #44: Optional step to stiffen up the LEM transition section.

This step is totally optional. The kit does not require this, but you may want to perform this step to stiffen up the LEM transition piece. To the right is the template you'll need to make the ring, so go ahead and print out this page. Adjust the print set-up as necessary to get the ring the exact size.

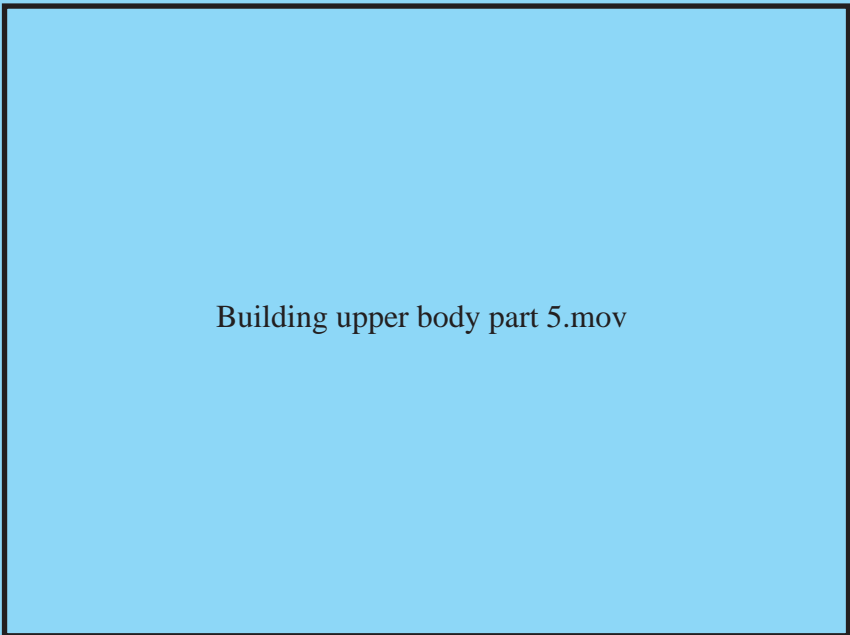


LEM Adapter
Optional Stiffener Ring Pattern



STEP #45: Building the upper portion of the Apollo rocket -- Part 5: Gluing the LEM transition into place.

We'll now be gluing the internal transtion section into place on the tube. We're going to use a lot of the thin CyA adhesive -- so you may want to perform this step outdoors if you are sensitive to the odor of the glue.

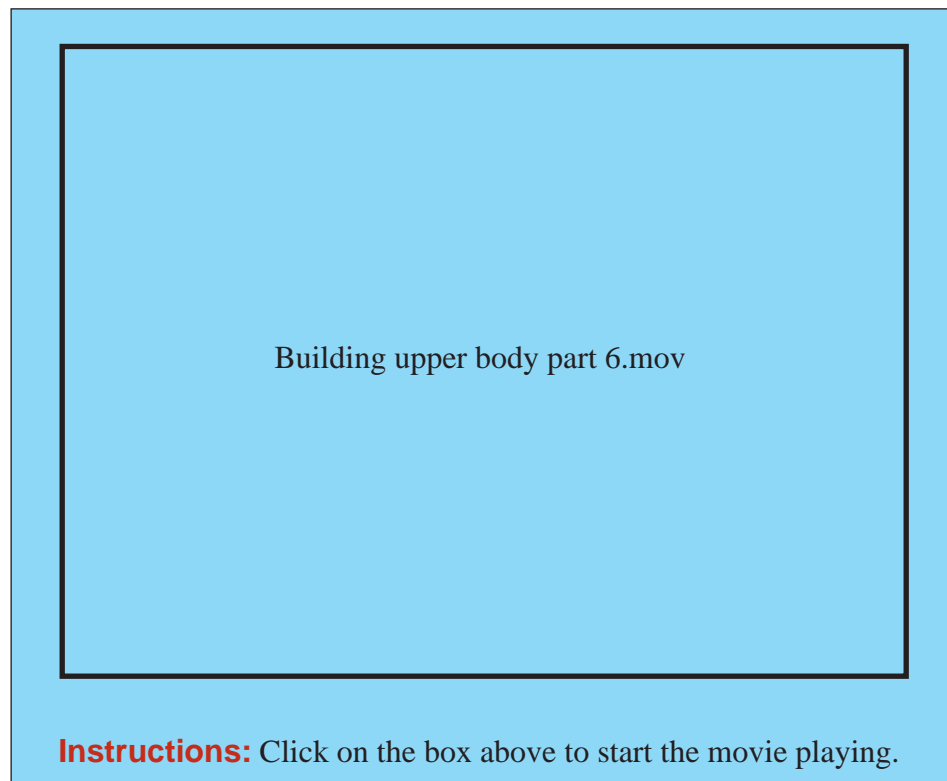


Building upper body part 5.mov

Instructions: Click on the box above to start the movie playing.

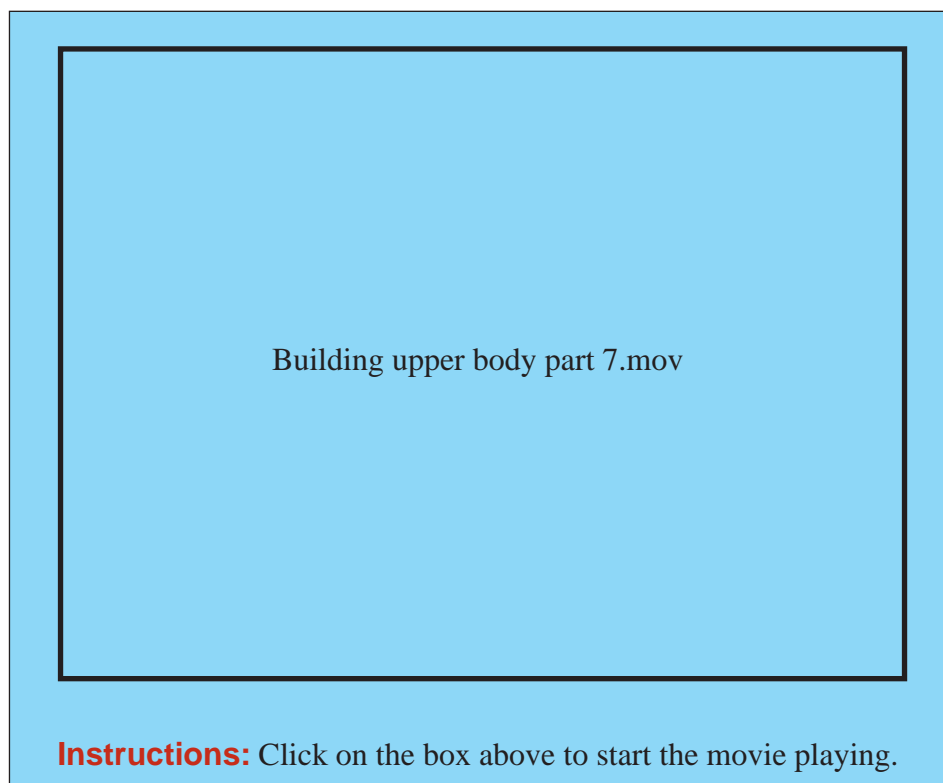
STEP #46: Building the upper portion of the Apollo rocket -- Part 6: Installing the embossed wrap.

The embossed paper wrap is what gives the LEM transition its texture. In this step, you'll be cutting it out, and attaching it to the rocket. As always, pay close attention to the steps shown in the video.

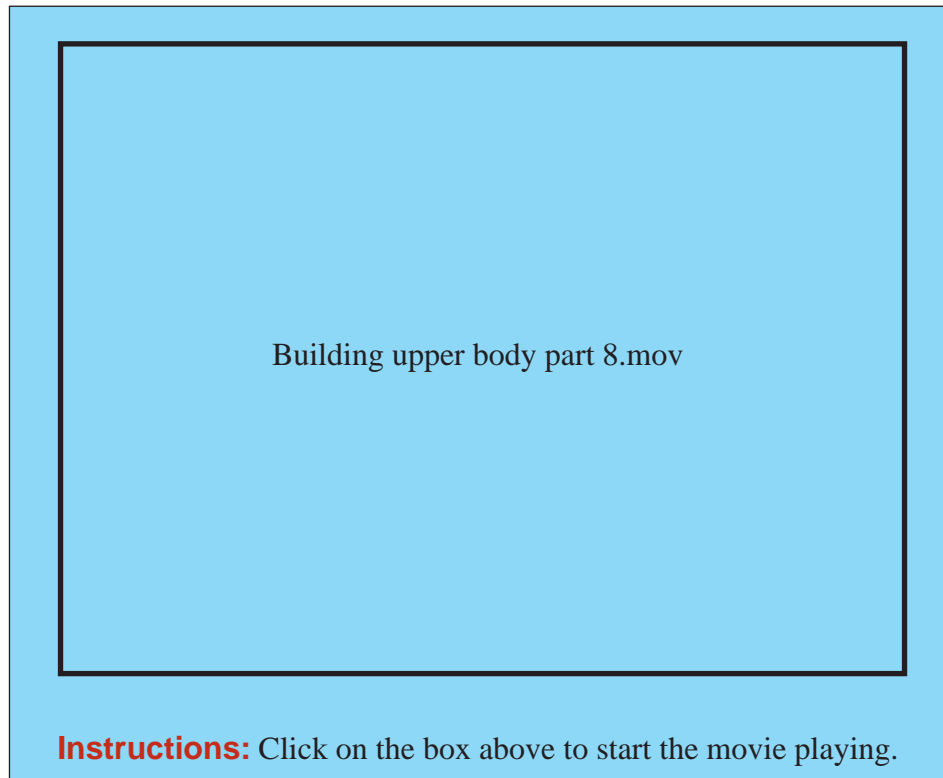


STEP #47: Building the upper portion of the Apollo rocket -- Part 7: Attaching the paper disk to the base of the LEM transition.

In this step, you'll be attaching the cardboard disk to the base of the LEM transition. This is optional on the Saturn V, but is required on the Saturn 1B.



STEP #48: Building the upper portion of the Apollo rocket -- Part 8: Positioning and Installing the Service Module wrap.



STEP #49: Identifying the plastic parts used in the Apollo Capsule.

This step will show you how to identify and remove the small plastic parts from the spue. The location of the cuts is important; so watch carefully.



Removing Plastic Parts.mov

Instructions: Click on the box above to start the movie playing.

STEP #50: Assembly of the escape tower

The escape tower is a little tricky to put together. But once it is assembled, it is a lot stronger than it looks. This is a testament to the original designers of the rocket: it is a very strong and robust vehicle that is light weight for its size.



Plastic Assy part 2.mov

Instructions: Click on the box above to start the movie playing.

STEP #51: Assembly of the RCS Nozzles

The Reaction Control System (RCS) nozzles are shown in this step. Because the parts are very small, you may find that using a pair of tweezers will help make assembly easier.

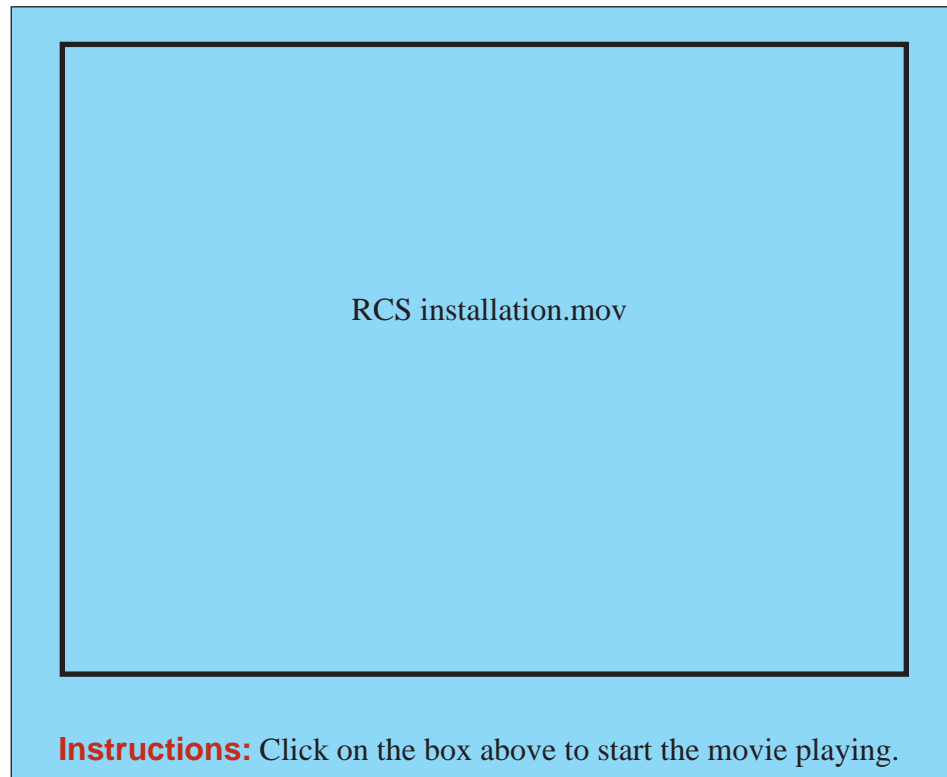


Plastic Assy part 3.mov

Instructions: Click on the box above to start the movie playing.


STEP #52: Installation of the RCS Nozzles

In this step, you'll be gluing the RCS nozzles to the Service Module of the rocket. You may want to delay this particular step until the rocket has been painted. If you do, then you should paint the RCS nozzles before you glue them to the rocket.



STEP #53: Touch-up all of the surface defects, and fill the tube spirals.

At this point the rocket construction is completed. But before you can paint it, you'll need to fix any surface blemishes; including the spirals on the tube. This step shows you how to do this important step.



Pre-paint_touch-up.mov

Instructions: Click on the box above to start the movie playing.

STEP #54: Repairing any damaged vacuum form wraps.

The vacuum form wraps are fairly delicate. Even I damaged a wrap while I was installing it on the rocket.

In this video, I'll show you the technique that I used to repair the wrap.




Ullage_motor_repair.mov

Instructions: Click on the box above to start the movie playing.

STEP #55: Your last chance to fix the surface blemishes.

You've spent a lot of time getting to this point. Do you really want to risk all the effort you've spent only to end up with a ruined model? You need to spend some more time fixing the gaps and other blemishes on your rocket before you can paint it. Because once you paint the rocket, fixing any flaws is 100 times more difficult.



Fix any gaps.mov

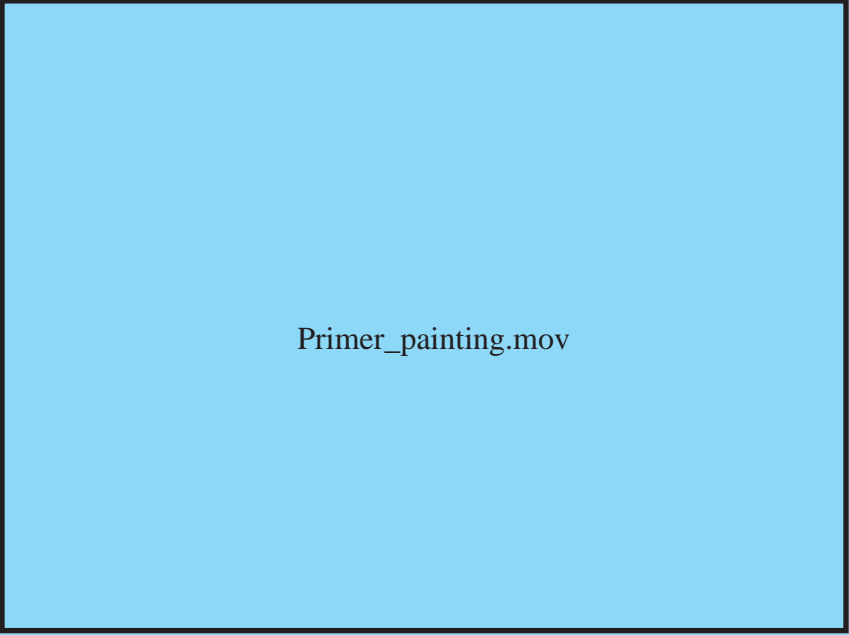
Instructions: Click on the box above to start the movie playing.

STEP #56: Applying the primer paint to the rocket

Painting begins... Don't ruin your model now by being in a hurry.

You'll start the painting process by laying down several layers of primer paint. Take your time, and try to avoid putting too much paint on the vacuum form wraps. The solvents in the paint can damage the wraps.

After the primer paint has dried, you can sand down the flat areas to remove the last remaining traces of the tube spirals. The paint will also help you to see other surface blemishes on the rocket. Use this opportunity to fix them before putting on the coat of white paint.



Primer_painting.mov

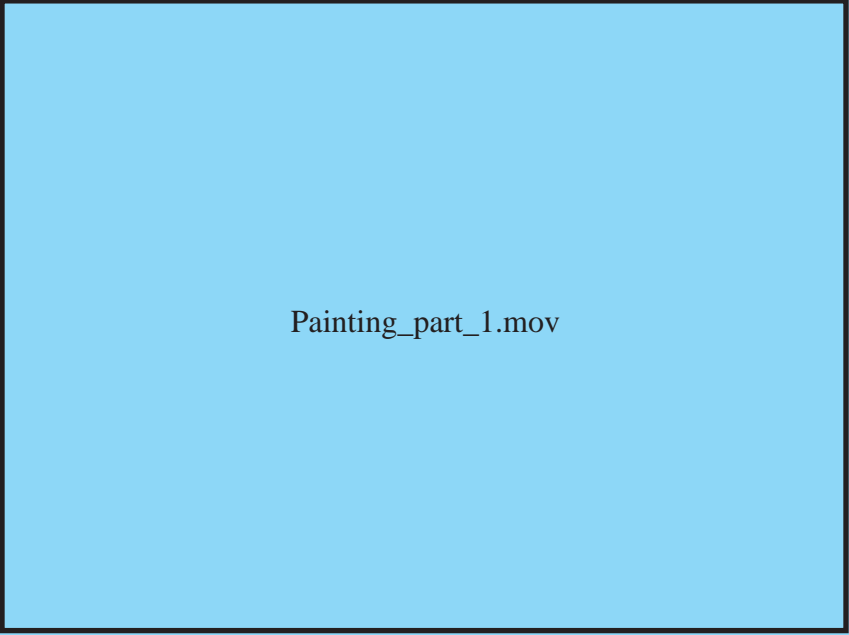
Instructions: Click on the box above to start the movie playing.

STEP #57: Painting Part 1 - Introduction to the paint pattern.

After you're satisfied with the surface of the rocket after painting and sanding it with the primer, you can go ahead and paint the entire rocket white.

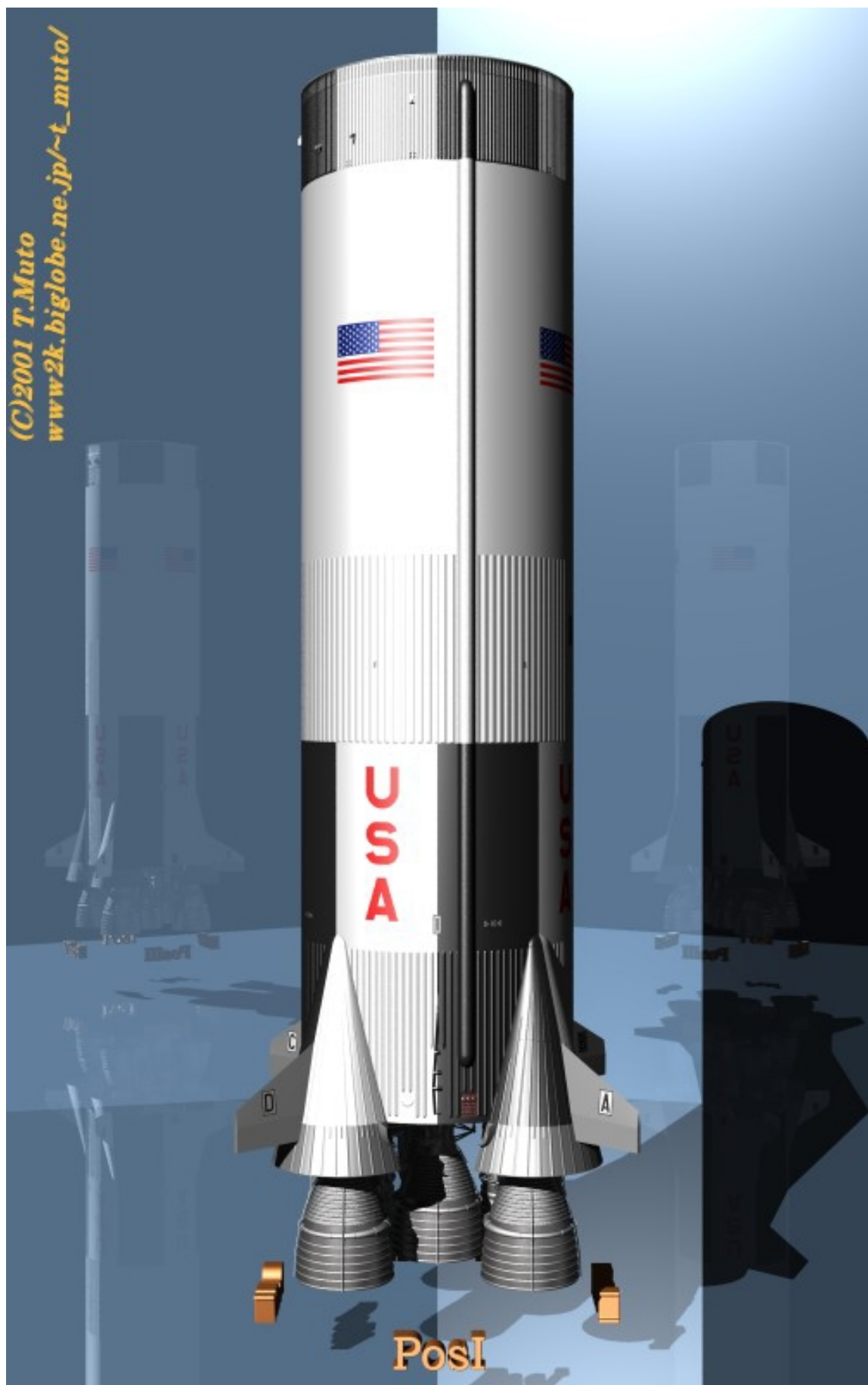
Allow the white paint to fully dry -- at least 24 hours -- before continuing with this step.

This step will give you an introduction to the process you will use to paint the color patterns onto the white surface of the model.

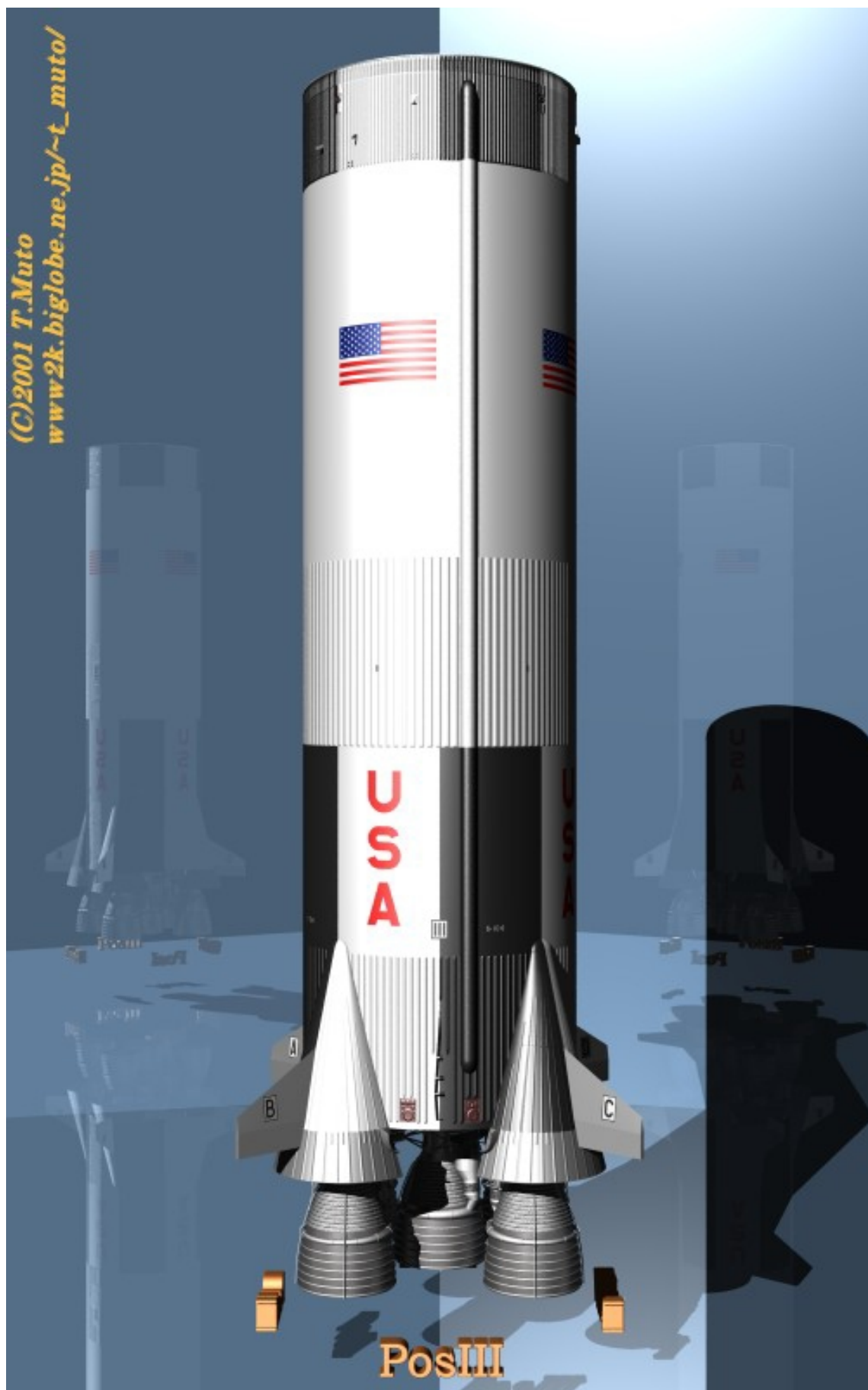


Painting_part_1.mov

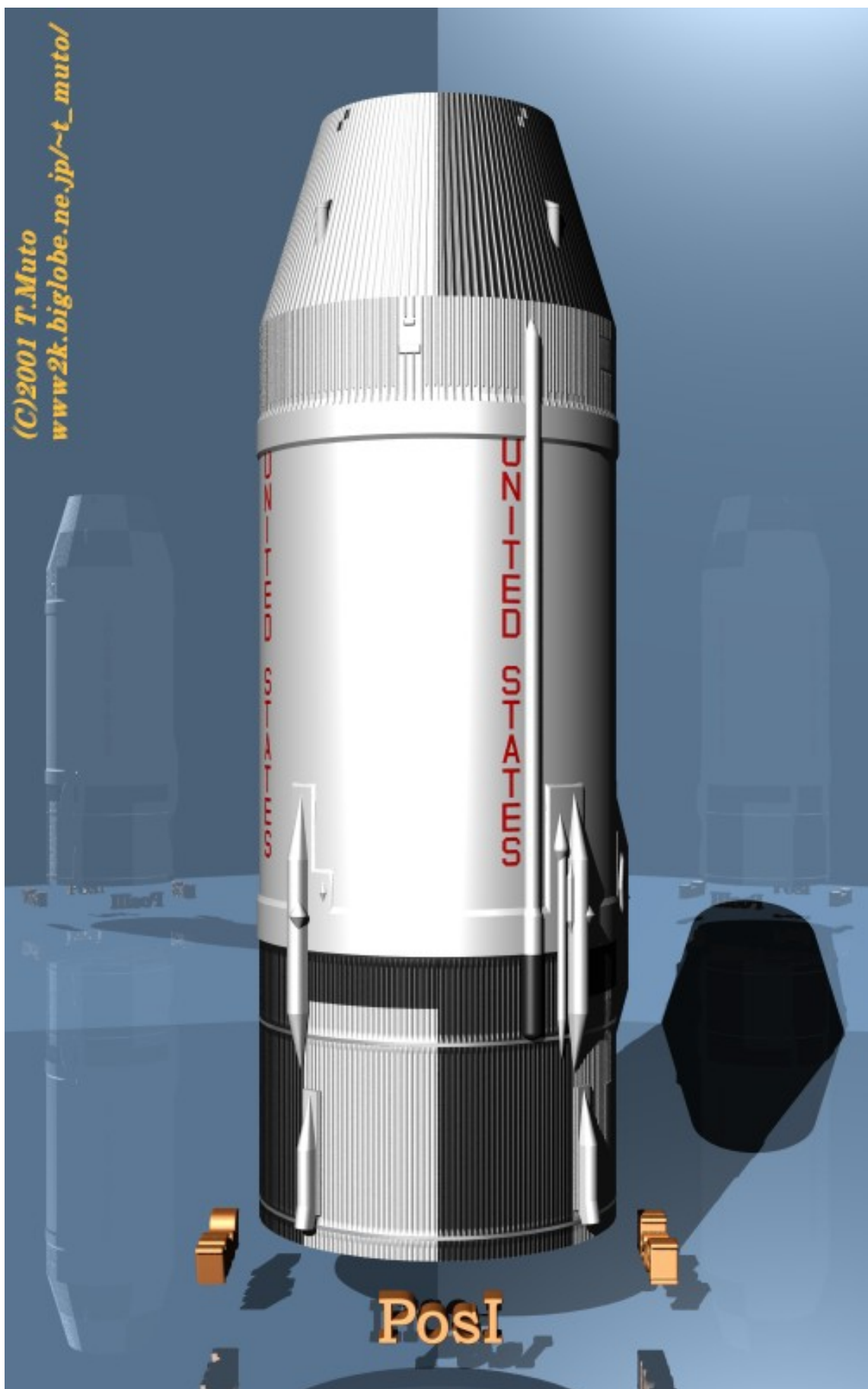
Instructions: Click on the box above to start the movie playing.

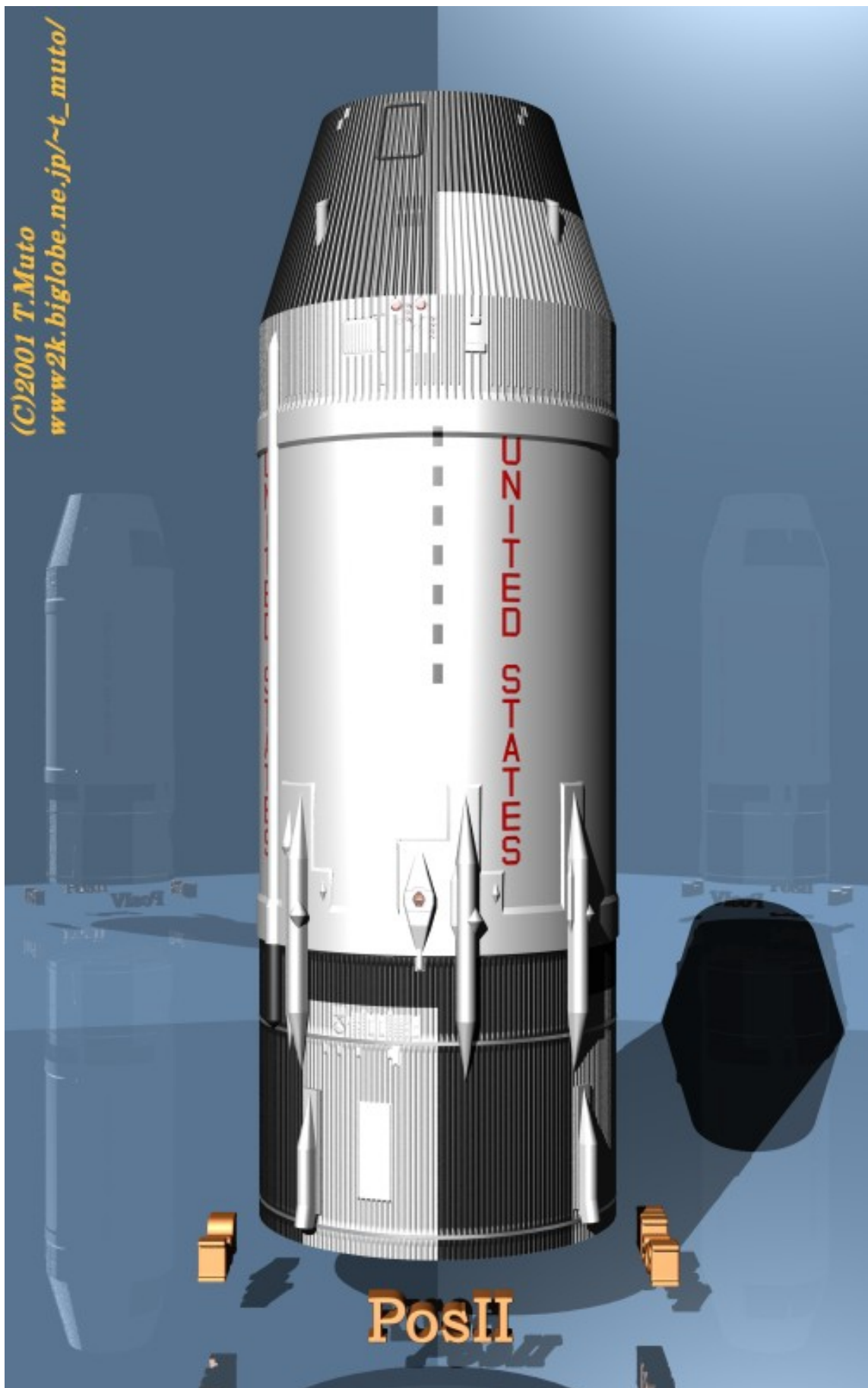


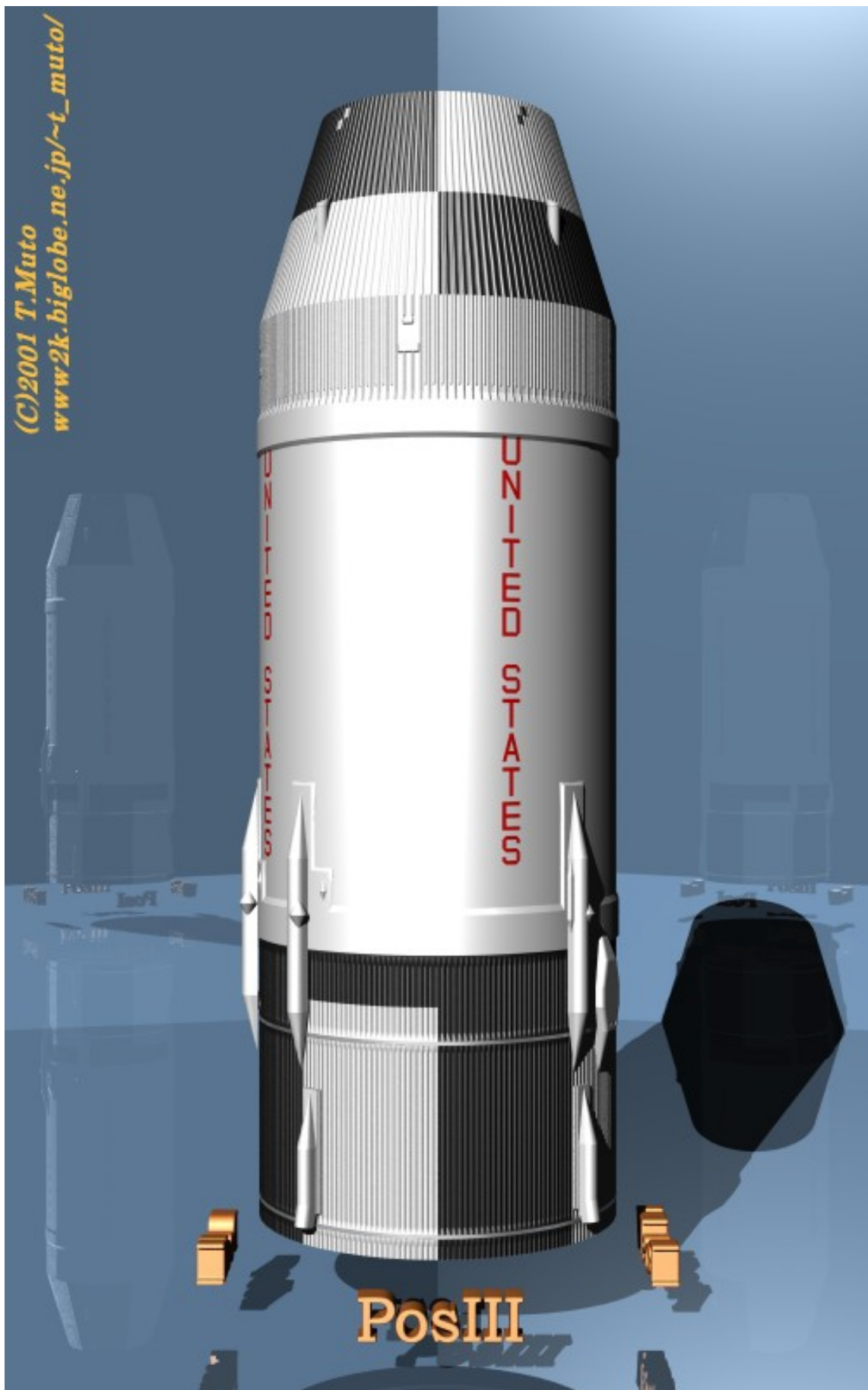






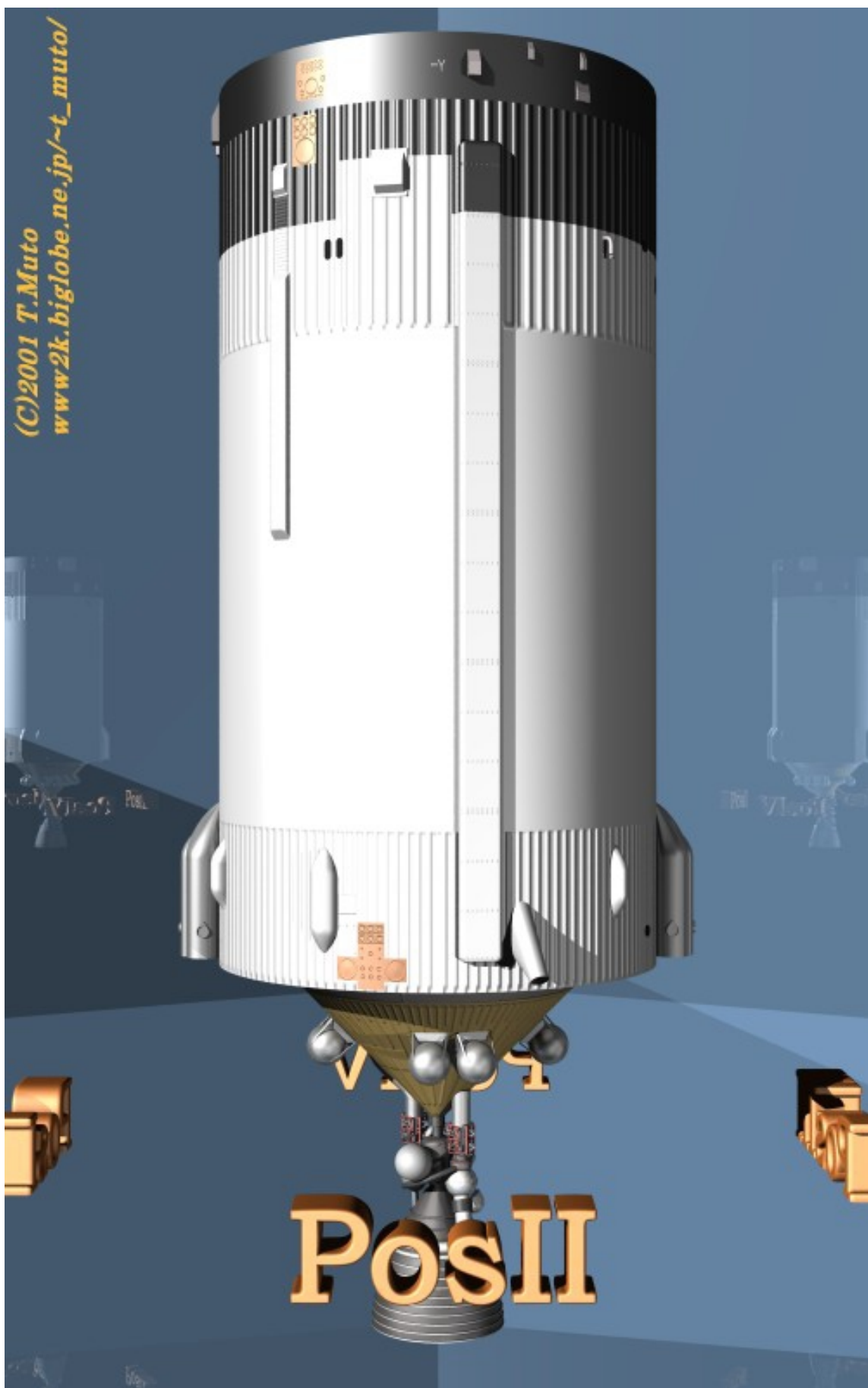






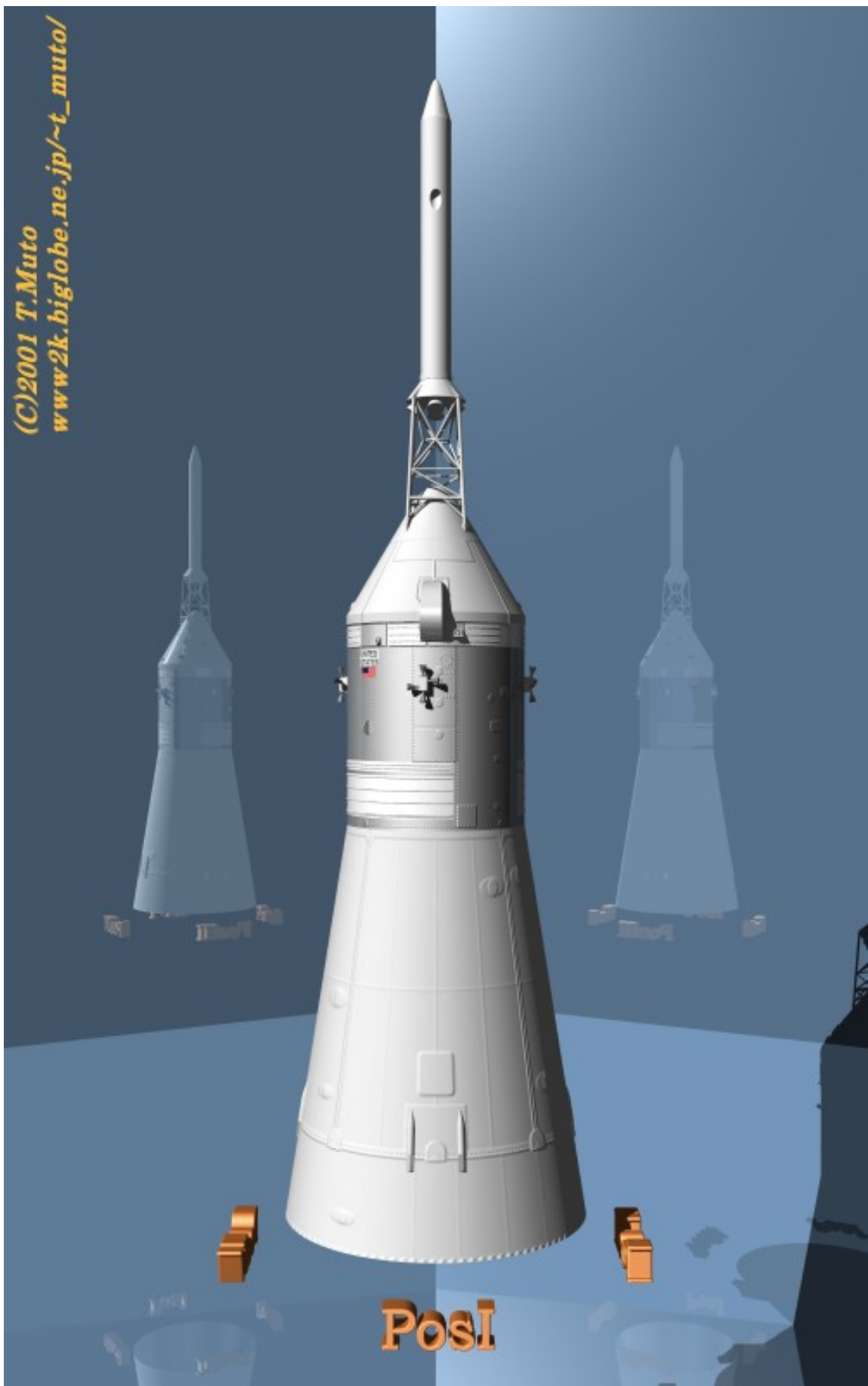


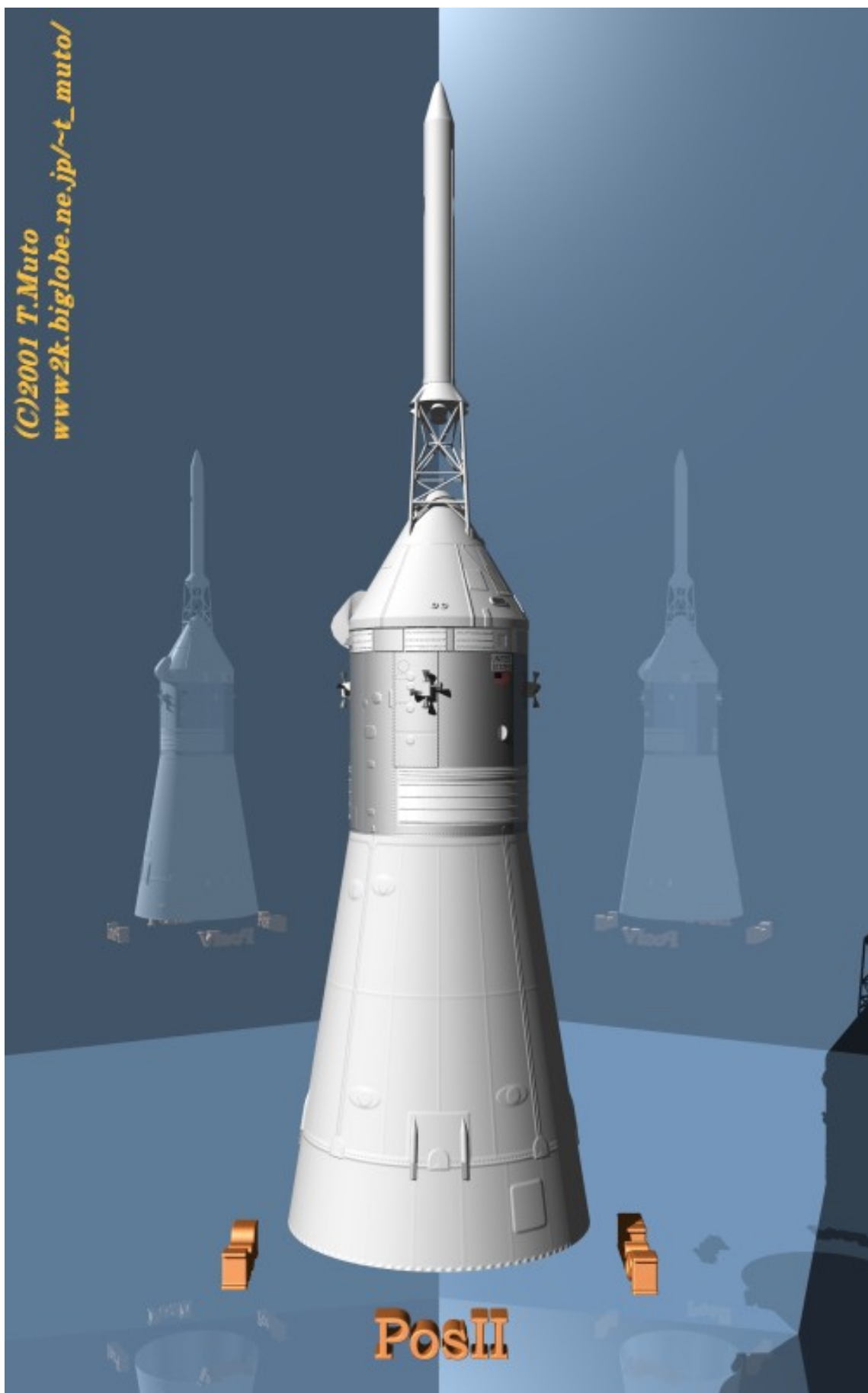


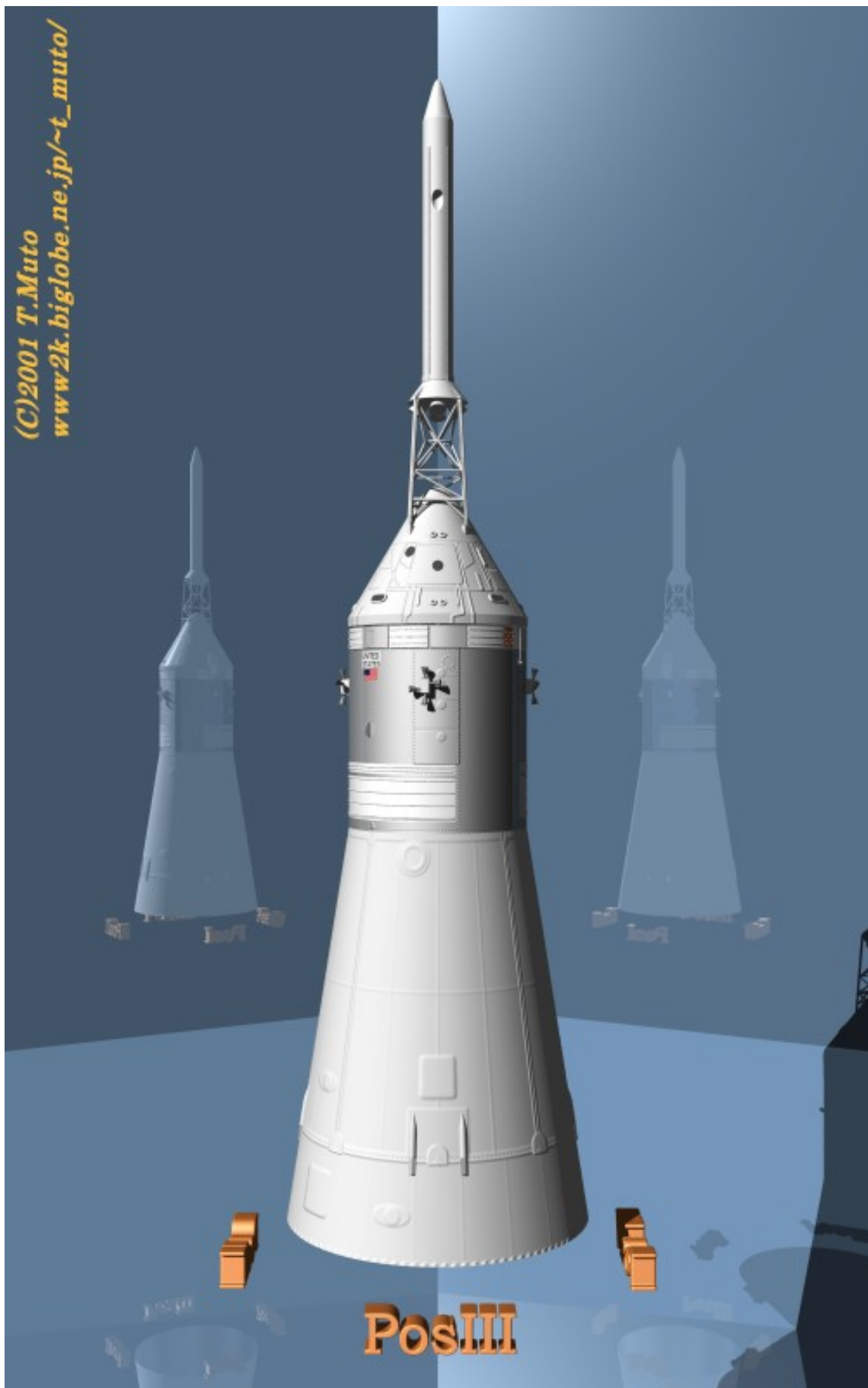


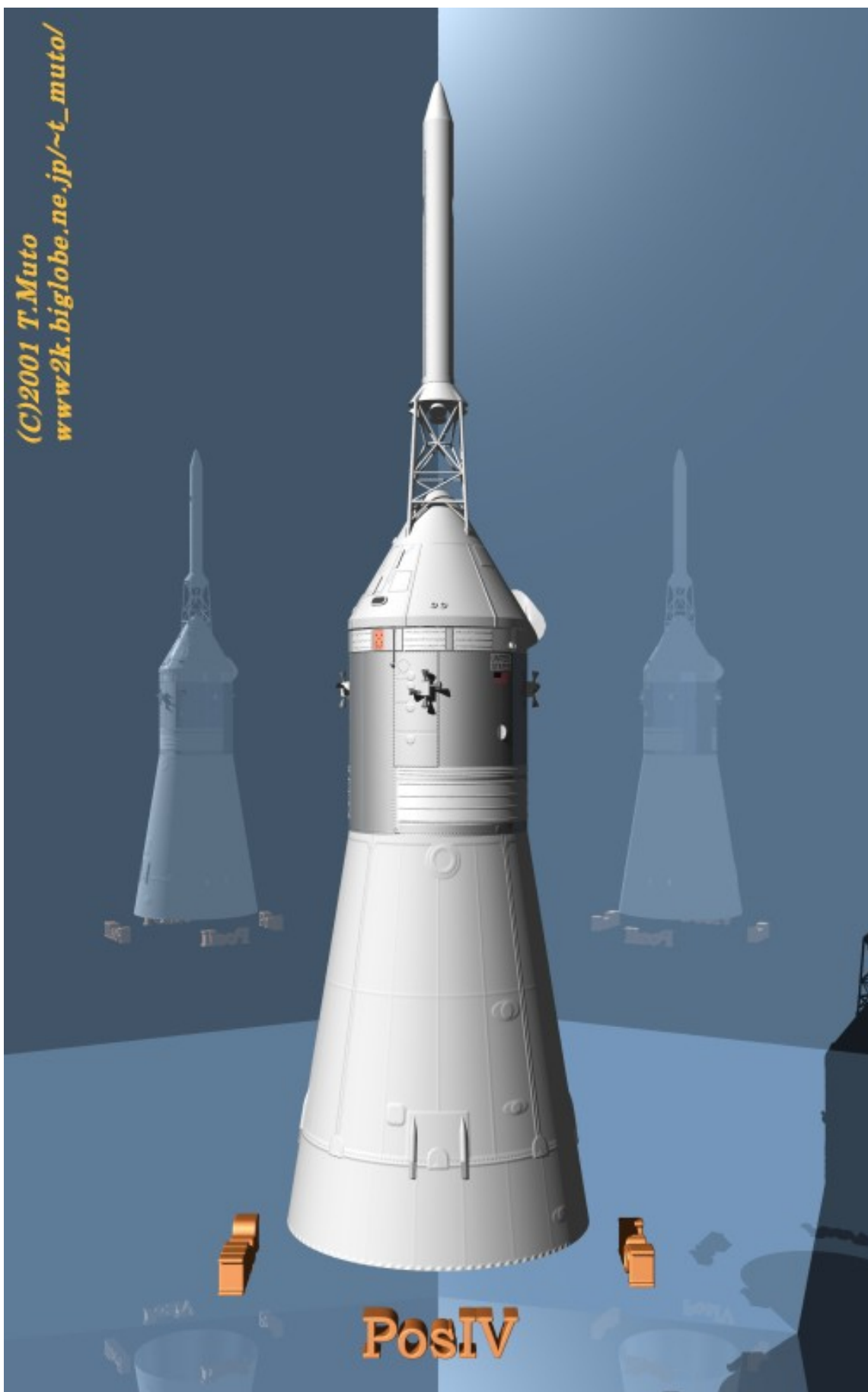








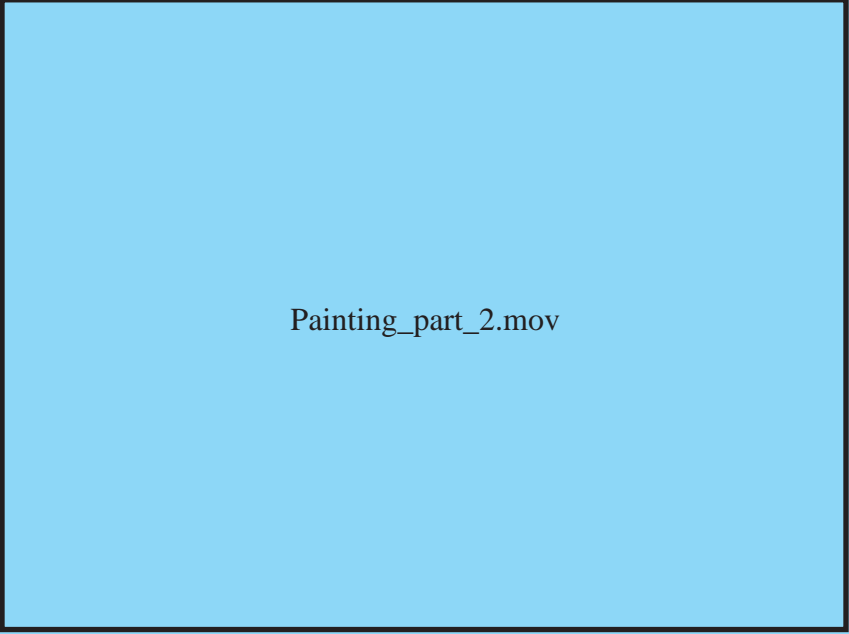




STEP #58: Painting Part 2 - Masking off the fin fairings

I won't be able to show every single step in how to mask and paint the model. But I'll try to show you the difficult areas, and the techniques you can use to achieve good results.

In this step, I'll show you how to mask off the fin fairings. The video doesn't show it, but after you've masked off the area, you can go ahead and paint the area silver.

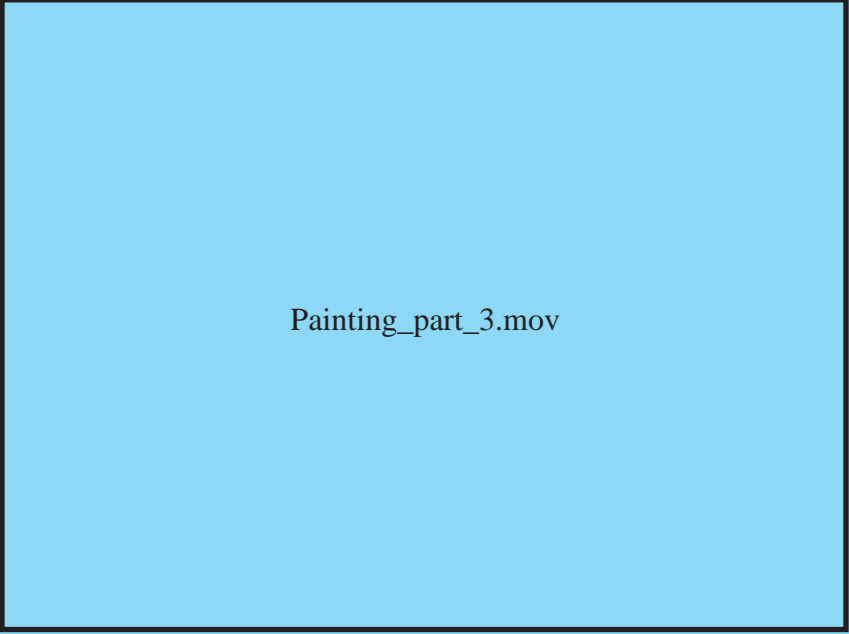


Painting_part_2.mov

Instructions: Click on the box above to start the movie playing.

STEP #59: Painting Part 3 - Masking off the corrugations on the big transtion.

Masking off the corrugations on the wraps is one reason why this is a Skill Level 5 rocket kit. In this video, I'll show you the technique that I used to get sharp dividing lines between the black and white areas on the rocket. I learned this method from John Pursley. It is time consuming, but I haven't found anything that works better.



Painting_part_3.mov

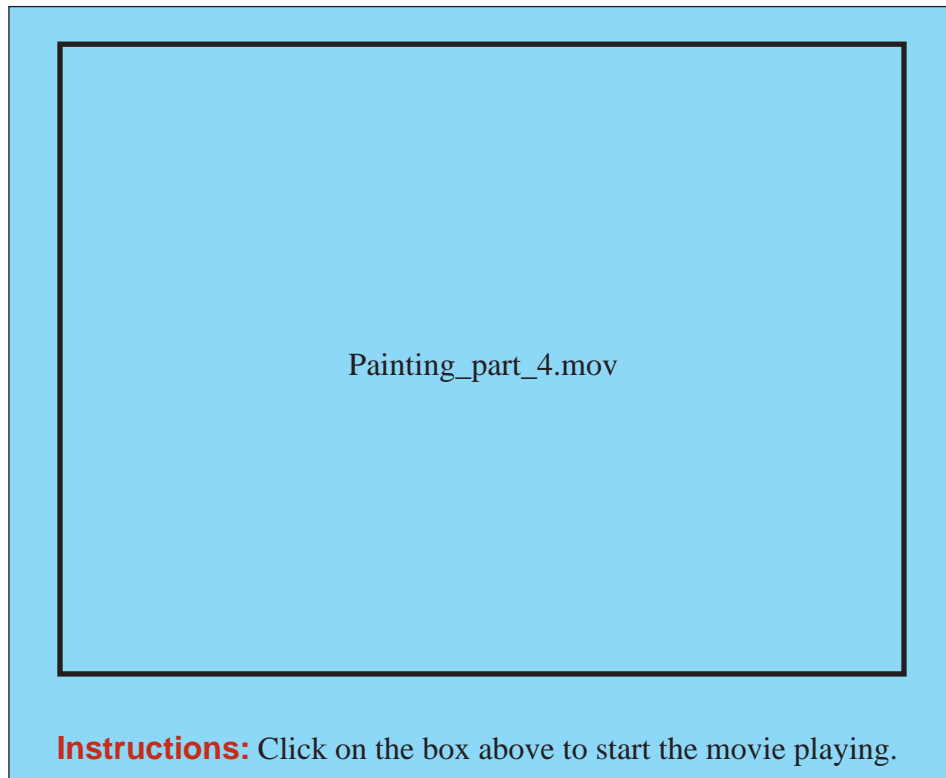
Instructions: Click on the box above to start the movie playing.

STEP #60: Painting Part 4 - Removing the masking tape.

In this step, you've painted the black areas, and you are now ready to remove the masking tape. This step shows how to remove the dried "liquid masking medium." You will also need to touch up the areas of the rocket where any paint might have

been removed.

Tip: To get an exact color match, spray some paint from the can, into a small cup. Use a small tip paint brush to apply this paint.




STEP #61: Repairing damaged fins

The fins have proven difficult to mold. Occasionally, a pin hole or a bubble appears in a fin during the casting process. Most times, this void occurs at the very tip of the fin. Sometimes, the fins may shift around in the box during shipping, and may break the tip.

This step shows you how to repair damaged fins. Basically, it involves using the Fix-it epoxy

clay to remold the damaged areas. This video shows the proper technique.

After the fins have been repaired, they can be painted and installed into the fin slots on the rocket. If the fit is tight, you do not need to glue them in place. They can then be removed whenever you transport the rocket to and from the rocket launch range.



Fin_voids.mov

Instructions: Click on the box above to start the movie playing.

STEP #62: Installing the decals

After all the paint on the rocket is dry, you can install the water-transfer type decals. The video below shows you the technique.

Use the rocket drawings ([Click Here](#)) to help you find the right location to install the decals. Note: The decal sheet contains decals for each of the individual Saturn V launches. So not all the decals will be used on your model. The portion of the decal sheet shown to the right are the serial number decals that are used on the first stage. You'll need to pick which mission you will model before you can select the right set of decals.

S-IC-1	S-IC-1	S-IC-1	S-IC-1	4
S-IC-2	S-IC-2	S-IC-2	S-IC-2	6
S-IC-3	S-IC-3	S-IC-3	S-IC-3	8
S-IC-4	S-IC-4	S-IC-4	S-IC-4	9
S-IC-5	S-IC-5	S-IC-5	S-IC-5	10
S-IC-6	S-IC-6	S-IC-6	S-IC-6	11
S-IC-7	S-IC-7	S-IC-7	S-IC-7	12
S-IC-8	S-IC-8	S-IC-8	S-IC-8	13
S-IC-9	S-IC-9	S-IC-9	S-IC-9	14
S-IC-10	S-IC-10	S-IC-10	S-IC-10	15
S-IC-11	S-IC-11	S-IC-11	S-IC-11	16
S-IC-12	S-IC-12	S-IC-12	S-IC-12	17

This number tells which of the Apollo missions the decal set is used on.

Decal_placement.mov

Instructions: Click on the box above to start the movie playing.



John Pursley photo



American flags positioned 14.7" from aft bulkhead of first stage. Center over USA at base of stage and white roll pattern area at fore end.

Decal Placement for SI-C Stage Apogee 1/70 Saturn V



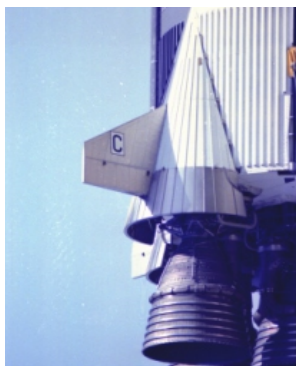
John Pursley photo



Center decals in flat rectangle areas on panel

INTERTANK
PERSONNEL
ACCESS DOOR

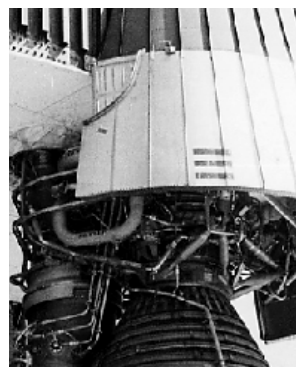
NOTE: The Intertank Umbilical Panel detail on the Intertank Wrap is located between fins A and B (it is closer to fin A than B). Keep this in Mind when applying the fin and position () decals.



John Pursley photo

Fuel vapor vents center even with the aft edge of the Intertank Umbilical Panel. Black dots center in adjacent valleys of Intertank wrap. Left vent lines up over the "position II" paint demarcation line.

"DRAIN" decals position just below every 8th corrugation to the right of the paint demarcation lines. Total of 8 decals.



John Pursley photo



Center "USA" in white area

Center serial # in black area

Center over demarcation

3.7"

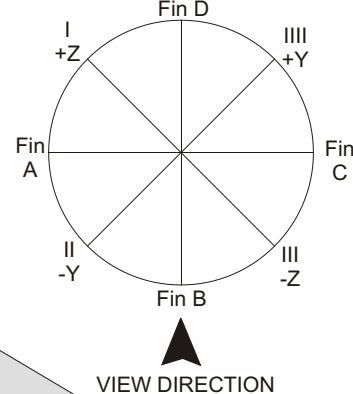
3.9"

3.77"

Corner of decal just touching leading edge



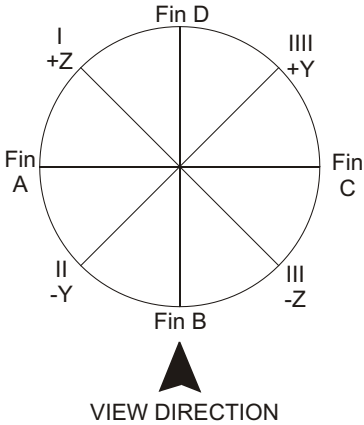
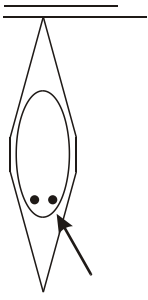
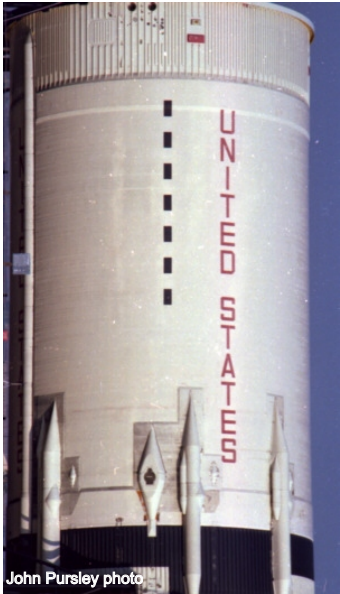
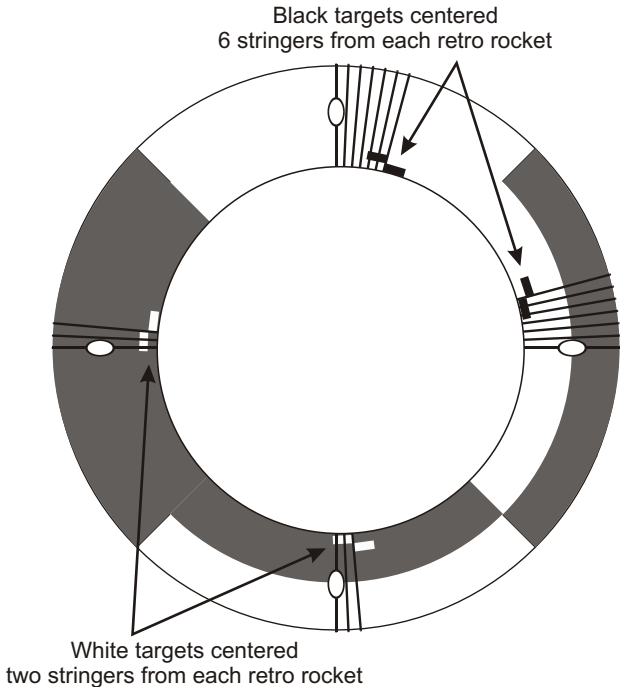
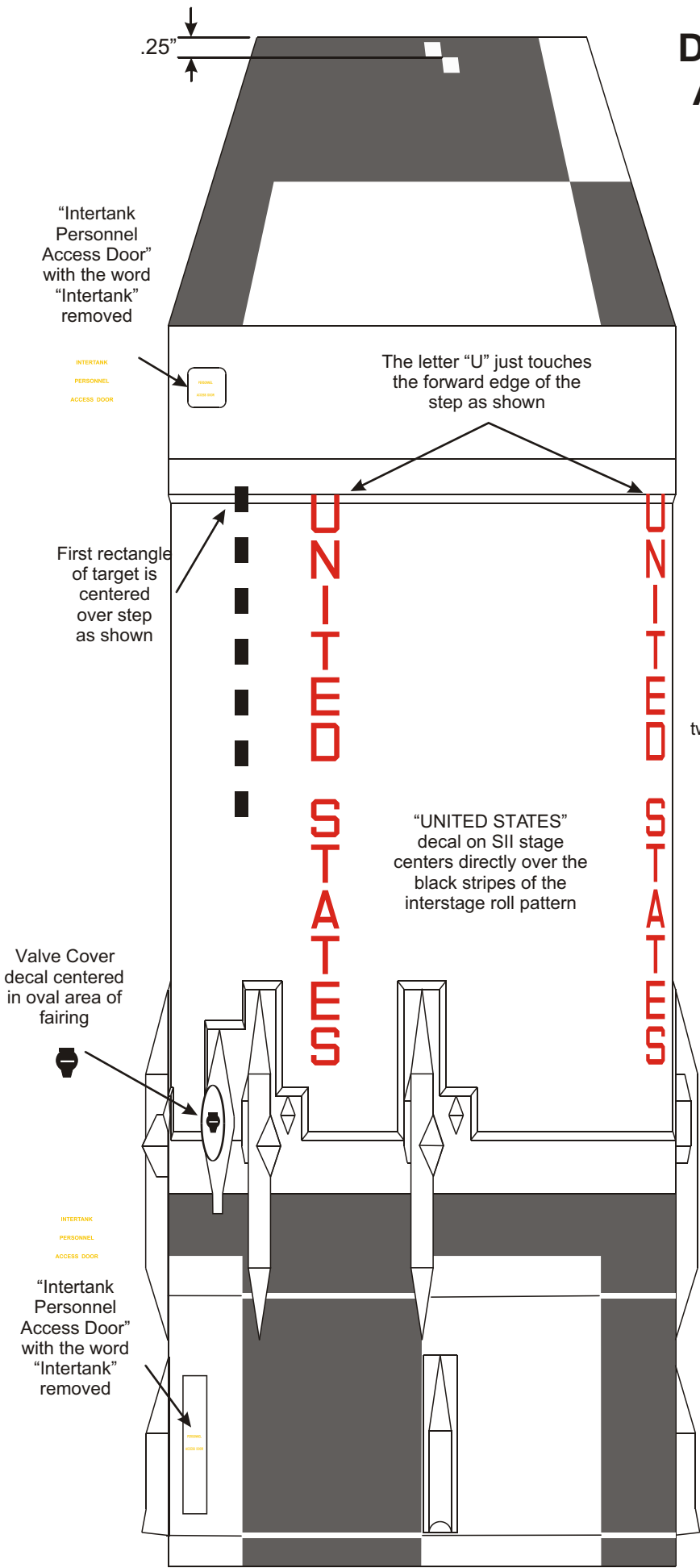
.61"



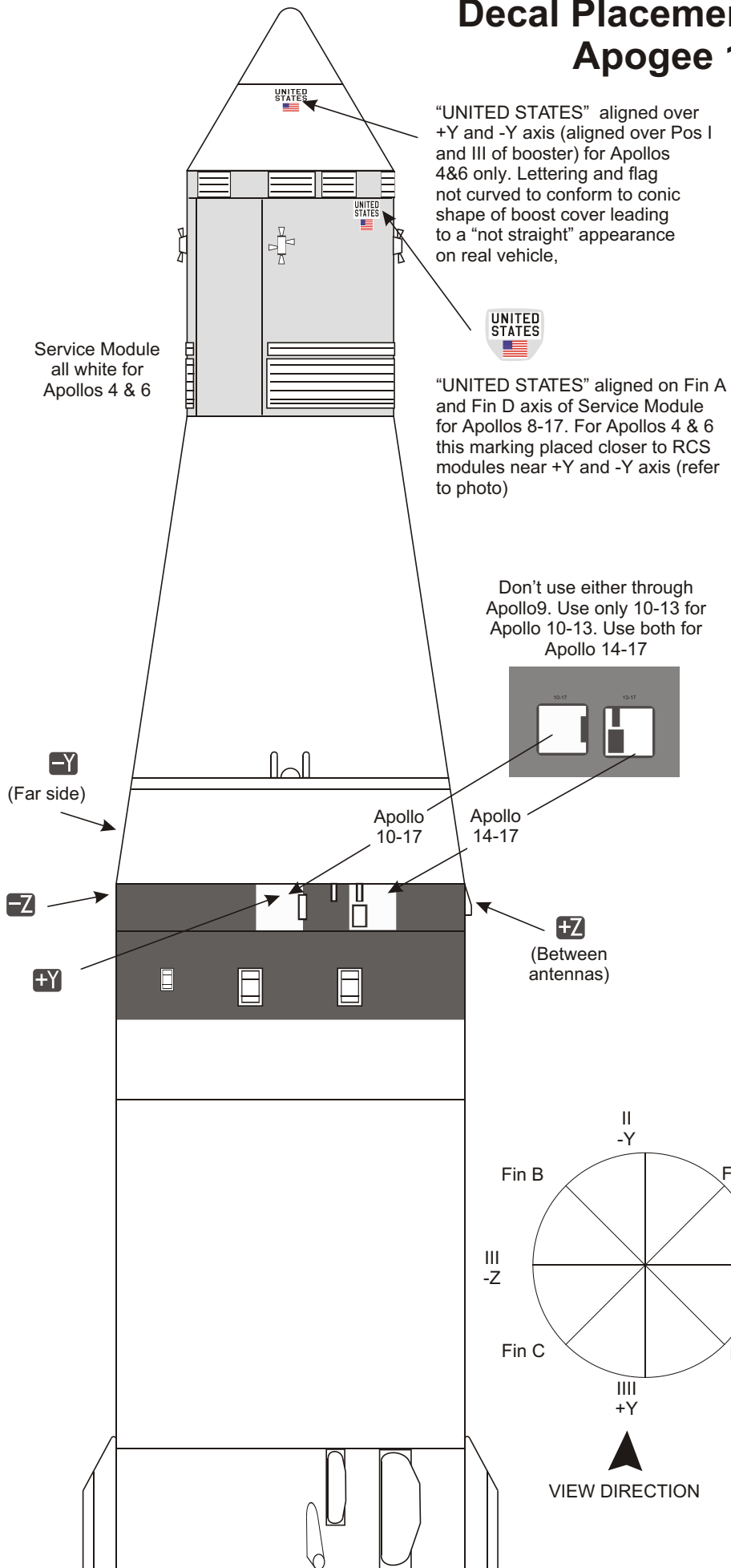
Base umbilical decals (2 used between fins B and C. 1 used between fins A and D)

Motion Target shown here for clarity only. Target goes on faings B and D, one per fairing, between 4th and 5th stringer with white bar flush with aft of fairing.

Decal Placement for SII Apogee 1/70 Saturn V



Decal Placement for SIV-B and SM Apogee 1/70 Saturn V



NASA Photo

APOLLO 11



NASA Photo

APOLLO 4

STEP #63: Installing the rocket motor

The rocket motor is installed using masking tape to hold it in the rocket. This is shown in the instructional video below.

I've only flown the Saturn V on the Aerotech G80-4 rocket motor. This gives an awesome flight to around 400 feet. You can use the RockSim software and the .rkt file found on this disk to simulate

the flight of the Saturn V with other rocket motor configurations. Since your model may vary from the one in the file, adjust the weight in the file as necessary to make sure the rocket will still be stable when you launch it. The .rkt file has the mass override box checked. So you may need to uncheck this box to perform your simulations.



Motor_installation.mov

Instructions: Click on the box above to start the movie playing.

STEP #64: Flight Preparations - Making the harness for the upper part of the rocket.

To minimize damage to the rocket from hard landings, we desire that the upper portion of the rocket descend in a horizontal attitude. This will help prevent the escape tower from breaking when the rocket touches down.

The video shows how to install nose weight into the rocket for stability reasons, and how to make the parachute harness from a piece of 5 foot long shock cord.



Flight_prep_1.mov

Instructions: Click on the box above to start the movie playing.

STEP #65: Flight Preparations - Installing the parachutes

The rocket has been designed to descend in two separate pieces. Which is why this kit contains two parachutes. In this step, you'll see how to install the parachutes.

The parachutes have been designed a little bit bigger than is actually required for a model of such light weight. But we thought that you'd want

greater insurance against hard damaging landings.

Because they are bigger than what is really required, the rocket can drift further distances on breezy days. You may wish to substitute smaller parachutes on windy days, or reef them so that they don't fully blossom open.



Flight_prep_2.mov

Instructions: Click on the box above to start the movie playing.

STEP #65: Launch!

The purpose of this video is to show you what your rocket will look like when you launch it. I know you will have a lot of fun flying this rocket. I certainly did -- even though the rocket drifted away on the second flight.

Please follow the standard [NAR Safety Code](#) when launching this rocket. Since this rocket

weighs over 1lb, you will need to contact the FAA control center for your area. If you followed the instructions in this manual, your rocket should weigh around 2-1/2 lbs without the motor installed. With the motor installed, it should still be well under the 3.3lb (1500 g) limit; and therefore it doesn't require a full waiver to fly it.



out_to_launch.mov

Instructions: Click on the box above to start the movie playing.

NAR Safety Code

- 1. Materials:** My model rocket will be made of lightweight materials such as paper, wood, rubber, and plastic suitable for the power used and the performance of my model rocket. I will not use any metal for the nose cone, body, or fins of a model rocket.
- 2. Engines:** I will use only commercially-made NAR certified model rocket engines in the manner recommended by the manufacturer. I will not alter the model rocket engine, its parts, or its ingredients in any way.
- 3. Recovery:** I will always use a recovery system in my rocket that will return it safely to the ground so it may be flown again. I will use only flame-resistant recovery wadding if required.
- 4. Weight Limits:** My model rocket will weigh no more than 1500 grams (53 oz.) at lift-off, and its rocket engines will produce no more than 320 Newton-seconds of total impulse. My model rocket will weigh no more than the engine manufacturer's recommended maximum lift-off weight for the engines used, or I will use engines recommended by the manufacturer for my model rocket.
- 5. Stability:** I will check the stability of my model rocket before its first flight, except when launching a model rocket of already proven stability.
- 6. Payloads:** Except for insects, my model rocket will never carry live animals or a payload that is intended to be flammable, explosive, or harmful.
- 7. Launch Site:** I will launch my model rockets outdoors in a cleared area, free of tall trees, power lines, buildings, and dry brush and grass. I will ensure that people in the launch area are aware of the pending model rocket launch and can see the model rocket's liftoff before I begin my audible five-second countdown.
- 8. Launcher:** I will launch my model rocket from a stable launching device that provides rigid guidance until the model rocket has reached a speed adequate to ensure a safe flight path. To prevent accidental eye injury, I will always place the launcher so that the end of the rod is above eye level or I will cap or disassemble

my launch rod when not in use and I will never store it in an upright position. My launcher will have a jet deflector device to prevent the engine exhaust from hitting the ground directly. I will always clear the area around my launch device of brown grass, dry weeds, or other easy-to-burn materials.

- 9. Ignition System:** The system I use to launch my model rocket will be remotely controlled and electrically operated. It will contain a launching switch that will return to "off" when released. The system will contain a removable safety interlock in series with the launch switch. All persons will remain at least 5 meters (15 feet) from the model rocket when I am igniting the model rocket engines totaling 30 Newton-seconds or less of total impulse or less and at least 9 meters (30 feet) from the model rocket when I am igniting model rocket engines totaling more than 30 Newton-seconds of total impulse. I will use only electrical igniters recommended by the engine manufacturer that will ignite model rocket engine(s) within one second of actuation of the launching switch.
- 10. Launch Safety:** I will not allow anyone to approach a model rocket on a launcher until I have made certain that the safety interlock has been removed or that the battery has been disconnected from the ignition system. In the event of a misfire, I will wait one minute after a misfire before allowing anyone to approach the launcher.
- 11. Flying Conditions:** I will launch my model rocket only when the wind is less than 30 kilometers (20 miles) an hour. I will not launch my model rocket so it flies into clouds, near aircraft in flight, or in a manner that is hazardous to people or property.
- 12. Pre-Launch Test:** When conducting research activities with unproven model rocket designs or methods I will, when possible, determine the reliability of my model rocket by prelaunch tests. I will conduct the launching of an unproven design in complete isolation from persons not participating in the actual launching.
- 13. Launch Angle:** My launch device will be pointed within 30 degrees from vertical. I will

never use model rocket engines to propel any device horizontally.

14. Recovery Hazards: If a model rocket becomes entangled in a power line or other dangerous place, I will not attempt to retrieve it.

This is the official Model Rocket Safety Code of the National Association of Rocketry. Note: The largest “model” rocket engine defined by the CPSC is an “F” (80 N-s). To launch rockets weighing over 1.36 Kg (3 pounds) including propellant, or rockets containing more than 62.5 grams (2.2 ounces) of propellant, you must obtain a waiver from the Federal Aviation Administration (FAA). Check your telephone directory for the FAA office nearest you. They will be able to help you obtain permission to operate larger rockets than those listed above.

Acknowledgements

This project started out as the brain-child of Mike Dorffler. He worked over a year on this model, drawing up the plans for the plastic parts, as well as sizing all the tubes and centering rings. Without his vision, it would have not have gotten off the ground.

John Pursley took over the creation of the vacuum form molds after Mike left Apogee Components. Making these molds was a learning process for both John and I. We had to overcome a lot of technical difficulties due to the complexity of the parts. But I believe it was worth the effort, since the parts turned out beautiful. John also created the decals for this rocket, and the decal placement drawings.

Takeshi Muto (from Japan) created some beautiful renderings of the Saturn V rocket. After seeing his web site at: http://www2k.biglobe.ne.jp/~t_muto/ I asked him for permission to use them as painting guides to help make your task of painting easier. He not only gave me permission, but he redrew them to provide even better views of the rocket!

Patrick McCarthy helped out by providing photographs of the Saturn V at KSC. We needed these pictures to make sure we had accurate information on the surface details of the rocket.

Most of all, this rocket would not have been possible without the financial support of those modelers that pre-ordered this kit; and paid cash. Without this money, I would not have been able to buy the molds or stock up on the parts in this kit. These modelers took a huge risk --they believed that I would be good to my word that I'd complete this huge project. In model rocketry, it is still rare that manufacturers are good to their word. I'm relieved that I was able to complete this project. I just wish I could have done it a lot quicker...

To these people, and to many un-named modelers that gave kind words of encouragement, I am eternally grateful. Thank you all!

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	A	B	C
1	Part Number	Description	Qty
2			
3		Pre-Bagged Capsule Set	
4	70100	Injection Molded Capsule	1
5	70100	Injection Molded Skirt	1
6	70100	Injection Molded Small Nose Cone	1
7	70100	Injection Molded Umbilical Fairing	1
8	17101	Cast Resin Fins - Saturn V	4
9	17101	Cast Resin Ullage Motors	2
10	17101	Cast Resin Fins OMS Pods	2
11	31104	Engine Block	1
12	13056	Launch Lug	1
13	14399	Spruce Wood strip (1/8"X1/4"X3")	1
14			
15		Pre-Bagged Molded Tower Set	
16	70100	Injection Molded Tower Lattice structure	1
17	31180	LEM Motor Tube	1
18			
19		Vaccum Formed Parts	
20	21109	Saturn V F1 Fairings vac-Formed	2
21	21110	Saturn V Lower Thrust Structure Vac-Formed Wrap	1
22	21111	Saturn V Inter-tank vac-Formed Wrap	1
23	21112	Saturn V 1st Stage Forward Skirt Vac Formed Wrap	1
24	21113	Saturn V Interstage Vac-Formed Wrap	1
25	21114	Saturn V 2nd Stage Forward Skirt Vac-Formed Wrap	1
26	21115	Saturn V Transtion Vac-Formed Wrap	1
27	21116	Saturn V 3rd Stage Vac-Formed Wrap	1
28			
29		Body Tubing	
30	31140	Main Body tube SBT-5657A	1
31	31142	Coupler Tube SBT-5657B	2
32	31144	Reinforcement Tube SBT-5657C	2
33	31172	Engine Mount Tube	1
34	31150	3rd Stage Body Tube	1
35	31152	3rd stage Adapter Tube	1
36	31160	SM Body Tube	1
37			
38		Misc. Items	
39	70102	Pre-Bagged F1 Engine Set (injection molded part)	5
40	32530	Saturn V Die-Cut Centering Ring Set (4 sheets)	1
41	15532	Die-Cut Balsa wood Fairing Braces	2
42	37014	2nd/3rd Stage transition (printed)	1
43	37013	3rd Stage/SM transition (printed)	1
44	37015	Service Module Printed Wrap	1
45	37016	Embossed Wraps for SM and LEM transition	1
46	29205	Nylon Parachute 58" dia	1
47	29203	Nylon Parachute 36" dia	1
48	29505	Shock Cord 100# Kevlar (5 feet long)	1
49	29506	Shock Cord 300# Kevlar (7 Feet long)	1
50	14350	Balsa 1/2 dowel (10 inches Long)	1
51	14351	Balsa 1/2 dowel (20 inches Long)	2
52	29604	Clay Nose Weight (pre-bagged)	1
53	41021	Saturn V Decal Sheet	1
54	1070	Instruction CD-ROM	1
55		How to Install CD-ROM Instructional sheet	1