PEAK OF FLIGHT NEWSLETTER

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PEAK OF FLIGHT

Triggering Events in RockSim with Fake Rocket Engines

By Tim Van Milligan

In RockSim, you sometimes need a triggering event in order to create complex simulations that are otherwise impossible to accomplish. An example might be an unpowered strap-on booster pod, where you need some sort of trigger to tell the software that the unpowered upper stage needs to separate from the booster stage and be recovered on its own.

The "trick" that I use to trigger events like this is to create a "fake" rocket engine that I put inside the pod, so RockSim is tricked into thinking this is a powered stage that needs to be tracked.

In this article, I'll go through the steps required to create the fake motor, and also explain in more detail what it means to "trigger an event."

Background

The way that RockSim understands complex simulations is that there are a series of events that have to take place, and they must occur in some sort of order. For example, let's assume that it is a simple model rocket flight. As you know from your basic training of rocketry, there are 5 phase of flight:

- Ignition and Lift-off
- Engine Burnout
- Coasting Phase
- Parachute Ejection
- Descent Under Parachute

You can see read more about this in *Peak-of-Flight* Newsletter #117 (https://www.apogeerockets.com/education/downloads/Newsletter117.pdf).

RockSim processes the flight in that order. It doesn't do parachute ejection until after the coast phase has ended.

Each one of these phases has a beginning, and an end. The next phase doesn't trigger until the previous phase has reached its end. The "end" of the previous phase is actually the triggering event that starts the next phase.

In RockSim, we use the rocket motor as the triggering event, because it has a definite beginning and an end. However, it is not the only way to trigger events. For example, if you've done dual deployment, you know that the "altitude" the rocket reaches can also be the triggering event.

Normally, we name these triggers as a "flight event." You've probably seen the special screen in RockSim called "Flight events." The purpose of this is to allow the user to define the special events into the flight.

In RockSim, there is only one type of "Flight Event.". That defines when the recovery device is opened. You can set it to open at a specific altitude, or at a time relative to some other event in the rocket such as a time after ignition or time after the rocket is past the apogee point, or at a specific altitude (used commonly for dual deployment).

In RockSim-Pro, there is a second type of flight event, which is called a "Staging event."

The staging events are set up in order to tell RockSim when secondary rocket motors are to be ignited during the flight. The obvious example is a second stage motor. You have almost unlimited control when the upper stage motors are triggered (ignited), because you can use things like time, altitude or velocity as the triggering event to start the motor burning.

By comparison, in the regular version of RockSim, staging of rocket motors is much more limited, and is always triggered based on "time." Even though it is limited to just time, it actually makes the process of staging and air-starting simpler.

For example, say you have a two stage rocket using Estes motors. There is D12-0 motor in the booster, and a C6-7 in the upper stage.

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The way RockSim will run the simulation is that the D12-0 motor will burn first, and immediately ignite the C6-7 motor in the upper stage. We use the delay time of the Booster stage motor to tell RockSim when to ignite the upper stage motor. So the "0" on the end of the D12-0 engine tells RockSim to immediately switch over to calculating the C6-7 motor.

FIGURE 1: THE SMOKE TRAIL OF A TWO STAGE ROCKET.

That is the way it is done in real life, so that is the way we originally set it up in RockSim. Simple right?

Now let's say that we have electronics in the upper stage that will control when the upper stage motor is ignited. Say the electronics is a timer circuit, like the Apogee Simple Timer (https://www.apogeerockets.com/Electronics-Payloads/Staging/Simple-Timer-for-Staging).

The Simple Timer starts counting as soon as it feels acceleration, which means the booster stage motor has started its burn. We can set it to fire the upper stage motor at any time. For example, we can set it to fire the upper stage motor at 5 seconds into the flight.

In this example, the D12-0 lifts the rocket from the ground. After it burns out, the motor still fires its ejection charge, which separates the booster stage from the upper stage. The upper stage then simply coasts upwards. At five seconds into the flight, the timer electronics fires off the C6-7 motor.

Since the rocket is coasting in the air when the 2nd stage ignites, we call this situation by a special phrase: an "air start." The 2nd stage started burning while it was in the air, and it was completely separated from the booster stage.

FIGURE 2: THE SMOKE TRAIL OF AN "AIR START" TWO STAGE ROCKET. THE GAP IN THE SMOKE INDICATES THE UPPER STAGE COASTED FOR A SHORT TIME BEFORE IT IGNITED.

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This situation is a little more complex to set up in RockSim. The reason is that staging events are based on the time after the previous motor has burned out, not based on when the previous motor was ignited. That is the key.

Therefore, if we want to ignite the upper stage motor at five seconds into the launch, we have to deduct the burn time of the first stage motor. The result is the "ignition delay" we have to use for the upper stage.

You can get the burn time of each motor from RockSim, but you have to have a pencil handy, because it is listed on the engine selection screen. In our example, you can see from Figure 3 that the burn time of a D12 motor is 1.65 seconds long.

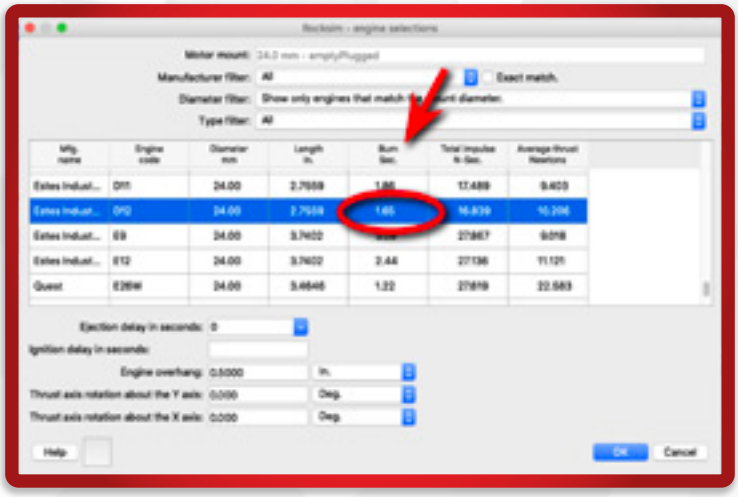

FIGURE 3: THE BURN TIME OF AN ENGINE CAN BE FOUND IN ROCKSIM WHEN YOU GO TO CHOOSE A ROCKET ENGINE.

Taking five seconds and subtracting 1.65 seconds that the D12 burns leaves us 3.35 seconds. That is the amount of time that the second stage has to coast after the D12-0 has separated from the model before the C6-7 motor roars to life.

Where do you put in the 3.35 seconds into RockSim? That is done by putting the value in as an "ignition delay" for the upper stage motor as shown in Figure 4.

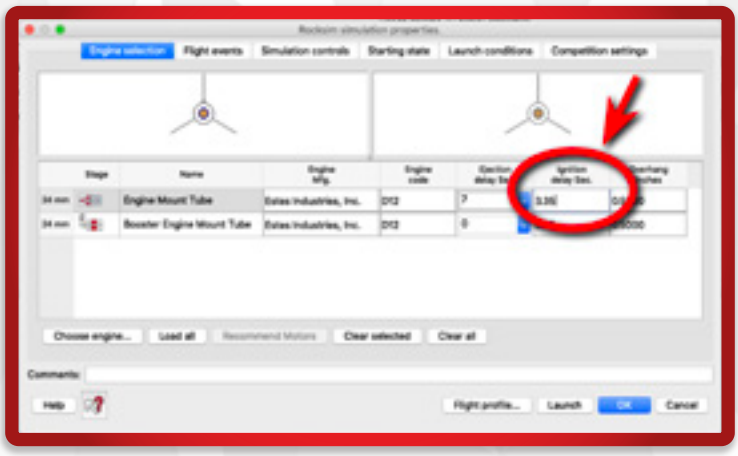

FIGURE 4: THE IGNITION DELAY COLUMN IN THE SIMULATION PROPERTIES SCREEN.

What "ignition delay" means is that we're pausing the ignition of the upper stage motor by that amount of time. It is like pushing the launch button on a controller, and it takes a few seconds for the igniter to heat up and start the motor burning.

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We need to do this because behind the scenes in RockSim, the trigger for the upper stage ignition actually occurs as soon as the ejection charge of the booster motor fires. The ignition delay feature allows us to build in some time before the thrust actually is produced in the upper stage.

So just keep these definitions and points in mind as you're setting up simulations:

"Delay time" is when the ejection charge fires. Normally it is when the parachute is pushed out of the rocket. But in a two stage rocket, this is the time from when the booster motor burns out to when the stages separate.

"Ignition delay" is the pause when the motor starts producing thrust. If you use ignition delay in a single stage rocket, the model just sits on the pad producing smoke, but no thrust (for giggles, try it in the Launch Visualizer at: www.Rocksim.com). But if you use it in the upper stage, this is how you force the rocket to coast upwards to create an air-start effect.

Separating Parts

The next thing to talk about is when and how parts are separated from the rocket. The only mechanism we currently have is an ejection charge of some sort. In the case of a parachute deployment, the event occurs when the delay of the motor is done burning. It is similar to when the booster stage separates from the upper stage - which also occurs when the delay is done burning. In a booster motor, such as an Estes D12-0, the delay is done burning at zero seconds. So it is immediately after the motor burns its propellant.

RockSim allows infinite customization on the delay time as shown in Figure 5. Instead of just picking from a list of delays, you can type in a delay value of any number you want. So you can trigger the separation of parts from the rocket at the time of your choosing.

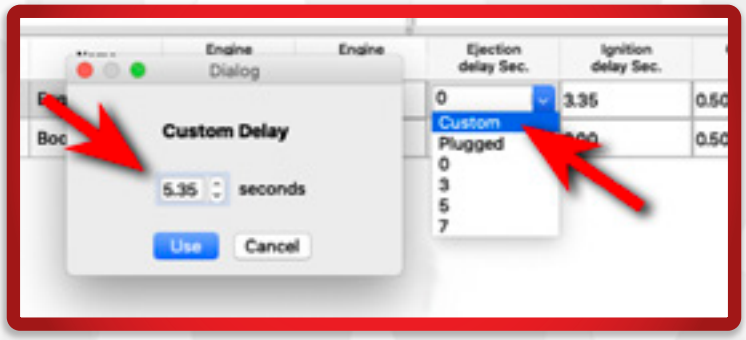

FIGURE 5: ROCKSIM ALLOWS ANY DELAY TIME FOR THE ROCKET MOTOR YOU WISH.

What does all this have to do with "fake" motors?

There are some launch situations where you can't trigger staging events to occur using either delay time or ignition delay features.

An example is an unpowered stage or pod that needs to separate from the rocket.

Because there is no motor in the part, it doesn't have an ejection charge to separate the part from the rest of the rocket. There is no triggering event to tell Rocksim that it is to fall away free.

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So how do we trick RockSim to seeing the part? The answer is we have to put a rocket motor into it. The motor needs a tiny bit of thrust, and an ejection charge to tell RockSim it separates from the rest of the rocket.

It can't be just any motor… it can't have any real thrust, because we want the part to remain unpowered. There isn't any motor like this in the RockSim database. The closest thing is the Quest Micro-Maxx motor which is a 1/8A size. But that still has thrust and weight so it will affect the trajectory of the pod.

But with the EngEdit software that comes bundled with RockSim, we can create a new "fake" motor.

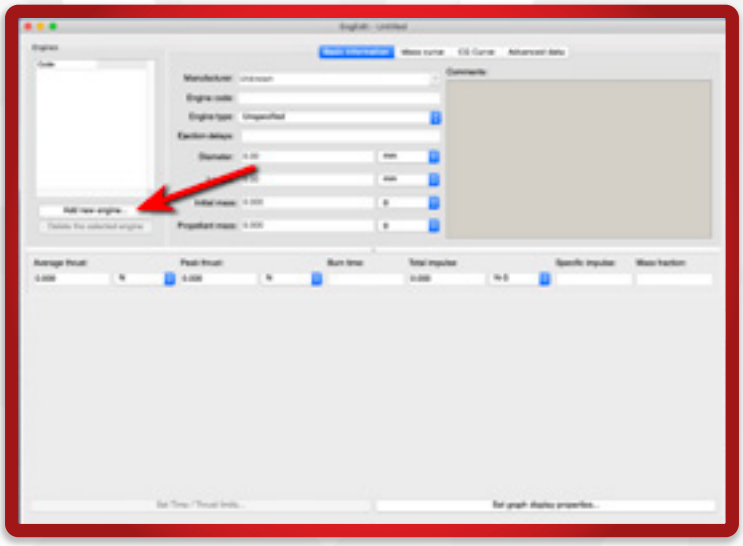

FIGURE 6: TO START A NEW MOTOR, BEGIN BY CLICKING ON THE "ADD NEW ENGINE" BUTTON ON THE LEFT SIDE OF THE SCREEN.

When you first open up EngEdit, you'll get a blank screen like shown in Figure 6. To start a new motor, begin by clicking on the "Add new engine" button on the left side of the screen. When you do, you'll get a dialog box that pops up to tell you to enter the maximum thrust of the motor, and the burn duration (see Figure 7).

In our case, we want to make the motor as small as possible. The motor will technically have some "thrust," but we can make it so small that it is negligible. That is what we engineers do… We know we can't make it "perfect" which in this case would be zero thrust. But we can make it "close enough" to zero that in all practical terms, it doesn't affect the simulation.

So to begin, we'll put in values of .1N for the max thrust, and 0.1 seconds for the burn time, as shown in Figure 7.

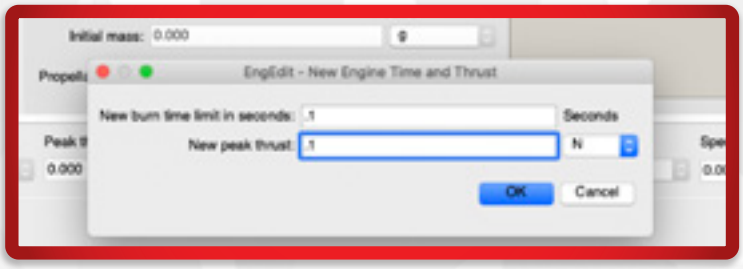

FIGURE 7: YOU'LL SET THE MAXIMUM THRUST AND THE DURATION OF THE BURN.

Once you click OK, the screen will update the graph axes for the thrust curve. If a thrust curve is not showing at this point, click on a point in the graph to create a placeholder thrust curve. We can then fine tune it to make it smaller, if we want.

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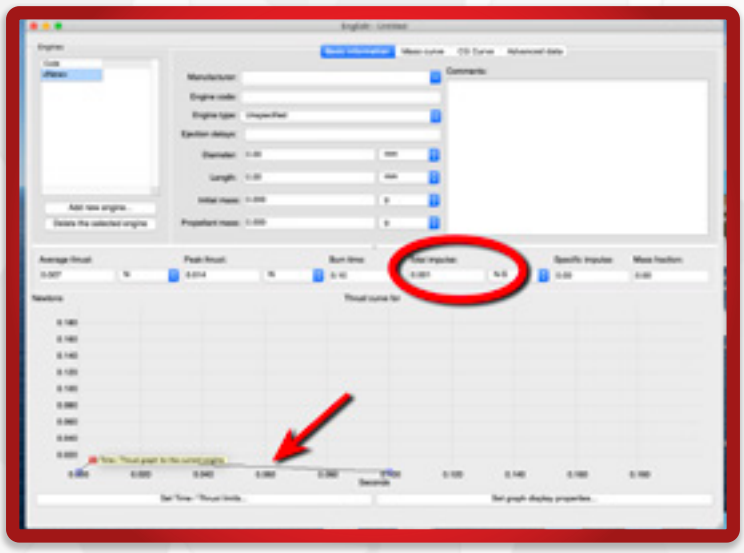

FIGURE 8: ONCE THE THRUST CURVE IS CREATED, THE ENGEDIT SOFTWARE AUTOMATICALLY CALCULATES THE TOTAL IMPULSE.

To do this, you'll go to the "View" menu and select the "Time ordered data." See figure 9.

The time ordered data screen is like a spreadsheet chart as shown in figure 10. In this case, our thrust curve only consists of three points. With the exception of the 0,0 point, everything can be reduced. And that is exactly what we'll do.

In this situation, I'll lower the peak thrust to 0.009, and the burn time to 0.06. When you move the Time-Ordered data screen off to the side, you can see that the total impulse calculated is now 0.000 N-s or close enough. It is so low that we're now at the point where can call it good. See Figure 11.

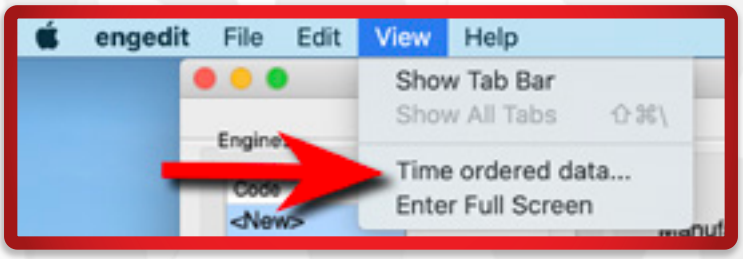

FIGURE 9: SELECT "TIME ORDERED DATA..." FROM THE VIEW MENU IN ENGEDIT.

Notice the total impulse is automatically calculated for this new motor based on the current thrust curve. In this case, it is 0.001 N-s. For comparison, the smallest NAR certified motor, the 1/8A MicroMaxx motor has a total impulse of 0.299 N-s. So at this point, we're pretty negligible.

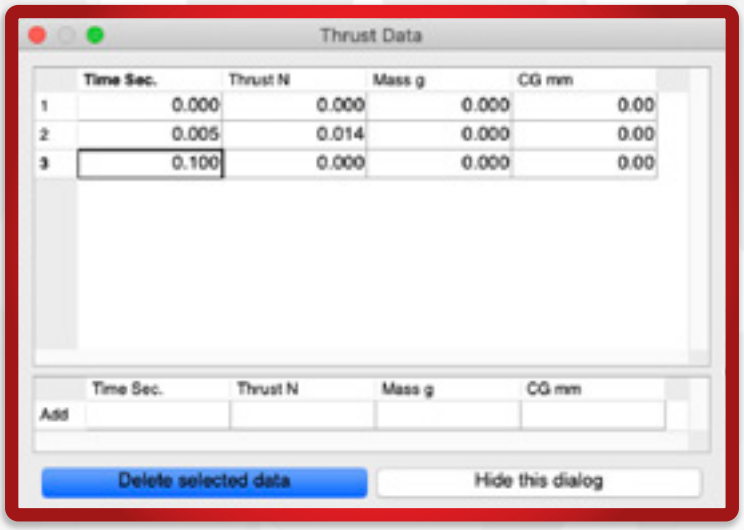

FIGURE 10: THE POINTS IN THE TIME-ORDERED DATA CHART CAN BE ADJUSTED TO REALLY FINE TUNE THE TOTAL IMPULSE.

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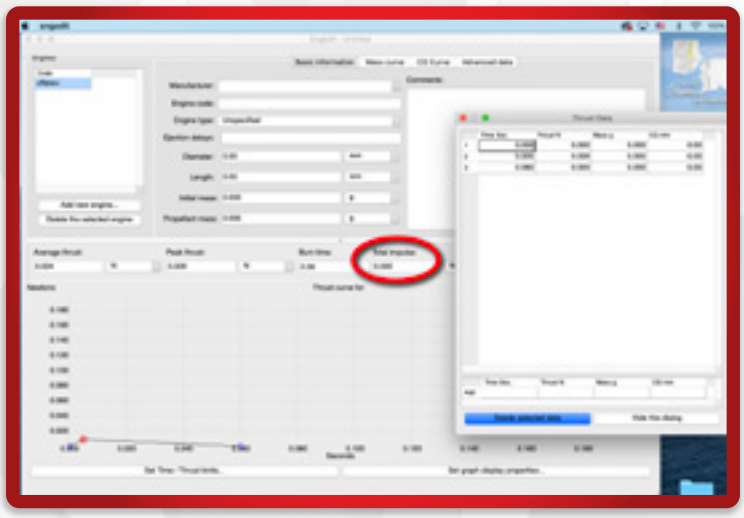

FIGURE 11: BY ADJUSTING THE POINTS, THE TOTAL IMPULSE HAS BEEN REDUCED TO A POINT WHERE IT IS NOW INSIGNIFICANT.

Our next step is to fill out the rest of the data for the motor, like the Manufacturer, the Engine code, the engine type, ejection delays, etc. You can see how I filled them out in Figure 12.

When choosing the Manufacturer and the Engine Code, you don't have to stick to the normal naming convention used in rocketry. You're probably the only one that is going to use the motor, so you can make it anything you want. In fact, I encourage you to name it something that stands out to you so you can find your motor in the charts when you select it in RockSim. If you use a manufacturer not in the list, it will show as "Unknown" in RockSim.

In my case, I assigned Apogee as the manufacturer, and then made the engine code "DART" because I planned on using this motor in a boosted dart rocket.

I also put two ejection delays in the motor, and also a P for plugged motor. With RockSim's ability to do custom delays, you really don't need to worry so much about the delays.

For the physical dimensions, the length and diameter are really unimportant. This is like a ghost motor anyway. What is important is the mass. We want to make it as lightweight as possible, so as you can see in Figure 12, I made the initial mass 0.4 grams, and the propellant mass 0.001 grams. The propellant mass has to be lower than the initial mass of the rocket. You just want it to be so low, that the fake motor won't really affect the flight. Again, we can't reach perfection, but we can be pretty close to where the motor doesn't make any difference.

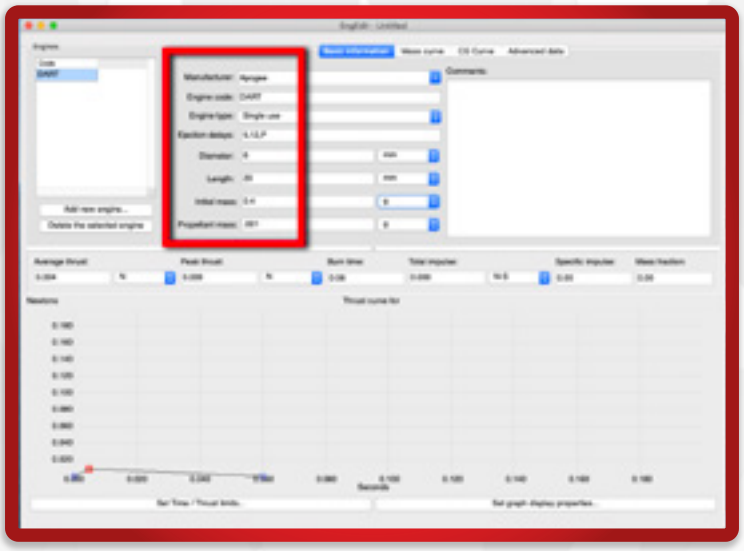

FIGURE 12: THE PARAMETERS FILLED IN TO COMPLETE THE MOTOR.

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With all the parameters filled in, we can save the motor file to our computer. The most important part about saving is putting the file in a place you can easily find it. Because of this, I typically put everything on my desktop. But the location doesn't matter at this point. It will be moved to a final location using RockSim. The other thing is making sure you remember the name of the file you are saving. See Figure 13.

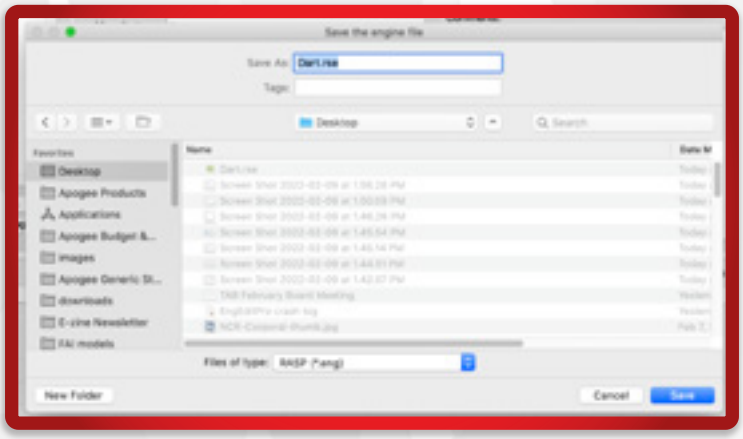

FIGURE 13: SAVE THE FILE TO YOUR COMPUTER. JUST REMEMBER THE FILE NAME AND THE LOCATION WHERE IT IS STORED.

At this point, you can close out of EngEdit, or at least minimize the screen because we are done with creating the motor file. You'll now launch RockSim.

In RockSim, begin by going to the file menu and choosing "Import / Engine Files…" as shown in Figure 14.

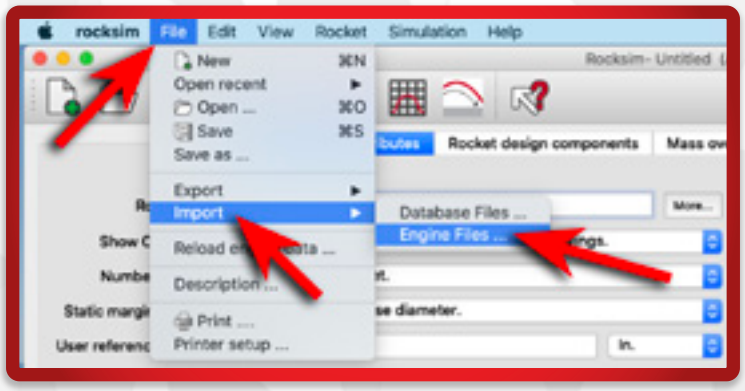

FIGURE 14: WHEN IN ROCKSIM, SELECT "IMPORT" AND THEN "ENGINE FILES" FROM THE "FILE" MENU.

When you do that, it will bring up a screen where you can select the new engine file you just created (see Figure 15). But you do have to remember where you stored it on your computer. So you may need to navigate to the location where the file was saved from EngEdit.

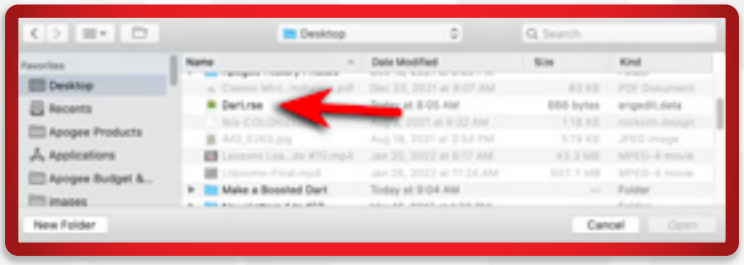

FIGURE 15: SELECT YOUR ENGINE FILE, AND CLICK THE OPEN BUTTON.

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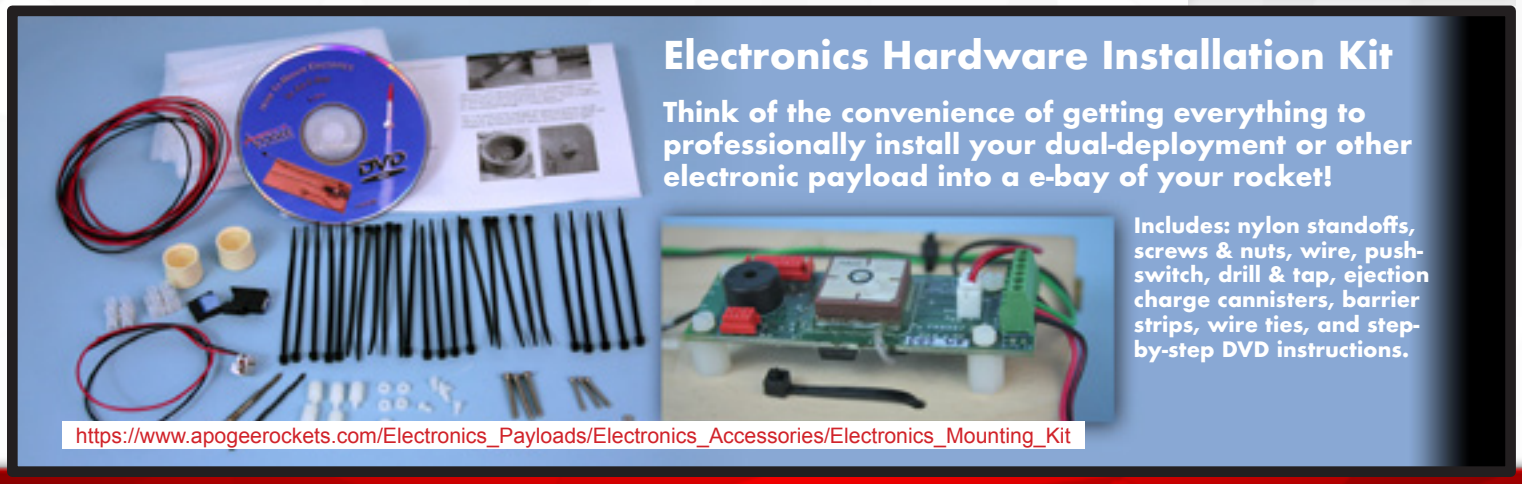

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Once you select the file, RockSim will make a copy of the file (leaving the original file where you saved it). When it copies the file, it saves it in the DATA folder, where all the other motor files are located. You'll get a little message as shown in Figure 16, saying the file was copied, along with the file path.

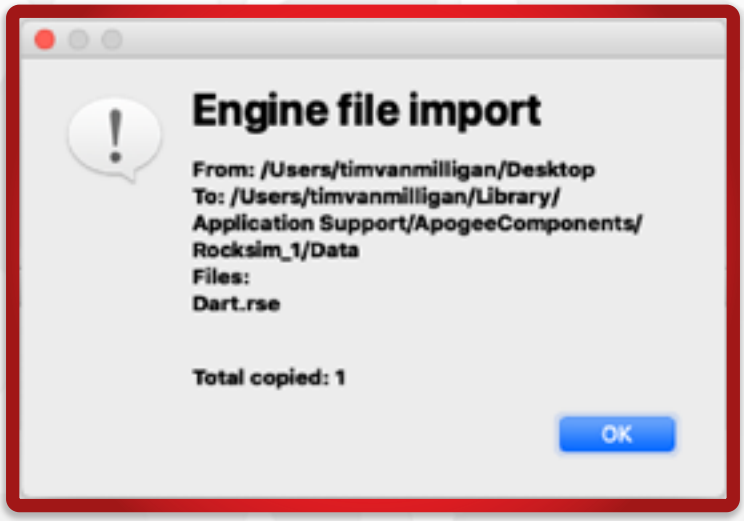

FIGURE 16: YOU'LL GET AN ALERT MESSAGE SAYING THE FILE WAS COPIED FROM THE ORIGINAL LOCATION, AND MOVED TO THE DATA FOLDER WHERE ALL THE OTHER MOTORS ARE STORED.

When you click on the "OK" button on the alert screen, RockSim will automatically open up the Import screen, as shown in Figure 17. This is the screen where you finally move the new engine file into RockSim itself. When you get to the screen, the file is still just stored on the computer, but RockSim hasn't been told to merge it into the motor database that it uses. So you have to select the new motor file that appears on the left-side column, add it over to the right side, and then click OK.

FIGURE 17: THE IMPORT MOTOR SCREEN.

At this point, the motor is ready to use for your simulations.

In Figure 18, I've opened up the Apogee Flying Machine design file (that comes as a standard design file when you install Rocksim v10. You can also download it

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from the Apogee website at: https://www.apogeerockets.com/Rocket-Kits/Skill-Level-4-Model-Rocket-Kits/Flying-Machine). This is a rocket with two strap-on booster pods that can detach during the flight when you put rocket motors in them.

But let's say you want to fly the rocket without motors in the strap-on booster pods, but you would still like the pods to fall away during the flight. This is a very complex simulation, and you can't do it in RockSim unless you have motors installed in the pods.

This is a very good use of our fake motor. Since it doesn't create any thrust, nor does the fake motor have significant mass, using the motors should not affect the upward trajectory.

So to confirm this, I first loaded a single motor (Aerotech E15-4) into the core portion of the rocket and ran a simulation. The result was that the rocket reached an altitude of 662.42 feet high.

Now I loaded the fake engines into the outer pods. I previously named the special fake motor "DART" -- which doesn't have any significance; it was just so I could tell it apart from other motors in the database. You can see this in Figure 18.

Notice that I had two different delays on the DART motors. One was 12 seconds, and the other was 8 seconds. So what should happen is that the first pod should fall off the rocket at 8 seconds, and the remaining one should fall off the rocket at 12 seconds into the flight.

FIGURE 18: THE NEW FAKE MOTORS ARE LOADED INTO THE STRAP-ON BOOSTER PODS OF THE FLYING MACHINE ROCKET.

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Since the motors have insignificant thrust and negligible mass, I fully expect the rocket to have the same upward performance as if there were no motors installed in the pods. So running the simulation and comparing the results against a sim with no engines in the outer pods, you can see the results in Figure 19. You'll notice that the altitude is about 1.4 feet in difference. I attribute this to the slight addition in mass of the rocket from the fake motors. But it is something that I can live with.

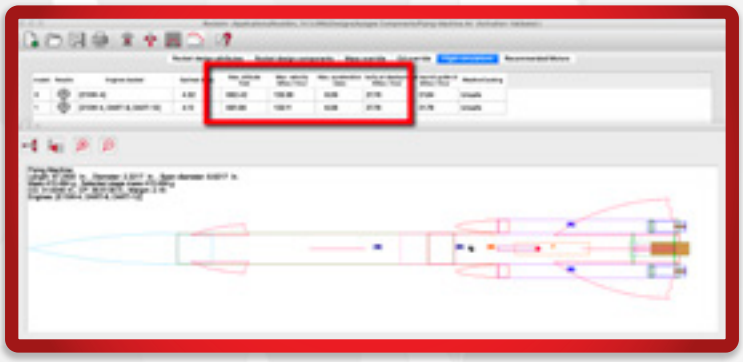

FIGURE 19: COMPARING THE TWO SIMULATIONS - THE PERFORMANCE, WHILE NOT IDENTICAL, IS PRETTY CLOSE.

But you can't see much from the simulation summary, right? That only tells us the upward performance of the rocket. It doesn't indicate that the pods fell off like we hoped.

To see some sort of an indication that the pods fell off, you have to go to the graphs, and see the proof there. In Figure 20, I've plotted the thrust and the mass of the rocket during the first 15 seconds of the flight. I chose 15 seconds because it is longer than the 12 seconds that we used for the delay charge of the second pod. Remember, the delay time controls when the pod separates from the rest of the rocket.

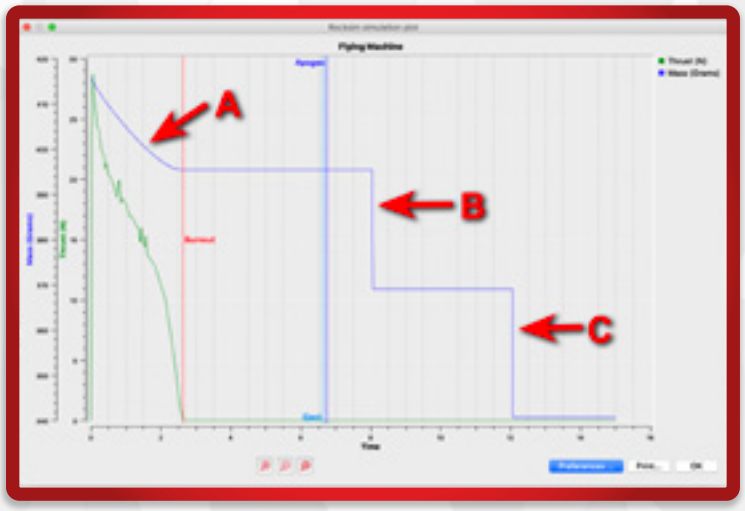

FIGURE 20: MASS VS TIME PLOT SHOWING THE TWO PODS FALLING OFF.

Looking at Figure 20, we can see the mass changes three times during the flight. At section "A," the rocket loses mass because the propellant is being consumed while the engine is under thrust. As soon as the motor burns out, the mass stays constant (it's a flat line) until 8 seconds. At that point, "B", the first pod drops off the rocket, and the core vehicle's mass gets lighter. The second pod falls off at 12 seconds into the flight, and you can see the rocket losing weight there as well.

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Where things get really interesting is if you run this same simulation in the Launch Visualizer (www.rocksim.com). Then you can see a 3D trajectory of the flight, and you can watch the pods drop off during the flight, as shown in Figure 21.

FIGURE 21: THE LAUNCH VISULIZER SHOWS THE TRAJECTORY OF EACH OF THE PARTS OF THE ROCKET DURING THE FLIGHT.

Conclusion

While this article used some trickery, what I wanted to show was that it is possible to get the results for some pretty advanced launch simulations. You have to think a little bit like an engineer, and instead of looking for a perfect solution, try instead for a "workable" result. It can usually get you close enough to draw some conclusions from your experiments.

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I've been thinking of how it might be possible to use the Launch Visualizer to perform some Boost Glider flights, and this might be one way to do it. In a boost glider, like the Mini Condor kit (https://www.apogeerockets.com/Rocket-Kits/Glider-Rockets/Mini-Condor-Boost-Glider), there are two parts that are attached together. One is powered, and the other is unpowered and needs to separate at a specific time in the flight. I haven't tried it yet, but it may be possible to use this fake motor technique on the glider section. It would fall off at a certain time, and then maybe we could see it glide in the Launch Visualizer. Maybe you'll try it before I find the time to get to it. If you do, let me know what you discover.

About The Author:

Tim Van Milligan (a.k.a. "Mr. Rocket") is a real rocket scientist who likes helping out other rocketeers. He is an avid rocketry competitor and is Level 3 high power certified. He is often asked what is the biggest rocket he's ever launched. His answer is that 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 an 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 also the author of the books: Model Rocket Design and Construction, 69 Simple Science Fair Projects with Model Rockets: Aeronautics and publisher of the "Peak-of-Flight" newsletter, a FREE ezine newsletter about model rockets. You can email him by using the contact form at https://www.apogeerockets.com/Contact.

Launch Visualizer is Here!

LAUNCH VISUALIZER™
A PRODUCT OF ROCKSIM BY APOGEE COMPONENTS

The Launch Visualizer™, which Apogee released on Friday, February 11, 2022 was a project that took two years of development to accomplish. And we invite you to try it out by going to the website: https://www.RockSim.com

You might be wondering, what does the Launch Visualizer do? And why should you even give it a try?

The reason I created the Launch Visualizer was because I saw people over-relying on a "peak altitude" number from either RockSim, or some other rocketry simulator.

The question I always had for them was: "Does a peak altitude number tell you the whole story of the launch?"

If someone described the launch of their last rocket to you, and only said: "It went 550 feet high," do you think you could say if it was successful? How would you know that the rocket didn't go unstable? How would you know if it arced over severely into the wind (called weathercocking)? Could it have gone even higher?

Of course you couldn't make any assumptions about the launch based on a simple peak altitude number. But that is exactly what a lot of rocketeers are doing.

FIGURE 22: DOES THIS TRAJECTORY LOOK OK TO YOU?

When simulating a launch, you should be more interested in the path the rocket takes than just the peak altitude it reaches. You're not getting the full story of the flight from a "number." You can only get the entire story of the rocket, if you can actually see the launch and compare it to the mission you have envisioned for it.

That is where the Launch Visualizer is so important to your rocketry success. It shows you the flight path and how the rocket reacts along the entire trip, from lift-off to touchdown on the ground. It allows you to be more successful, and get more of your rockets back so you can fly them again and again.

Isn't that information already in RockSim in the 2D flight profile? To a small extent, it is. But even the 2D flight profile doesn't tell you the full story, because it limits the rocket's trajectory to a single plane. The rocket is a flat object that is limited to three degrees of freedom. It can only go 1) Up/Down, 2) Upwind/Downwind, and 3) Pitch into the wind or with the wind.

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In order to get the full story of the rocket's flight, you also need to see three other degrees of freedom, which are: 4) Moving in the cross wind direction, 5) Yaw rotation to either the left/right, and 6) Roll around the long axis of the rocket.

The Launch Visualizer does all 6-degrees of freedom, so you get the full story of how the rocket flies when you launch it. But there's more to it than that.

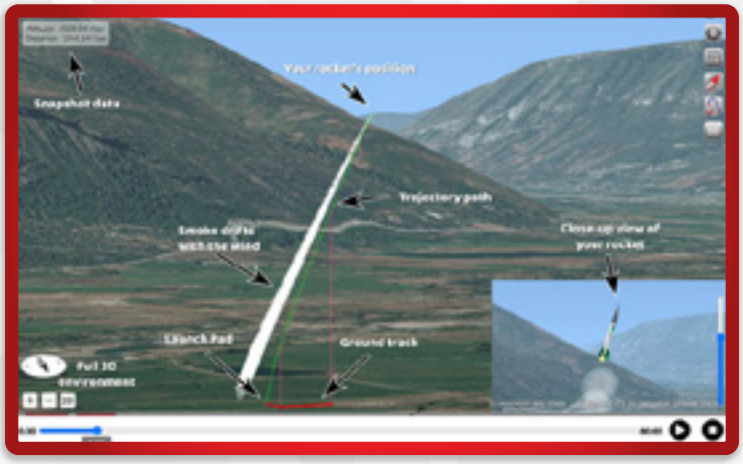

FIGURE 23: THE MASSIVE AMOUNT OF INFORMATION YOU GET FROM THE LAUNCH VISUALIZER WILL HELP YOU BETTER PREDICT IF YOUR ROCKET IS SUCCESSFUL.

You also want to see where the rocket is in relation to the launch pad. And it is not just any pad location, it is where YOU put the launch pad on your launch site. Where you launch the rocket from on your field makes a huge difference to you, right? You normally launch in a location that gives you the greatest chances of recovering the rocket, and for the safety of any spectators or other participants.

So "THAT" is why you should use the Launch Visualizer. It gives you the complete story of your rocket's flight, so that you can maximize the success of your launch.

But there is more…

We originally built the Launch Visualizer into RockSim-Pro. But we are looking into the future, and we are seeing the rapid approach of the end of desktop software. People want to run simulations from their smart-phones, tablets, and Chromebooks. They don't want to be tethered to a computer that is at the mercy of Microsoft and Apple. Whenever those companies release a new operating system (which happens almost yearly), the new version seems to break all their programs. Staying compatible with the latest operating system is a logistical nightmare for computer owners.

So to solve this problem, the Launch Visualizer is cloud based. What that means is that it is run from any web browser. Whether it is your phone, tablet, chromebook, or desktop; if you have an internet connection, you can use

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the Launch Visualizer. And getting connected to the internet is getting easier every day thanks to high speed internet, 5G, and satellite based internet networks. It won't be long before every remote launch site on the planet has access to high speed internet.

Being cloud based is also an advantage for schools, as they don't have to worry about the issues of deploying software over a network, or security concerns with giving students access to storing data on the schools' computers. They just get a username and password for the students, and let them do their work from any web browser.

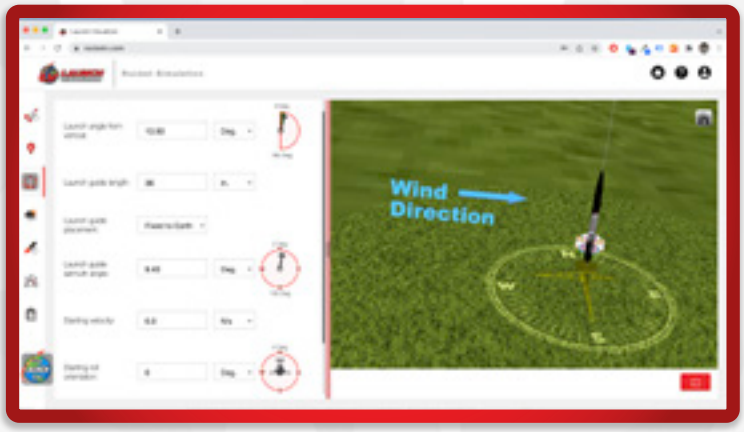

FIGURE 24: SETTING UP THE LAUNCH IS INTERACTIVE AND IN 3D.

Another feature of the Launch Visualizer is the ability to share your simulations with others. So say for example, you run a simulation and when you view the flight in the 3D environment, you notice something unique that amazes you (which you'll find is actually a common occurrence). You say to yourself, "I think my friend should see this." Now in the Launch Visualizer, there is a button that allows you to share the simulation. It generates a specific URL that you can send over to your friend or post on your favorite social media channel. When the recipient clicks on the link, they'll see the exact simulation that you just saw yourself. YES… in an 3D animation, from the exact launch site you chose for the rocket. It would be just like they were sitting next to you watching the same thing you see on your screen.

Just think of the ways you can use this as a training aid to teach others about rocketry. If a picture is worth a 1000 words, just imagine the value of seeing a video of the launch.

I think that is going to be a new reason people will want to use the Launch Visualizer -- "training." People are always asking me for ideas on how to "present" the subject of rocketry to a new group, like boy scouts, Civil Air Patrol, or for some other corporate group. Instead of using a static power-point presentation, you can make it dynamic and live-action by showing exactly what the launch will look like. And then you can say to the group, "let's see what happens to the flight if I make this change, such as angling the rocket further over, or modifying the wind direction." And since it is cloud based, you can use any computer (or device) that has a connection to the internet, so you can do your rocketry presentation anyplace, any time. The value to people that do presentations is utterly tremendous.

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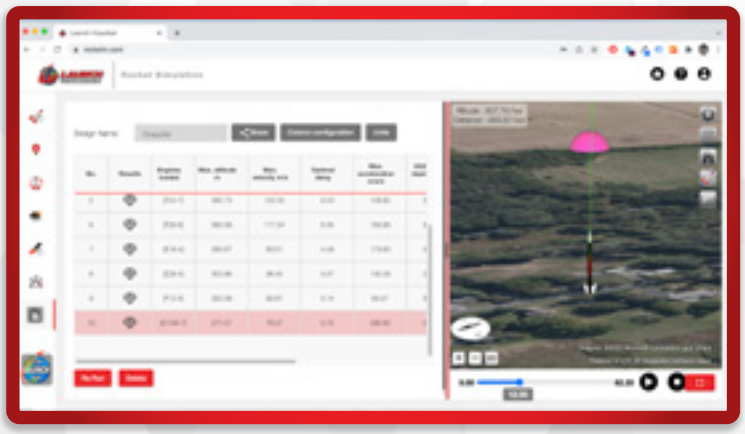

FIGURE 25: SHOW THE RESULTS AND A LIVE VIDEO OF YOUR FLIGHT ON THE SAME SCREEN.

What Are the Limitations of the Launch Visualizer?

The main limitation is that the Launch Visualizer only runs simulations. It doesn't allow you to design or modify the physical aspects of a rocket. In order to do that, you'll need RockSim.

In order to run a simulation, you'll need a RockSim design file of the rocket. This design is simply uploaded to the website with the simple user interface on the website: www.RockSim.com.

What if you don't have a RockSim design file? No problem. There are thousands of free rocket designs already on the internet. People have been using RockSim for 20 years and have been uploading their designs to numerous websites. A lot of kit manufacturers also make RockSim files available at no cost on their websites as well. You'll find that almost all of the rocket kits on the ApogeeRockets.com website have RockSim files that you can download for FREE.

There is very good chance that the rocket you wish to simulate is already in the RockSim format. All you have to do is a quick internet search to find it. Just go to your favorite search engine and type in the name of the rocket kit along with the phrase "RockSim file."

Future of the Launch Visualizer

When I started the Launch Visualizer project, my goal was to take all of RockSim, and put it into the cloud. That way rocketeers could design and simulate their rockets all in one place. But unfortunately, that project was just too large and complex. My programmers told me that it would take significantly more money and time for that to happen. So the Launch Visualizer was the smaller scale project that we started with.

My thought was that if we could do the simulation part of the program first, we can add the design portion later. And that is the overall plan -- to migrate everything that RockSim and RockSim Pro can do, and put it into the cloud. But we're not there yet.

Just doing the simulation part of RockSim in the cloud took two years to accomplish, by a team of programmers working full-time on the project. I don't see putting the design portion into the cloud happening faster. It is actually an order of magnitude more complex. And we haven't started that yet. When will we start? At this time, I don't know. We'll see how users like the interface of the Launch Visualizer and if they are willing to use it. That is the ultimate test anyway.

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www.apogeerockets.com/Rocket-Kits/Skill-Level-2-Model-Rocket-Kits/SkyMetra

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FIGURE 26: SELECTING ROCKET ENGINES IS JUST LIKE YOU'RE USED TO WITH ROCKSIM.

Three Types Of Memberships

There are three levels of membership in the Launch Visualizer at RockSim.com. Two of them, the "demo" and "basic" membership, are both free! The demo is for people that just want to kick the tires and see a few launches. It is for people who want to try it without giving up their email address. But the downside for the trial is that you can't upload designs - you can only use the few sample design files on the website.

We need an email address in order to designate server space for you to save your own design files. So that is the big difference between the trial and the basic membership. In the basic membership, you can upload your design, and also have access to larger rocket motors.

The "Premium" membership allows for even more control of your simulations, like being able to see the entire trajectory from lift-off to touchdown. You can also launch rockets in any direction and use higher powered rocket engines. Plus you have significantly more room to save lots more designs and simulations to our servers.

I invite you to try it out right now while you're thinking of it. I think you'll really see the value of it as soon as you see the rocket lift off and blaze a trail up into the sky.

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