Simulating Short, Wide Rockets Part 2

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Plugging into Sputnik

Extending this concept allows me to simulate a Sputnik design, which is essentially a sphere with four stick legs (fins). The mass-less tail cone can be added to the aft hemisphere of this design in an analogous fashion to that for the tail cone added to the Estes FatBoy design above. Figure 5 shows the Sputnik design with a C6-3 motor loaded has a stability margin is 0.26. Figure 6 shows the same design with the added mass-less tail cone giving a stability margin is 0.98.

mass-less aft cone at its forward end will then be is the length of the tail cone on the rocket divided by pi (see figure 2). In essence, the length of the aft transition (on the rocket) is subtracted from the front end of the added aft cone (which accounts for the base drag). It is as if the added mass-less aft cone still begins at the widest part of the body, which would be at the forward end of the transition in the modified Fatboy (see figure 3) simulation without added aft cone for base drag and (figure 4) with added aft cone to account for base drag.
Since the Cd of the faux parachute is the same as that of the rocket, this trick should provide an accurate simulation of the tumble recovery phase of the flight. Bruce S. Levison (NAR #69055, MTMA #606) is a rocketeer from Ohio and a member of the National Association of Rocketry (NAR). He has published numerous articles on model rocketry, related to many practical aspects of the hobby. Bruce enjoys tricking RockSim software into performing simulations of non-standard rocket designs. Bruce earned an advanced degree in chemistry and works as a research scientist at the Cleveland Clinic Foundation.

Figure 5

Note that a recovery device had to be added to these Sputnik designs to get a valid simulations. This also shows how to simulate tumble recovery in a model of this type. The recovery device is simulated as a parachute equal to the cross sectional surface area of the model with one 0.001” length shroud line. The Cd of the recovery device was set to the Cd of the rocket.

Figure 5

(1.05) from the CD analysis under the Rocket menu. Since the Cd of the faux parachute is the same as that of the rocket, this trick should provide an accurate simulation of the tumble recovery phase of the flight.

Quote from NAR - The groundhog saw his shadow and winter drags on with your budding rocket students only dreaming about launching rockets. It’s just too cold to get out and fly now, but it’s the perfect time to dream, design and build. Get out the drawing board or your computer laptop, and start your kids on their mission. Now’s the time to plan your spring launch, school space day or rocket science fair projects. As your kids’ design progresses, you will know what parts and materials your class will need and get them so you can start building. Take the time now inside while you have it, so you’ll have more time to be outside flying when the warm weather arrives. And it will come, groundhog or not. Aim high.

-Vince Huegele, NAR Education Chairman

Editor - When you are ready to order parts for your rocketry projects, think Apogee Components, your rocketry experts! We’re here to assist you! www.apogeerockets.com
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**QUESTION AND ANSWER CORNER**

One of the questions we get asked frequently is, "Is there help for Rocksim and if so, where is it?" The answer is that there are actually 4 sources and the following will show you where.

The first is on the CD ROM. There are 11 Quicktime videos that will provide you with the basics. These are found in the "Rocksim Help Videos" folder. The second is the "Help Assistant" in the program. You can find this under the "Help" menu and go to "Contents". Number 3 way is shown in the picture at the right. On the Rocksim CD ROM you will also find a folder titled "Technical Reports". Once inside of that, you will find a larger Rocksim help manual called "Rocksim In Depth". This is a guide to all functions and features of Rocksim made to compliment the help menu in the program.

The fourth way to find help is to simply give us a call at 719-535-9335 or e-mail me at johnm@apogeerocks.com. If I don't have the answer for you, I will find it. If you have a question about rocketry-related subjects, please feel free to e-mail me at the address previously mentioned and I will do my best to address it quickly!

"Apogee Books" is not affiliated with Apogee Components. But they do sell some nifty space books, and we do recommend them.
Spin Stabilization is correcting instability by attempting to cause the rocket to spin on the way up. The spinning action creates angular momentum, which provides inherent stability (think of a toy spinning top). The spinning also cancels out any unbalanced forces acting on a rocket, such as one fin causing more lift than another. Spin stabilization can be done in 3 main ways. The first is to add "spin tabs" on the aft end of the fins. The second is to "cant" the fins which is to set them at an angle to the line of the body tube. The third way is to sand each of the fins so that they have a cambered airfoil shape to them. The drawback of spinning to keep in mind is that the overall drag will increase, which makes the altitude of the rocket decrease.
RockSim is the leading software for designing rockets, and finding out how high they will fly. Here is what rocketeers are saying about it:

"After a lot of searching on the Net, Rocksim is the best rocketry simulation software I have seen. In terms of sophistication, ‘Rocksim’ is to ‘VCP’ as ‘VCP’ is to ‘cutting out pieces of cardboard’. " – Brian Crosse

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TIP OF THE FIN

Have you ever needed a specially-shaped decal or maybe you want just a little bit of trim color to add to your favorite model? Here is a very easy method of doing this very thing! Start by getting some clear labels for laser printers with a matte finish. These are full sheets and are a bit more heavy-duty than some others.

Next, as seen in picture 1, choose your favorite color for the trim or decals in question, and spray a sheet thoroughly so that it achieves a glossy, wet finish as seen in picture 2. Allow this to dry completely. If you don’t, you will wind up having a mess as you try to do the next step in a wet, sticky pool of paint. Just to play it safe (depending upon how thick you put the paint on), leave it to dry overnight.

Now, what you will do next is decide what shapes are needed to cut out of this sheet. For our purposes here I needed some trim colors and instead of trying to mask off the affected areas, I decided this was a much easier alternative. Picture 3 shows me cutting strips that I measured off all at once rather than doing it over and over. My finished products for this rocket are shown all cut out in picture 4. Make sure that you use a new, sharp hobby knife in order to get clean edges!

Last, but not least, picture 5 shows the decal as it is being placed on the fin. This really adds some very nice detail to the model without the extra hassle of trying to mask off the areas!