Apogee Components

PEAK OF FLIGHT

NEWSLETTER

New Features in RockSim v9

Explore the limits of your creativity with the new pod feature.

Rocket Image created using the NEW RockSim v9

Apogee Components, Inc. — Your Source For Rocket Supplies That Will Take You To The “Peak-of-Flight”
3355 Filmore Ridge Heights
Colorado Springs, Colorado 80907-9024 USA
www.ApogeeRockets.com e-mail: orders@apogeerockets.com

ISSUE 221 NOVEMBER 4, 2008

Features Coming In The *NEW* RockSim v9

By Tim Van Milligan

PODS! WE HAVE STRAP-ON PODS!

RockSim v9 is entering beta testing and has got some HUGE new features that we're pretty sure we couldn't stop beta testers from talking about. Because of that, I thought I'd spill-the-beans first by writing about the new features.

Let's get right to it; the big new feature is the ability to add pods to the outside of the rocket. It may not seem so huge, but this revolutionizes the process of designing rockets. All those work-around procedures you had to do in the past to put things on the outside of the rocket are now eliminated. It also opens up the door to all kinds of new rocket designs. I'm pretty sure that users are going to create designs that we did not know possible. That's OK, I like surprises too.

The ability to add pods to the outside of the tube is the most requested feature that users have asked for since RockSim version 2.0 came out in the late 1990s. When people realized that version 2.0 had many new enhancements over the original version 1, they really started thinking light-years ahead. I guess the thought process was: "If we could improve on version 1, what other things could we ask for?" And asking for pods is what users did.

I almost got sick of it. But it was such a popular request that ever since version 2.0 we've been logically building the features of RockSim to get to this point. With version 9, we have all the pieces in place and we're happy to give users the thing they've always wanted. This new "pods" feature is so fantastic, that I can't contain my excitement about it. You will not be disappointed when you try it out.

First, what is a pod?

In RockSim v9, think of a pod as an object that is similar to a sub-assembly part. Essentially it is a collection of other parts, like a nose cone, body tubes, and fins. You just arrange these parts under the "pod" label (see Figure 1). The main differences from sub-assemblies are that the pod can begin with a nose cone and that it is attached to the outside of the main core/body of the rocket.

The first thing that comes to your mind will be strap-on booster pods, like on a Titan IV or Delta 2 rocket. And those configurations are now possible!

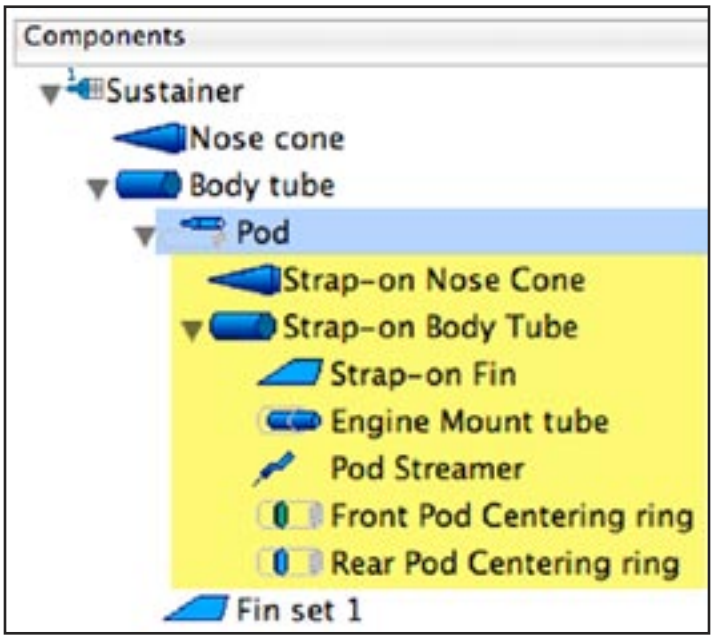


Figure 1: A pod is just a collection of parts attached externally to the rocket. The parts in yellow show what this particular pod contains. Essentially, it is a second rocket on the outside of the main rocket.

Besides a nose cone and body tube, a pod can also have fins attached to it, like shown in Figure 2. What is cool is that RockSim automatically calculates the CP and the CG affects of the pod, just like it always has.

I do want to point out one area of concern that you should keep in the back of your mind. The addition of pods will also change the drag coefficient of the rocket. Right now that change only includes the extra components. There is an additional interference factor that should be added to the rocket every time there is a new component added. We do not know what that interference factor is so right now we simply ignore it. You will have to adjust your drag coefficient in the software for each design you make that uses a pod. That will probably be done based on actual flight tests of your completed rocket.

Continued on page 4

About this Newsletter

You can subscribe to receive this e-zine FREE 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.

Newsletter Staff

Writer: Tim Van Milligan
Layout / Cover Artist: Tim Van Milligan
Proofreader: Michelle Mason

Sales of the New Book Have Really Blasted Off!

Imagine How Much Brandango Could Improve *Your* Bottom Line

Award-Winning Experience, Quality and Creativity

We are all about *you*, your brand and your revenue.

Brandango can improve your book designs, magazines, catalogs, toy and game packaging, web sites, advertising, publicity and marketing.

Brandango's team includes some of the best designers, illustrators, photographers, marketing and branding professionals, publicists, writers and editors available.

Our offices are in Colorado Springs, Colorado.

Contact@brandango.us

Brandango created the cover for Apogee's *Model Rocket Design and Construction* book and refined the interior. Check out our killer ad copy for Sunward King Tut's Pyramid on Apogee's web site.

Call Jeff at 719-630-8760 today!

"Brandango embraces and perfects contemporary art styles, as well as traditional successful techniques. Their art and design have always exceeded our expectations and invariably produces an incredible response of superlatives and desired marketing objectives."

—Karl Schaller, Zeal Media Group

Continued from page 2

RockSim Version 9 Features: PODS!

Droppable Strap-on Boosters

But what good is a strap-on booster if it doesn't fall off during the flight simulation? So RockSim v9 also allows that too. There is a little checkbox on the pod editor screen that you mark if the pod is to be droppable. Once you check it, the ejection delay of the motor in that pod will trigger it to fall off from the rocket.

It is very simple and intuitive, just like when you specify when to kick out a parachute to bring the rocket back to the ground.

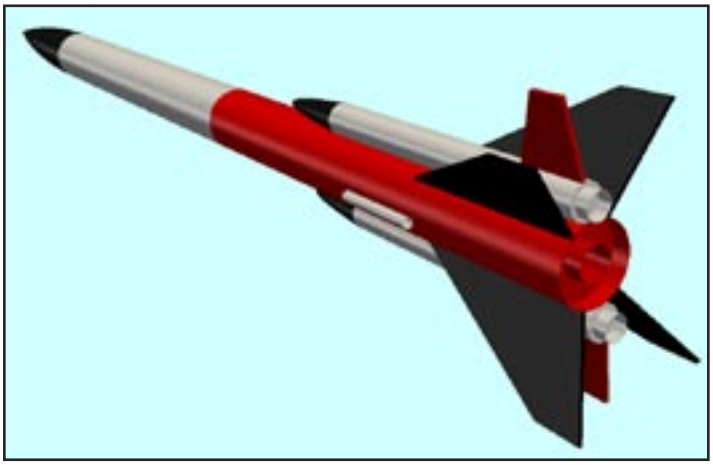


Figure 2: Pods are a "grouped collection of parts" that are on the outside of the central body tube. Up through RockSim version 8, the software only allowed for fins and launch lugs to be outside the rocket's central tube. Now almost anything is possible.

Just remember, you do have the option that pods can stay attached throughout the entire flight, or they can be made to fall off (at ejection of the motor inside the pod).

More Pod Configurations

But there is so much more that can be done with pods, because a pod can be attached to nearly any external part of the rocket. In other words, you can put a pod on a fin if you want (see Figure 3). So those cool looking designs with pods on the ends of fins are possible too!

Think about this if you fly egg-lofters -- you'll now be able to put your launch lug on a stand-off.

But as mentioned above, a pod can include its own fins. So your fin-tip pods can have awesome looking fins attached to them (see Figure 4).

Here is the really awesome concept that is going to blow your mind…

You can attach an additional pod to the ends of the fins that are on the first strap-on pod, like shown in Figure 3.

Just let that sink in to your brain for a second. What could you come up with now?

There is virtually no limit to the number of fractal pods you can come up with that are attached to a main pod. The possibilities are almost too awesome to comprehend.

Fins-Attached-To-Fins

Continued on page 5

A Picture Says a 1000 Words

I'm really excited about the new feature at EMRR: Flight Logs with Pictures. It really allows guests to show-case their flights and rockets. I personally like to try to capture my lift-offs with the camera and sometimes I get it just right. With the new feature EMRR's guest and I can attach these photos with the specific rocket Flight Log to all to enjoy. Like these:

Ted Cochran's ARC 1824 PSR

Tim Dicke's FlisKits - Deuce's Wild

Gary Tortora's MAD DOG 6

Moe Bertrand's Estes Mercury Redstone

EMRR's UFO Drag Race

Brought to you by Essence's Model Rocketry Reviews & Resourses - www.rocketreviews.com

Continued from page 4

RockSim Version 9 Features: PODS!

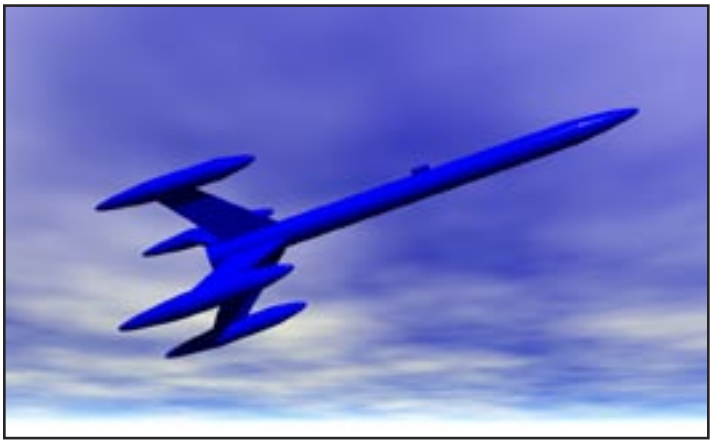


Figure 3: This rendering was created after exporting the 3D model from RockSim. Rockets with pods on the ends of fins are easy to create in version 9.0.

This is something we didn't originally plan for. But it is possible thanks to the pods feature. Here's how it works…

Since the pod can be attached anywhere on the rocket, what we did was to allow you to directly attach fins to the pod without adding other components first. So what you'll do to attach a fin to a fin is to first attach a "pod" to the fin, and then attach the second fin to that pod.

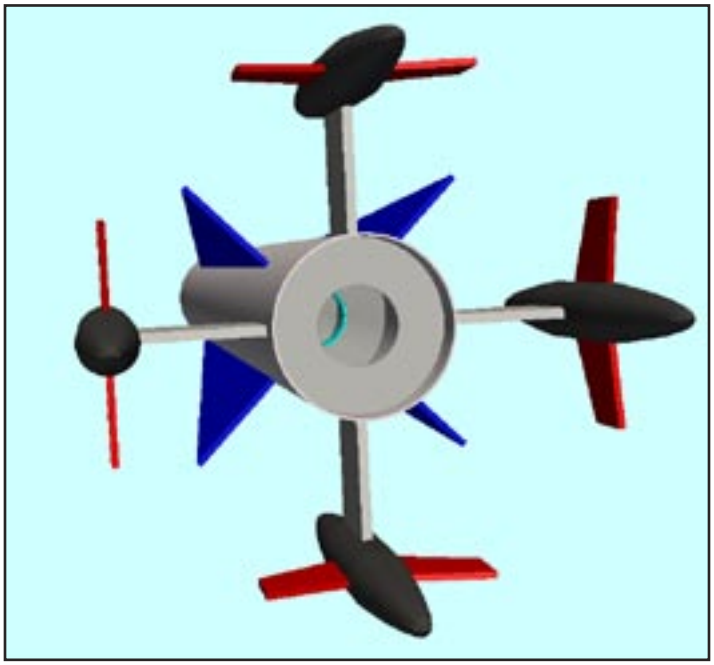


Figure 4: Base view of a rocket with fins on the pods, which themselves are attached to the ends of fins. There is no limit to the number of pods or complexity that you can go to.

All of a sudden, you have a T-Tail (see Figure 5)!

Now imagine that you can take this pod with fins on it and move it anywhere on the rocket. Where would you move it? What configurations would then be possible?

Essentially, you now have the ability to put wings on various parts. You'll be able to do things like:

A. Put T-Tails on fins

B. Have fins that are wedged in between a cluster of body tubes

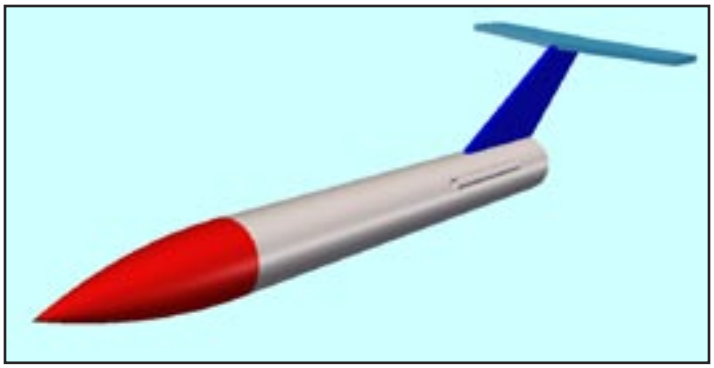


Figure 5: To make a "T-Tail," first start by placing a pod on the rocket attached to the tip of the fin. Then simply attach a set of fins to it.

C. Place a wings on the underside of a tube instead of radiating perpendicular from the center of the tube

D. Simulate a scoop or air duct on the bottom of a tube made from a ring fin

E. Place fins on tube-fins and ring-tails

F. Box fins

This concept opens up RockSim to all sorts of possibilities. You'll now be able to make complex designs like these famous kits:

- Apogee Components' SR-72 Darkbird
- DynaStar LexxJet
- Madcow Rocketry Bomarc
- Madcow Rocketry Jayhawk
- Quest Space Shuttle Intrepid
- Competition style boost gliders
- Sunward Box Racer
- Estes SpaceshipOne
- Estes Trident
- Estes Interceptor E
- Estes Orbital Transport
- Sky Shenzhou

Continued on page 6

Continued from page 5

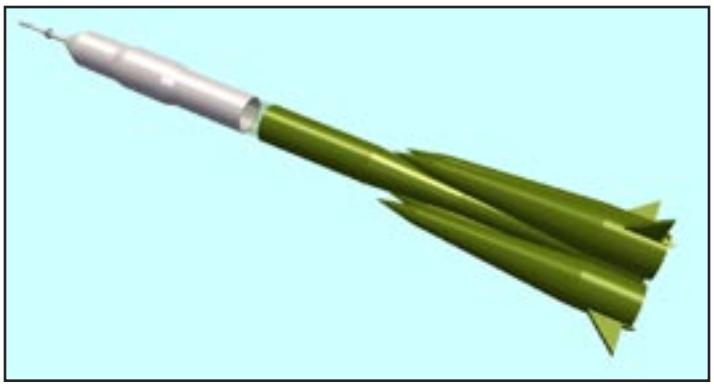
RockSim Version 9 Features: PODS!

Figure 6: Types of designs that were not possible prior to RockSim v9. Left Side: Sunward Box Racer with box fins, Jayhawk with tip fins, Estes Orbital Transport with parasite glider, Competition Rocket Glider with polyhedral wings. Right side: Saturn V fin fairings Semroc Hydra 7 with conformal nose cones on the external pods, DynaStar LexxJet with winglets, DynaStar Firefox-SHX with offset body tube.

Continued on page 6

Continued from page 6

RockSim Version 9 Features: PODS!



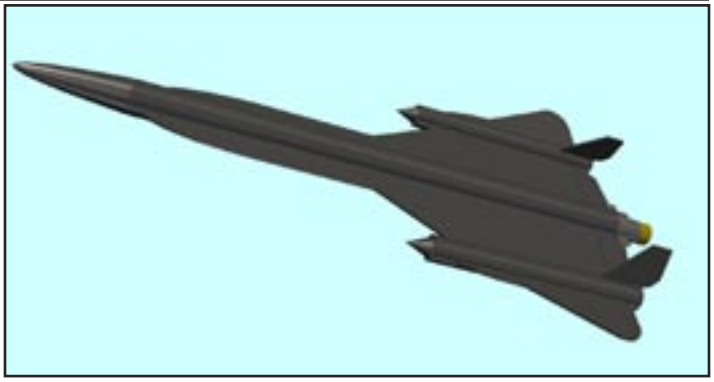


Figure 6 (continued): More designs that are possible in RockSim v9. Left, the Noris Soyuz. Right, the Apogee SR-72 Darkbird kit.

- Semroc Hydra VII
- Semroc Gee'hod
- Put polyhedral on glider wings.
- Engine pod stand-offs on gliders
- Use a flat stick for a glider fuselage boom.

Pods don't have to be external to the main tube of the rocket. You can create a nose cone that starts inside the tube, so that the external surface conforms to the curvature of the tube. This makes designs like the Semroc Hydra VII possible.

You can also slide a conical nose cone toward the base of the rocket, and all of a sudden, you have those fairings for the fins on a Saturn V!

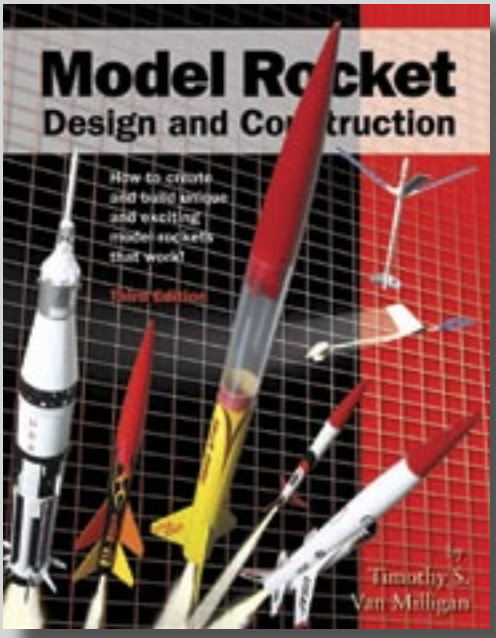
Are you impressed yet?

You're going to be even able to simulate one of the coolest kits of all: the Dynastar FireFox SHX, with its cool offset body tube!

And don't forget, you can add decals to any part in RockSim. Now your design dreams can become real, just like the image of the Orbital Transport that is shown in Figure 6.

Because the complexity of the rocket can be increased, you may want to hide a pod to make your design easier for you to view. This can be done by highlighting the pod in the parts tree, and simply clicking the new show/hide button on the screen. The pod instantly drops off, and in the parts tree, the column called "status" tells you the pod is "hidden."

Continued on page 8



Model Rocket Design and Construction

By Timothy S. Van Milligan

New 3rd Edition Now Shipping!

This new 328 page guidebook for serious rocket designers contains the most up-to-date information on creating unique and exciting models that really work. With 566 illustrations and 175 photos, it is the ultimate resource if you want to make rockets that will push the edge of the performance envelope. Because of the number of pictures, it is also a great gift to give to beginners to start them on their rocketry future.

For more information, and to order this hefty book, visit the Apogee web site at: www.ApogeeRockets.com/design_book.asp

Apogee Components
3355 Fillmore Ridge Heights
Colorado Springs, Colorado 80907 USA

telephone: 719-535-9335
website: www.ApogeeRockets.com

APOGEE COMPONENTS

Continued from page 7

RockSim Version 9 Features: PODS!

This feature comes in handy when you are designing your stages and confirming they are stable by themselves. It is similar to hiding the lower stages of a multiple stage rocket. It makes sense!

Other Changes – There are Other Cool Features

We could have released the pod feature all by itself for RockSim version 9.0. It is totally worth the upgrade price by itself — and then some! But we want you to really feel that this is an upgrade worth having and that it is the best bargin in all of rocketry. So we put in even more great new features into it like:

Scale your design up or down!

This was the second most requested feature after the ability to add pods. For some RockSim users it was even more important. There were quite a few that said they'd pay $50 extra for this feature alone. Wow, I didn't expect that either! I suspect there are a lot of budding entrepreneurs out there that are ready to sell more upscale rockets of those old classic kits.

With a click of your mouse, you'll be able to change the size of your rocket, making it either bigger or smaller. This is useful when upscaling old classic kits. Just grab the RockSim file from your favorite web site, and turn it into the rocket size that you want.

However, there is one small catch. You will still have to go back and tweak the dimensions to match available tube sizes. But much of the work will be done for you already.

Scale the Fins Separately

You can also scale your custom fin shapes up or down separately from the rest of the design. This is helpful when you are making a design and the complex custom fin shape that you just made does not look right on the tube. Instead of tweaking each corner point separately, you can change the size of the fin with a click of a button.

Automatic Engine-File Download

To be honest, I really wanted some sort of automated method of getting new engine files into RockSim. The old method often seemed to go something like this: "send email to Apogee requesting the engine file for a new motor just produced by Aerotech."

Somehow everyone thought that I got some inside knowledge of a new motor that was going to be produced. Sorry to burst your bubble, but I'm usually the last person to know what other manufacturers are doing.

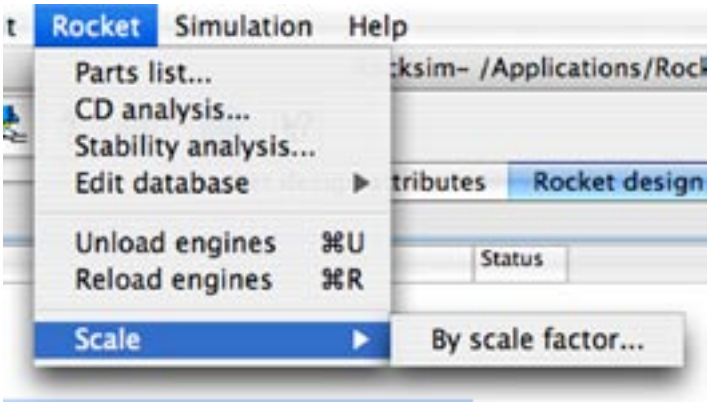


Figure 7: Scale your design and make the whole thing bigger/smaller with just one click of the mouse.

Fortunately, John Coker, who runs the web site www.thrustcurve.org is among the first to find out about a new motor. He seems to get the motor files up on his web site very soon thereafter. His web site is a great resource for all modelers that use the RockSim software.

Last year John created a piece of software that will query his web site and automatically download the engine files. When I saw that, an idea popped up in my head. What if RockSim was able to query the thrustcurve.org website and look for motors for users of the software?

With a bit of effort from Paul Fossey, the programmer of RockSim, that is now possible. Besides making my life so much easier, users can make the query for new motors right from within RockSim. If the query brings back a new motor, they can download it directly into their data folder for use in RockSim.

Zoom in On Graph Data

We switched to a new plotting software for this version. The upside is that you now can zoom in on the graphs. Actually we had this feature in RockSim version 7.0. But we had to switch to a different plotting software that could be used on the Mac edition of RockSim. It is nice to get this feature back for RockSim version 9 which now works on both the Mac and the PC.

Stability Overlay on the base view of the Rocket

You know, RockSim v9 has the potential to produce a lot of cool looking rockets. But what good would that be if they were not stable when you launched them? Not so good, right?

Our philosophy with RockSim has alway been to give

Continued from page 8

RockSim Version 9 Features: PODS!

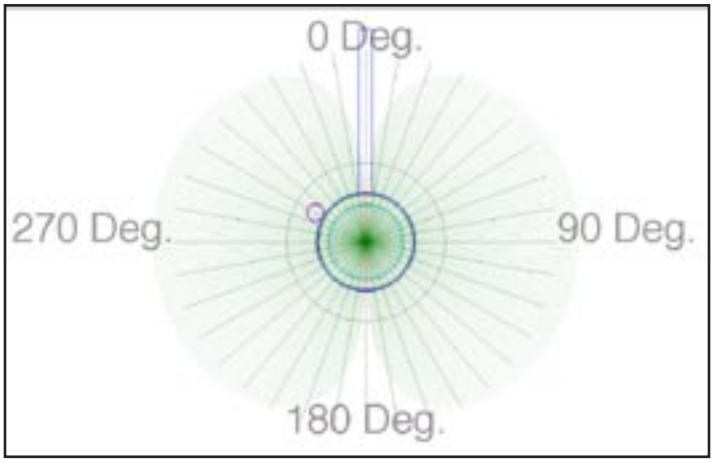


Figure 8: Stability overlay shows if your rocket is stable in all axes. This rocket is unstable on the 0° and 180° orientations.

you a handy tool to allow you to create cool designs that really do work as you dream they will. There are a lot of features in the software that we developed over the years to do just that. That started in RockSim version 1.0, with the slider bars to position parts which also recalculated the CP/CG positions on-the-fly when any part moved. Another big design tool of course is the 2D flight profile. The stability analysis screen is yet another example. We invented a number of tools in RockSim which we are very pleased to say have revolutionized how people design rockets.

In version 9, we're refining a tool that was in version 8: the base-view stability overlay. We hope that now it is a lot easier to read and understand.

You don't know it yet, but this is a feature you will want. Why? Because with the ability to add pods, you can design some unique configurations that may not be stable. With the base-view stability overlay, you'll be able to tell right away how to take an unstable design and make it into a stable one.

I'll write more about this feature and how to use it in a future newsletter article. It takes some explanation to understand its importance.

Improvements to the 2D graphics

The rocket image in the view window can now be made to look sharper and less pixilated. This doesn't sound like a big deal, but it was to me. I want you to have the best views of your awesome new designs.

Additional Features Coming In Future Updates

The ability to add pods is so huge that we decided to release version 9.0 instead of holding it back until we have all the other stuff we wanted to get into the new version. I think you'll agree this was a good decision after you have a chance to download and play with the software.

The progression of additional new features for version 9.0 will be similar to what we did in the past. We'll issue FREE updates to the software with the additional features we want to incorporate into the software. So while version 9 does not currently have everything we want to put into it, you won't have any additional expenses when the new stuff is issued.

What are we going to add? That's a great question, especially when you consider that it already has so much new stuff in it. So here is a list of things we know we'll be adding for free to the basic version.

1. Enhancements to the 2D flight profile. The ability to add strap-on boosters that drop off in flight really compounds the complexity of simulations. It is so complex that the current 2D flight viewer can't handle it yet.

Imagine a 3 stage Delta II rocket with 9 strap-on boosters that fall off in different time periods, first a set of 6 and then the final 3 -- just like it does in real life. You have a total of twelve falling objects instead of three. Tracking all those falling objects is a nightmare.

The current 2D viewer that you'll get with the initial release of version 9 does not show the strap-on boosters falling off. It just keeps them attached in the picture to the core vehicle. But bear in mind that the actual simulation does drop them off; you just don't see it in the animation. To confirm the effects of them dropping off, you have to view the graphs of the flight.

We had this same "animation viewer" problem in RockSim v8 when it first came out 3-1/2 years ago. It didn't show dual-deployment for the booster stages of big rockets. The animation just showed the booster doing tumble recovery, even though the parachutes were actually deployed. That dual-deployment animation was fixed. We will be fixing strap-on animation soon, but we felt that it wasn't a show-stopper from a user's standpoint. All the flight data is there, and if you need help, I'll be happy to walk you through the interpretation of the flight data.

2. A Top View to go along with the 2D side-view and the 2D base view that are currently in RockSim.

Continued on page 10

Continued from page 9

RockSim Version 9 Features: PODS!

This extra view is really needed when you are positioning pods on the tips of fins. The more complex the design, the more you want to view it in multiple angles so that you are assured that everything is in the right position.

I probably could have done the Orbital Transport design file in a much shorter time if I had that extra top view. I think you'll agree that it is needed too.

3. Neutral Point Calculator for glider designs.

The neutral point of a glider is the CP. Actually, RockSim version 8 has been calculating the CP point of a rocket from any view angle (see *Peak-of-Flight Newsletter* #220 at: www.ApogeeRockets.com/education/downloads/Newsletter220.pdf). That's all you need to display the neutral point of a glider. But it doesn't display the information in a logical and usable format. We will be adding this to a future upgrade to version 9.0 in case you want to design gliders.

Updating will be just as easy as it was in version 8. When RockSim v9 first starts up, it pings the ApogeeRockets.com web site and checks to see if a new version is available. If it sees a new one, it will pop up an alert box. The alert will say that there is a new edition available, as well as tell you what the change list is for that version. You will then have the option of downloading and installing the new version, or ignoring it until a later date.

This simple system has worked very well for users in version 8, so we decided not to change a thing. This allows you to have the latest and greatest edition of the software without having to manually look on the web site yourself.

When I look back 3-1/2 years to when RockSim v8 first came out, I knew that those people that jumped in early and purchased the software were going to get a great deal because of the way we bundled new features with bug fixes. Did you know that there were over 20 FREE upgrades in version 8 since it was initially released? That's why I wanted to let you know that we are planning a lot of free upgrades to version 9. If you jump in early, you'll also be getting the best deal.

Conclusion

RockSim v9 is totally revolutionary, and I believe that from the bottom of my heart. It is exciting because it opens up the number of design and simulation possibilities that you've been waiting for since RockSim v2.

I want to leave you with one other fact that I don't want you to forget: RockSim 9 is the only rocket design software that can do this! There is really nothing to compare it to. That is why nearly every other rocket company that makes kits uses RockSim as their main design tool.

With RockSim v9, the hobby is only going to get better. The golden age of rocketry was not in the past. It is NOW, and I'm excited to see what you're going to do next!

Finally, I also do need to issue a mild warning. RockSim v9 is as addictive as a video game. In one way that is a good thing. Rocketry is educational, and you'll be improving your mind. But it is going to use up a lot of your free time, which may mean you might become sleep deprived. And I know that many people create rockets while they are at work. Just don't make your boss so angry that he fires you. I don't want to lose a customer because you don't have a job to pay for your rocketry addiction.

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 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.

Attention Rocket Manufacturers

Apogee Components is expanding, and we're looking for additional items to offer to our great customers. If you have high-quality rocketry items and you're looking for a high-volume sales outlet, please give us a call. Let us put some additional money in your wallet!

phone: 719-535-9335
email: www.ApogeeRockets.com/contact_us.asp