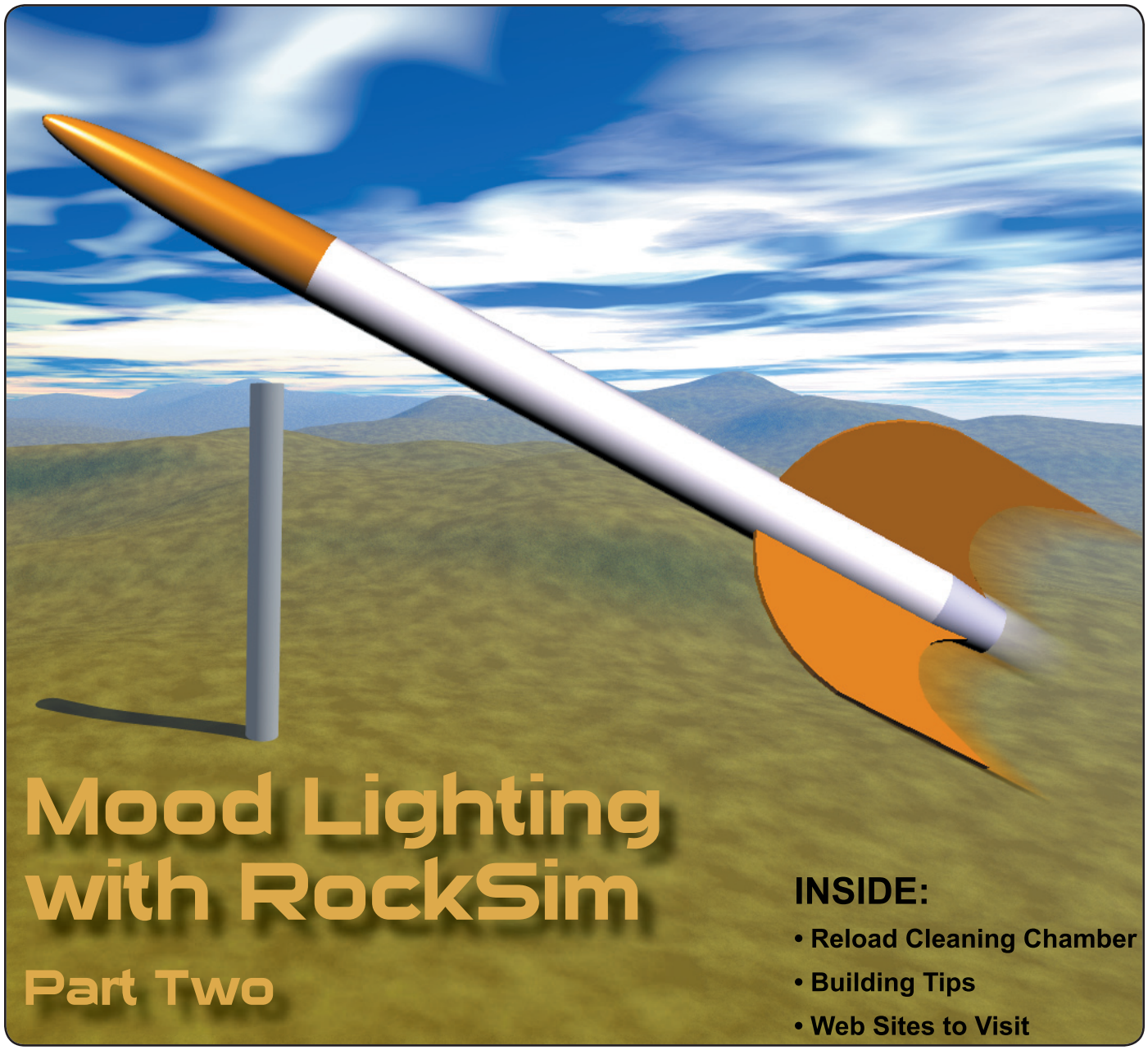
ISSUE 144 - JUNE 27, 2005

APOGEE PEAK OF FLIGHT NEWSLETTER



Mood Lighting with RockSim

Part Two

INSIDE:

- Reload Cleaning Chamber
- Building Tips
- Web Sites to Visit

APOGEE COMPONENTS

1130 Elkton Drive, Suite A
Colorado Springs, Colorado 80907 USA
www.ApogeeRockets.com e-mail: orders@ApogeeRockets.com
phone: 719-535-9335 fax: 719-534-9050

RockSim: Mood Lighting
Part Two

by Tim Van Milligan

LIGHTS, CAMERA, AND ACTION!

In the last issue, I started this article and talked about the coordinate system RockSim uses when it draws the 3D view of the model. In essence, the rocket is fixed in space, and the camera moves around it. While it may look like the rocket is moving when you push the position/orientation buttons, it is actually the camera that is moving.

In this article, I'm going to show you how to control the precise lighting of the rocket. This allows you to get cool looking shadows on the rocket.

Why is this important? Great question. The answer is how the rocket image is used. I often use images of rockets designed in RockSim and place them in this newsletter. For example, the image of the rocket on the cover of this issue was created in RockSim and was superimposed over a nice background. It really sets a mood effect for the artwork if you do it right. You may want to try doing this yourself.

Figure 1 shows the same rocket (from the cover), and how it would look if the lighting on the rocket was wrong. It just doesn't look right, does it? That is because the shadows on the rocket don't match the shadows on in the landscape.

It is for this reason that you have the option of lighting the rocket using RockSim. So that you can adjust the location of the shadows and even the color of the light illuminating the rocket. For example, say your background is of a rocket launched at sunset. The evening sun might have a reddish hue to it. With RockSim's lighting features, you can match that background illumination.

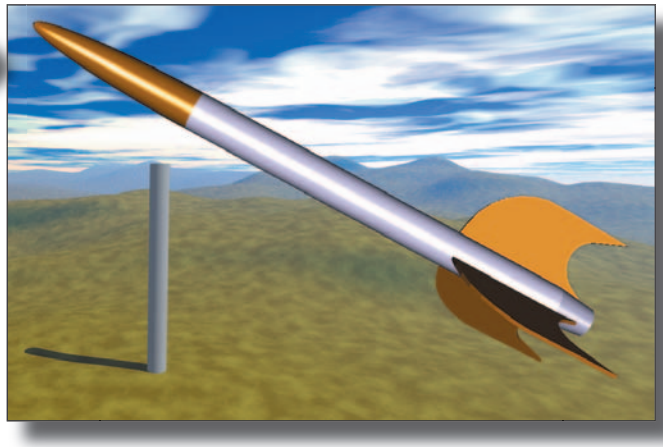


Figure 1: This picture looks like it was faked. The tell-tale clue is that the shadows on the rocket don't match the shadows on the landscape.

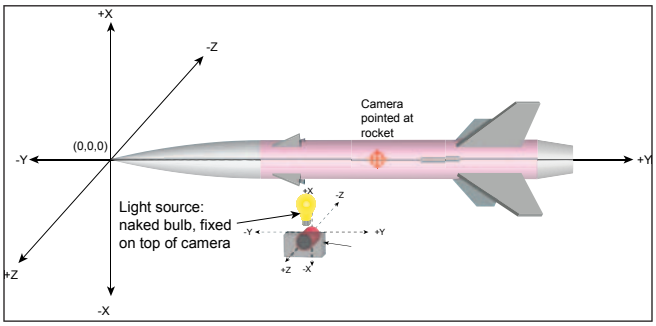


Figure 2: The default light is mounted on top of the camera. When the camera moves, the light moves with it.

The Default Lighting

When you first click the 3D button in RockSim, it will display the rocket's side view. By default, the rocket is illuminated with a light bulb that is mounted on the top of the camera. So when the camera moves, the light bulb that provides the light moves with it. See Figure 2.

It should be noted that the light is actually a bare (naked) light bulb. The light travels in all directions.

RockSim also has a spotlight option, where the light will travel in a cone. We'll talk about this a bit later.

The reason we talked about the coordinate system in the last issue is because the lighting also follows the same convention. To set up the shadows in the right location on the rocket, we just need to set up lights in the right locations in the coordinate system. In effect, we're acting like movie directors by positioning our lights so that the stage looks right.

Turning On Lights

The first step in creating mood lighting, is to set up our

About this Newsletter

You can subscribe "FREE" to receive this e-zine at the Apogee Components web site (www.ApogeeRockets.com), or by sending an e-mail to: ezine@apogeerockets.com with "SUBSCRIBE" as the subject line of the message.

lights in the coordinate system. You do this by clicking on the "lighting" button on the 3D screen. This will bring up the "Global Lighting Manager," which is a control panel that will

Figure 3: The global lighting manager is where we can turn on/off the lights we create.

allow us to turn various lights on and off. Yes, that's right, we can have several lights in the scene. This first control panel screen allows us to turn them on and off individually.

By default, there are no lights in the scene except the one mounted on the camera. When we add any lights to the scene, it will automatically turn this camera-mounted light off.

If we add a number of lights to the scene, and use the control panel to turn them all off, this will, in effect, cause the camera-mounted light bulb to turn back "on." This allows us to get back to the default position without having to delete all the lights we set up.

Adding a New Light

Adding a new light is easy. First, we go to the **Global Lighting Manager** and click the "**Add Light**" button. This will then bring up the "**Light Editor**" control panel.

At the top of the screen is a little checkbox that is labeled "Use this node as a control point. Do not create a scene light for this node." Basically, when you check this box, you aren't creating a light. You are creating a switch that will control multiple lights. When you switch it on, it is like switching on a bank of lights. This will save time if you have multiple lights in a scene. Normally, if you are trying to match a background scene which itself has just one light (the sun), you won't need multiple lights. You'll just create one light. So this checkbox is typically left "unchecked."

Next, we have a name field. It is wise to type something descriptive in this field. If you have multiple lights, you'll have a hard time figuring out which is which if none of them have any sort of description.

The "**Light On**" checkbox does just what the name describes. It turns the light on or off. When you create a new light, it will automatically default to "on." Makes sense, doesn't it?

Next, we have the location on the scene where the light points toward (focal point), and the physical location of the light itself. These are in the X,Y,Z coordinates that we discussed in the last newsletter.

Of everything on this "light editor" screen, the focal point and the position of the lights are the most tweaked items. I've

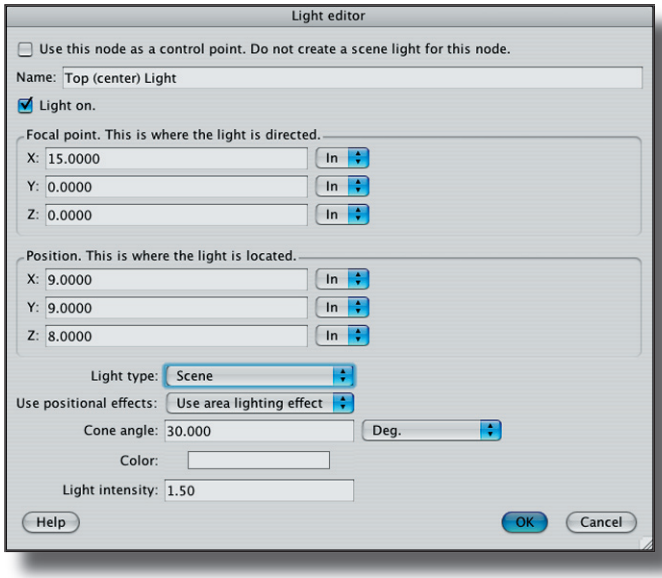


Figure 4: The "Light Editor" allows us to set the position of each light that illuminates the model.

found myself constantly moving them around until I get the shadow effects that I like.

Below the "**Position**" fields is the "**Light Type**." Here you have a couple of choices.

Camera Mounted: this is like the default configuration of RockSim. The light is sitting on top of the camera, and moves where ever the camera moves to.

Camera Tracking: This is taking the light, and moving it off the camera. But when the camera moves, the light moves with it.

Continued on p. 4

This is the hardest one to understand, but think of it like this: you are looking through the camera lens and at the same time holding a light in your outstretched arm and when you walk around the rocket to a different view, the light in your hand moves with you and your camera.

Scene: This is a fixed light that doesn't move. It always stays in the same place, no matter where you move the camera. I use this one most often to illuminate the rocket. It is the one that is closest to being like the sun. It stays fixed in the sky during the flight of the rocket. The hardest part is getting it in the right location relative to the rocket. That is where the coordinate system is so important. You'll need to play around with the positioning to get it right. But the effect is awesome.

Below the "Light Type" on the light editor screen is the "Use positional effects" choices. You have two choices here, either "Use spotlight effect" or to "Use area lighting effect."

The spotlight effect is simple to understand. It is just like

Figure 5: Here is a spotlight shining on the rear of the rocket.

it sounds. The light comes out and illuminates in a circle. The "Cone angle" controls how far out the light will spread. The bigger the cone angle, the wider the area on the rocket that will be illuminated.

The "Use area lighting effect" is the same thing as saying "use a bare (naked) light bulb." The light illuminates in all directions. If you wanted to recreate sunlight, this is the type of positional effect that you would use.

When you select the "Use area lighting effect," the "Cone angle" adjustment has no effect. Even though it looks like you can change it, the light will still radiate in all directions from the bulb.

Below the cone angle is the light's color choice. When you click on the box, it will bring up a color selector that will allow you to change the color of the light.

The final option on the Light Editor screen is the intensity of the light. According to the directions, it can have any value from zero to one. However, I've found that you can enter larger values (greater than 1.0) into the field. It makes the light

Figure 6: Rocket illuminated with a red light.

even brighter. In my own playing around, a value of 2 or 3 is a good approximation of the sun.

Adding Multiple Lights

As I mentioned previously, you can have multiple lights illuminating a rocket. These can be used several different ways. For example, in Figure 7, if you have just one light illuminating the rocket, you get some pretty dark shadows. They are so dark, that you don't have any definition on the bottom side of the rocket. In real life, light will bounce off the ground and illuminate the backside of the rocket. So a second light placed under the rocket with a low intensity level will give us

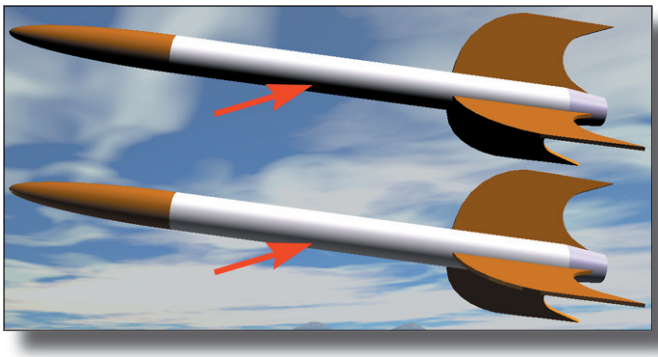


Figure 7: By adding a second light (lower image), the shadow on the bottom of the rocket isn't so dark. It looks more natural.

the same effect.

What I did to create this scene was to first create a "node." It is just an imaginary point in the coordinate space. You can reference other lights in relation to this point. Then, I used the "Add Light Below" button on the Global Light Manager screen to place the two new lights.

One thing I would suggest is giving your node point a unique name. Why? So you can set up several different scenes. For example, you might have a sunset scene with red lighting, and another scene where the rocket is lit from the tip or tail. You just turn lights on and off to change from one scene to another. It is much easier to do this than creating and

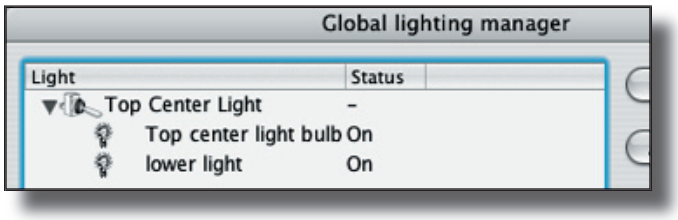


Figure 8: Adding multiple lights.

placing new lights from scratch.

When you are in the light manager, you will see there are several new options available. Basically, the options are all similar: how the new light is referenced to the parent light (the node). Figure 9 shows the Light Manager screen when you are attaching a light to a node.

Conclusion

In this article, I attempted to give you some tips on how to change the lighting in the 3D view. The whole purpose is basically for artistic expression. It is fun to play with even though it doesn't really change the rocket, or how it sims.

The hardest part of the process is selecting a good background image. I am constantly taking pictures of scenery just so I can have some backgrounds to play with. I'm sure that once you start playing with the lighting feature in RockSim v8, you'll be on the lookout for background scenes too.

Stay tuned... we may have a picture contest for cool images created by taking the Rocksim image and placing it in a nice background image. If we can come up with some rules, we'll let you know.

About The Author:

Tim Van Milligan (a.k.a. "Mr. Rocket") is a real rocket scientist who likes helping out other rocketeers. Before he started writing articles and books about rocketry, he worked on the

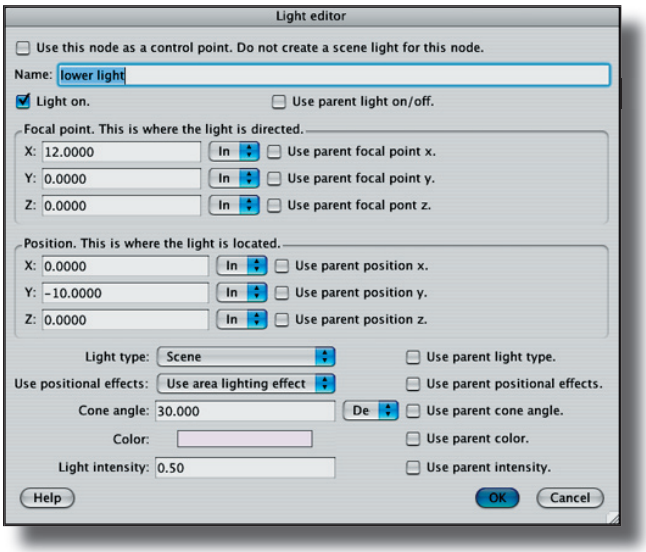
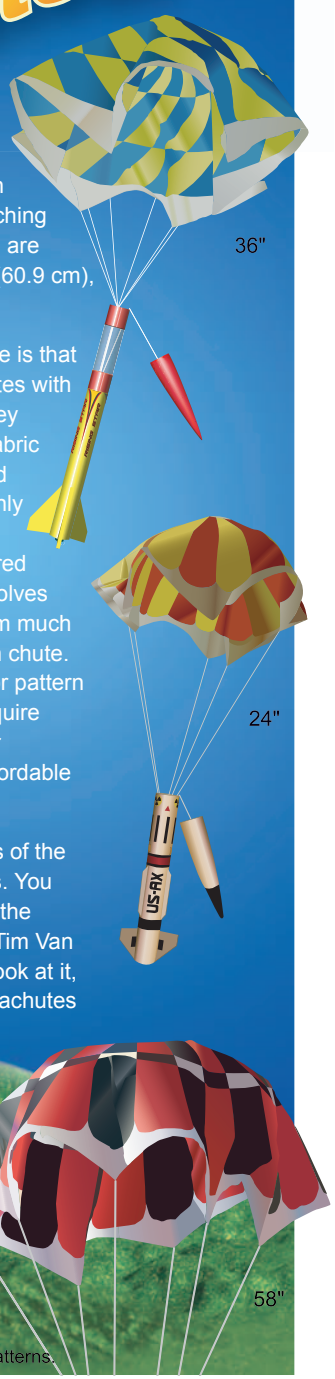


Figure 9: When you add a new light to a node point, you have additional options available.

Delta II rocket that launched satellites into orbit. He has a B.S. in Aeronautical Engineering from Embry-Riddle Aeronautical University in Daytona Beach, Florida, and has worked toward a M.S. in Space Technology from the Florida Institute of Technology in Melbourne, Florida. Currently, he is the owner of Apogee Components (http://www.apogeerockets.com) and the curator of the rocketry education web site: http://www.apogeerockets.com/education/. He is also the author of the books: *"Model Rocket Design and Construction," "69 Simple Science Fair Projects with Model Rockets: Aeronautics"* and publisher of a FREE e-zine newsletter about model rockets. You can subscribe to the e-zine at the Apogee Components web site or by sending an e-mail to: ezine@apogeerockets.com with "SUBSCRIBE" as the subject line of the message.

DYNA STAR

Rip-Stop Nylon Parachutes!



DynaStar Mid-Power Model Rockets is offering a new line of rip-stop nylon parachutes with colorful and eye-catching patterns printed on them. The chutes are available in three popular sizes: 24" (60.9 cm), 36" (91.4 cm), and 58" (147.3 cm).

What makes these parachutes unique is that they are the first nylon cloth parachutes with colorful patterns printed on them. They blend the strength and durability of fabric chutes, with the eye-appeal of printed plastic parachutes. In the past, the only way to get a multi-colored nylon parachute was to have different colored fabric pieces sewn together. This involves extra labor and material, making them much more costly than a single piece nylon chute. These new parachutes have the color pattern printed on the fabric, so it doesn't require additional laborto make a multi-color parachute. This makes them very affordable as well as stunning to look at.

"The ink actually soaks into the fibers of the cloth, making it colorful on both sides. You can't tell which is the inside or which the outside," said company spokesman Tim Van Milligan. "No matter which way you look at it, from the top or the bottom, these parachutes attract attention when you fly them."

For a more information on these new parachutes, and to see a list of dealers that carry the DynaStar Mid-Power Model Rockets, visit:

http://www.dynastar-rockets.com/Parachutes.html

Parachutes pictured are actual colors and patterns.

QUESTION AND ANSWER CORNER

Is there an easy way to clean RMS cases? I came across this tip that an Indiana club member posted on the Internet a while back.

Reload Cleaning Chamber

One of the things you can use PVC pipe for is to create an easy-to-make cleaner for reloads that costs less than $10.00 using parts from your favorite lumber yard.

Here is what you will need:

1. One end cap for the size of PVC you are using. This should be larger than the biggest reload case you will want to clean in it. In this case, 2-inch pipe was used for 38mm casings.
2. One piece of PVC pipe cut to the length of the longest case to be cleaned in it.
3. One test plug
4. PVC glue

After you have cut the PVC pipe to length, glue the end cap to one end. Make sure that you get a good seal all around the pipe and cap so that it doesn't leak. That's all there is to it. Now, you are ready to clean those cases.

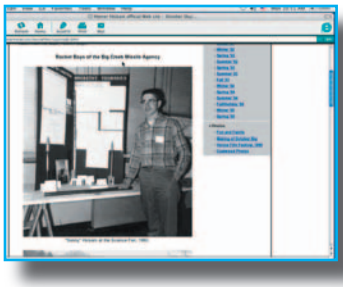
To use, put your dirty case and closures in the pipe and add your favorite cleaner (vinegar used in this instance). Screw on the test plug and shake it for a few minutes. Remove the plug and motor case and continue cleaning with paper towels or baby wipes. If you feel like you have to clean your cases right after you use them, now you can just put them in the cleaning chamber and move on to prepping your next rocket.

If you feel a need to avoid the cleaning altogether, we have single-use motors available for immediate shipping at: http://www.apogeerockets.com/rocket_motors.asp

Photo credits: Plastic Pipes Institute: www.nsf.org/business/newsroom/plumbing99-1/pvcpipe.html
US Tube Doors: www.ustubedoors.com

WEB SITES WORTH VISITING

This issue's featured web site is that of Homer Hickam, of the movie "October Sky" fame. It is found at http://www.homerhickam.com/. This site takes you back to the good old days of the 1950's and 60's when the space age was just beginning and through ingenuity, determination and creativity, some young men in a small coal mining town set their sights on bigger and better things. I'm sure most, if not all of you have seen the movie and don't need me to tell you what an inspiration and shot in the arm it was and is for this hobby. There are many pages on this site where you can view images from the past that are a treat, to say the least! Take a look on the "Coalwood, WV" page and you will find a link to " Coalwood photos". It has some great pictures of Homer and his crew as they have meetings for their BCMA (Big Creek Missile Agency) and Homer at the science fair showing off their rocketry project. They are an inspiration to many, even after this much time. My oldest daughter has done two different rocketry projects for science fairs over the years; one of which got her to the Colorado State Science Fair. She's seen the movie, read the book, and finds them both inspirational. This year marks the 7th annual "October Sky Festival" where they have all kinds of events planned and the rocket boys all try to show up for the crowd. There is much to find on this site, including information for educators and students. And, if you haven't seen the movie, do yourself a favor and rent it! I'm sure their story will inspire you, too!

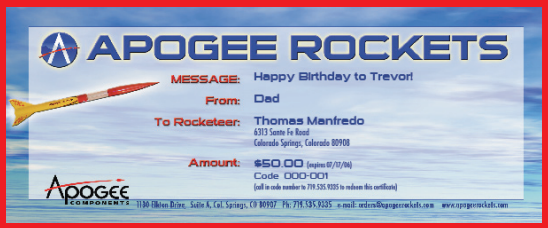


If you would like your web site featured in this newsletter, contact me at johnm@apogeerockets.com

DEFINING MOMENTS

A 'Prang' is a slang term for any flight that crashes into the ground. See picture. 'Nuff' said. Don't try this at home.

If your nose cones get squashed, please see our web page for a large selection of replacements! http://www.apogeerockets.com/nose_cones.asp



Apogee Components, Inc. is pleased to announce that we now offer gift certificates for those people on your gift list that you know won't be satisfied with anything less than all things rocketry! You can purchase the certificates in increments of $25. Ladies, when your husband has just too many ties too count, give him the gift of love; give him rockets! Go to http://www.apogeerockets.com/gift_certificates.asp to order.

LAUNCH EXCITEMENT!

Download Free Demo! www.RockSim.com

WITH ROCKSIM SOFTWARE YOU CAN:

- Design, simulate and build real flying rockets.
- Find out how high and fast your rocket will fly!

WHO USES ROCKSIM?

- 856 schools in the U.S.A.
- Aerospace engineers
- Rocket enthusiasts all over the world

IS IT EASY TO USE?

RockSim is user friendly and can be used by students ages 10 and up.

Mac

ROCKSIM

Site licenses available for schools.

www.www.apogeerockets.com/rocksim.asp

APOGEE COMPONENTS
EMAIL: ORDERS@APOGEEROCKETS.COM
1130 ELKTON DRIVE, SUITE A
COLORADO SPRINGS, COLORADO 80907 USA
PHONE: 719.535.9335, FAX: 719.534.9050

TIP OF THE FIN

This issue's tip has to do with painting. Everyone does this differently, but, for what its worth, this is my technique:

I wet sand the second coat of primer with 400 grit. The smoother the base is, the glossier the finish will be. Then, let it dry for 24 hours. I use oil-based enamel (Rustoleum, for example), and if the primer even REMEMBERS the water from the wet sanding, there will be pinhole voids. Spray on the first coat of color and "flood" the surface so that it will level out without that microscopic pebbling one gets from a spray can. You may have to practice this on a piece of cardboard. You need to get just enough material to flood the surface, but not so much that it runs. Let dry 24 hours and wet sand with 400 grit or finer. Let dry another 24 hours.

48 hours after the first coat, put on the second color coat. Flood the surface again. If you don't wait at least 48 hours, solvents still trapped in the first coat will partially dissolve the second coat and give you a "mud flat" effect. If everything went OK, now you have a mirror-like finish that looks like the surface of a still pond. If you don't have a mirror-like finish (see example), wet sand again (after 24 hours) and recoat (after 48 hours). If you want to apply a trim color, wait 48 hours. The surface will be so smooth that you will be able to mask with regular masking tape without the trim color bleeding under. Remove the masking tape as soon as the trim color sets up (in about one hour).

Anyway, this technique works really well for oil-based enamels. I like them because they are relatively slow drying and are pretty easy to handle. Lacquers dry so fast that I can't flood the surface enough to get a surface gloss that looks like a still pond. And remember, you can paint enamel over lacquer, but not the other way around.

If you have a rocketry-related tip you would like to share with our readers, please e-mail me at johnm@apogeerockets.com