ISSUE 163 - JULY 14, 2006

APOGEE PEAK OF FLIGHT NEWSLETTER

Getting all you can out of Rocksim's 2D Flight Profile

INSIDE:

- What Can the 2D do for you?
- Parachute Folding Tip
- Rocketeer Serviceman Web Site
- Adapting a Motor Mount for Multiple Motors

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

How Rocksim's 2D Flight Profile Can Help Your Flight Evaluations

by John Manfredo

2D Can Help You

If you haven't explore the possibilities and usefulness of Rocksim's 2D Flight Profile feature, you are missing out on a great feature of this program! The "results" screen gives you a basic quick glance at a simulation with you rocket, but the 2D feature provides you with a lot of information you may not see other places. There are many bits of information that can be gleaned from the flight profile and space is limited, so we will concentrate on some top ways that you can benefit from using this part of Rocksim.

Let's begin by looking at a simulation that I have already run and am now delving into a little deeper. In figure 1 you can see that you are able to confirm staging in a rocket by setting the smoke effects to have a different color for each stage. This helps to confirm that staging did occur and what altitude the rocket was at when this happened.

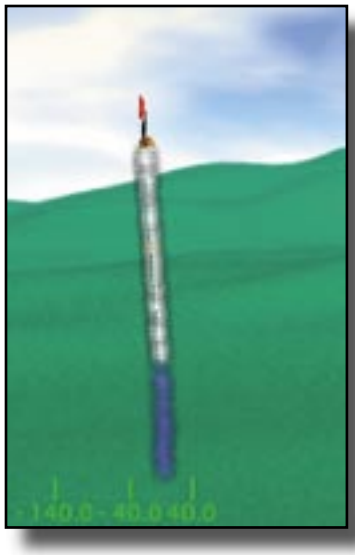


Figure 1

Also, if you click on the details button, you will be able to tell what speed the rocket was at when staging occurred. Why is this important? Let me give you an example. Let's say that you are using a timer to ignite the top stage of a rocket. You will want to make sure that the timer is going to be set properly so that the top stage of the rocket ignites when the rocket is moving at the proper speed. If it is going too fast, the top stage may be whipped and thrown off course. If it is going too slow, the top stage may have trouble gaining the momentum that is needed to fly straight.

Burning Out

The next scenario is that you have the ability to see a representation of the distance between burnout of the top stage and apogee and/or deployment. In figure 2 at the right you will see this clearly.

This comes in handy since you are able to immediately see if there is enough of a delay between burnout and apogee/deployment so that the recovery device is not moving too quickly and ripping itself apart.

In this instance, it also tells you that the booster stage fell free and tumbled back down safely to the ground. In both figures 1 and 2 I have set the smoke trails of the two stages to have separate colors so that it is easy to see when the staging occurs.

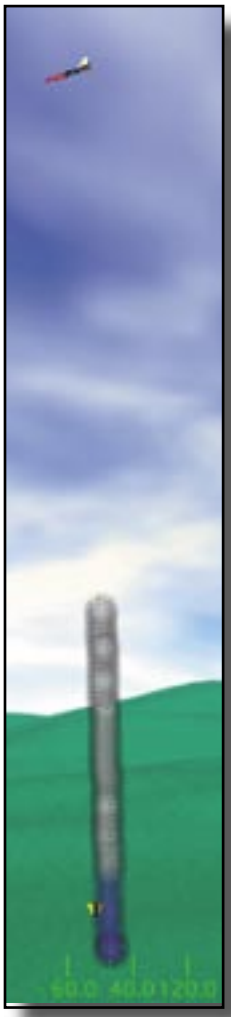


Figure 2

Figure 3 shows the screen that allows you to do this. It is lo-

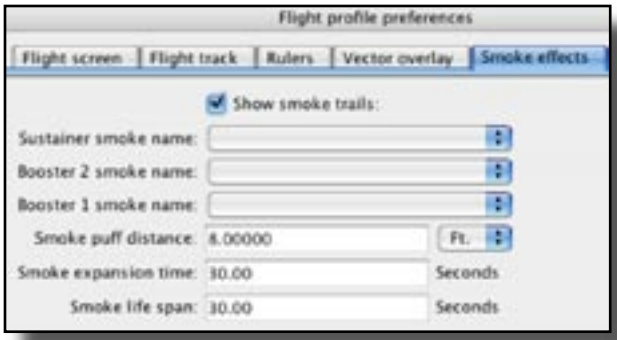


Figure 3

continued on page 4

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.

First Annual Apogee Components' Rocket Photo Contest: "Fun With Apogee Products!"

Apogee Components, Inc. is pleased to announce its first annual rocket photo contest!

CONTEST RULES

1. The products in the pictures should be any items that we sell on our website, whether it be kits (Apogee or otherwise) or scratch-built rockets using our parts. The key is that they must be items that we sell on our webstore.

2. The pictures should include people with the rockets and may be adults, children, and anybody in between. You may enter more than once!

3. The photos should show some kind of action in them. Examples of this would be rockets taking off, customers setting up rockets on pads, people waiting and watching for the rockets to take off, etc. Photos that would not be a good choice are those that simply have customers or kid simply holding a rocket.

4. Pictures should be sent by e-mail to johnm@apogeerockets.com. They should be as high of a resolution as possible for good photo quality.

5. By submitting a photo you grant permission to Apogee Components, Inc. to post your photo on our website. Your photo may or may not be used on the web.

6. The photos need to be submitted by July 14, 2006 in order to be eligible.

While this is very cute, we'd like to see action shots!

PRIZES

First Place: Full Version of Rocksim 8.0 (a $99.95 value)
Second Place: Building Skill Level 2 CD (a $21.15 value)
Third Place: Building Skill Level 1 CD (a $14.78 value)
Honorable Mention: Everyone walks away a winner with Apogee!
All other entries will receive a special mystery prize!

cated in the 2D Flight Profile screen and is accessed by selecting the "Preferences" button. Then you may click on the "Smoke effects" tab and you will see the blue pull-down arrows on the right that allow you to choose the colors of smoke for the different stages. Make sure that you "check" the box so that Rocksim recognizes the smoke selections.

You may also alter the smoke puff distance, expansion time, and life span. This will come in handy because it will let you see what direction the wind is blowing in a given simulation. That way, you have a better visual for how the rocket performs in those conditions.

Figure 3a

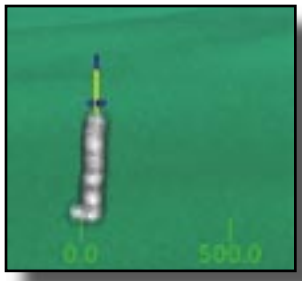


Figure 3b

Got Wind?

While we are on the subject of windy conditions, let's talk a bit about launch angles in the wind. The 2D feature will help you decide what angle to launch at as well as whether to launch into the wind or with the wind. After you have set the wind speed and angle as I have in the launch prep screen, you will see the differences. In both simulations I have set the conditions to "very windy". In figure 3a I have the launch angle set to 20 degrees with the wind. As you can see in 3b, the rocket weathercocks into the wind and flies fairly straight. The downside of this is that the rocket winds up drifting quite a ways down range. There is a possibility that the rocket will be lost and you will be "hoofing it" for a while to retrieve it!

Figure 4a

Figure 4b

On the other hand, as seen in figures 4a-c, launching the rocket 20 degrees into the wind presents its own set of problems. Now you have a rocket that takes a trajectory almost too close to horizontal for my liking! The rocket heads a long way up range from the pad. The upside of this scenario, if the model doesn't take a hard turn into the soil, is that by the time it is done drifting down range you won't have to wear out the sneakers too much. It ends up landing close to the pad. This is a judgement call you would have to make for yourself. Personally , I would bring the laptop to the field and run simulations with the current conditions prior to launch. I would probably opt to launch with the wind for a straighter flight and have to walk a ways rather than risk a crash.

Figure 4c

Details, Details....

Another great feature that is included within the 2D Profile is that of the "Details" screen. The button is located on the main 2D screen and will pop up on the right

x-Acceleration	0	Gees
y-Acceleration	0.925	Gees
Acceleration Total	1.142	Gees
x-Acceleration Total	1.139	Gees
y-Acceleration Total	-0.072	Gees
Velocity	23.181	Miles / Hour
x-Velocity	20.362	Miles / Hour
y-Velocity	-11.079	Miles / Hour
Mach number	0.0308438	
Altitude	1138.35	Feet
Range	-1027.64	Feet
Cd	0.75	
Drag force	2.2654	N
x-Drag force	2.79173	N
y-Drag force	2.2654	N
Longitudinal moment of inertia	1411.69	Ounces-Inches^
Radial moment of inertia	6.47835	Ounces-Inches^
Flight angle	90	Deg.
Gamma - Velocity tangent angle	-28.547	Deg.
Wind angle of attack	0	Deg.
CG	23.114	Inches

Figure 5

continued on page 5

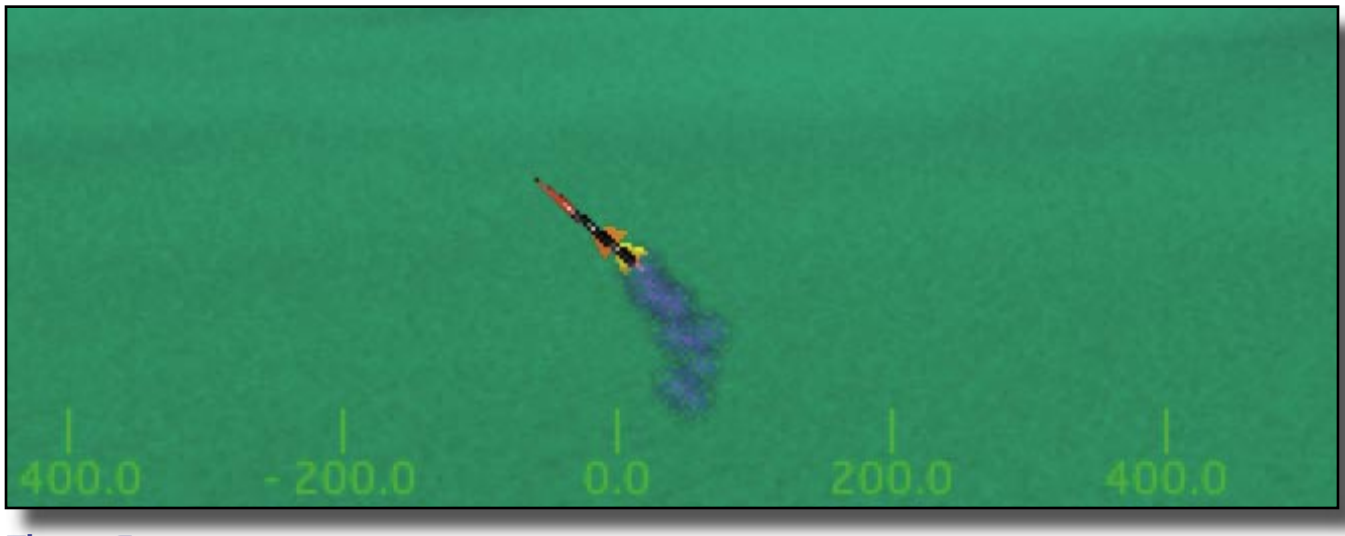


Figure 6

side of the animation. It will start running when you play the simulation and will give you a real-time readout of all the details of the flight. You will be able to see at any given time in the flight of the rocket what the speed is, the altitude, velocity, etc. It will also show how the center of gravity changes in relation to the center of pressure so that you will know if the model stays stable during its entire flight. Then changes can be made to the design prior to flight and, more importantly, prior to building. Avoiding costly mistakes is a big feature of Rocksim! The possibilities are endless with this software!

Don't Get Off Track

Last, figures 6 and 7 illustrate how launching into the wind with a 2-stage rocket would look. The more you increase the angle, the more likely it is that the upper stage will be in a compromising horizontal position when staging happens. This would bee similar to the aforementioned situation with the single stage design we looked at. In the case of a multi-stage rocket, however, the odds increase that the model will not be in a very vertical trajectory when the sustainer lights. This could lead to a dangerous situation and is easy to avoid by using Rocksim. You'll find out the problems before actually flying. *Rocksim is the way, to be able to fly another day*.

If you would like to try this software out please visit http://www.apogeerockets.com/rocksim_demo.asp to engage in the demo for 30 days! Once you experience the power and usefulness of Rocksim, I guarantee that you will agree there is nothing else out there like it in any other country in the world!

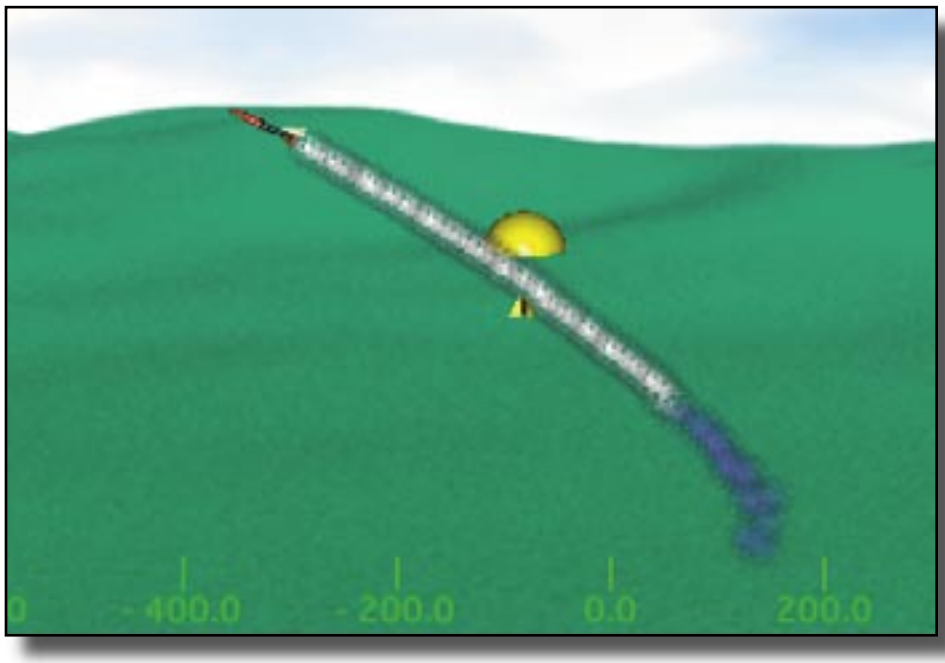


Figure 7

APOGEE'S SIZZLING SUMMER SPECIAL!

By subscribing to the Peak of Flight Newsletter, you are priviledged to be the first to hear about the new Dynastar Sky Torpedo! This is the first DynaStar kit to use the BT-80 size body tube. We'll be releasing it officially later this summer (everything but the color packaging is ready to go). We are offering it to you as a summer special along with the Apogee Blue Streak! It is a perfect combo-package deal; one rocket for dad, one for lad!

Best of all, if you order now we will give the set a 5% savings off the regular price!! The only thing hotter than this deal is the summer heat!

+

5 % SAVINGS!!

You'll get:
1 Dynastar Sky Torpedo ($41.95 value)
1 Apogee Blue Streak ($9.47 value)

For the low price of $48.85 (a saving of 5 %)!

Act Quickly, this offer ends July 31, 2006

To order, visit:
www.ApogeeRockets.com/Sky-Torpedo.asp

RockSim: The Software That Lets You Design Amazing Rockets!

FREE demo version. Download it today.

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

Launch Success Begins with RockSim

- ***Dream It***
- ***Design It***
- ***Simulate It***
- ***Build It***
- ***Fly It.***

CERTIFICATION SPACE EDUCATIONAL PRODUCT™
Space Foundation certified as an excellent teaching aid.

ROCKSIM

www.RockSim.com

For further information, call Apogee Components at: 719-535-9335.
Mention this ad for a free CD-ROM of RockSim how-to videos.

TIP OF THE FIN

There are many good parachute folding techniques out there and this tip shows one way that seems to work well fairly consistently. I'm sure it originated somewhere, but the place is unknown (who knows, someone may claim it after reading this!).

Photo 1

Begin by flattening the chute in half as shown in photo 1. This will help get any trapped air out of the canopy so that it packs and fits better in the rocket body. Next, you will take the top point of the parachute and fold it down until it is even with the bottom or outer edge of the canopy (see photo 2). This begins the process of compacting the 'chute down so that it fits loosely in the tube. The next step is to gather the shroud lines together and lay them on top and in the middle of the canopy that you previously folded down on itself. This is shown in photo 3 at the right. In photo 4 you will see that you may now go ahead and fold the right and left sides of the canopy in towards the middle. Last, but not least, start at one side of the parachute and roll it up like a cigar as shown in photo 5. When you insert it into the rocket, stick the loose shroud lines in first followed by the 'chute itself. If you need some parachutes to try this technique on, please visit http://www.apogeerockets.com/parachutes.asp and choose from a variety of beautifully colored parachutes!

Photo 2

Photo 3

Photo 4

Photo 5

QUESTION AND ANSWER CORNER

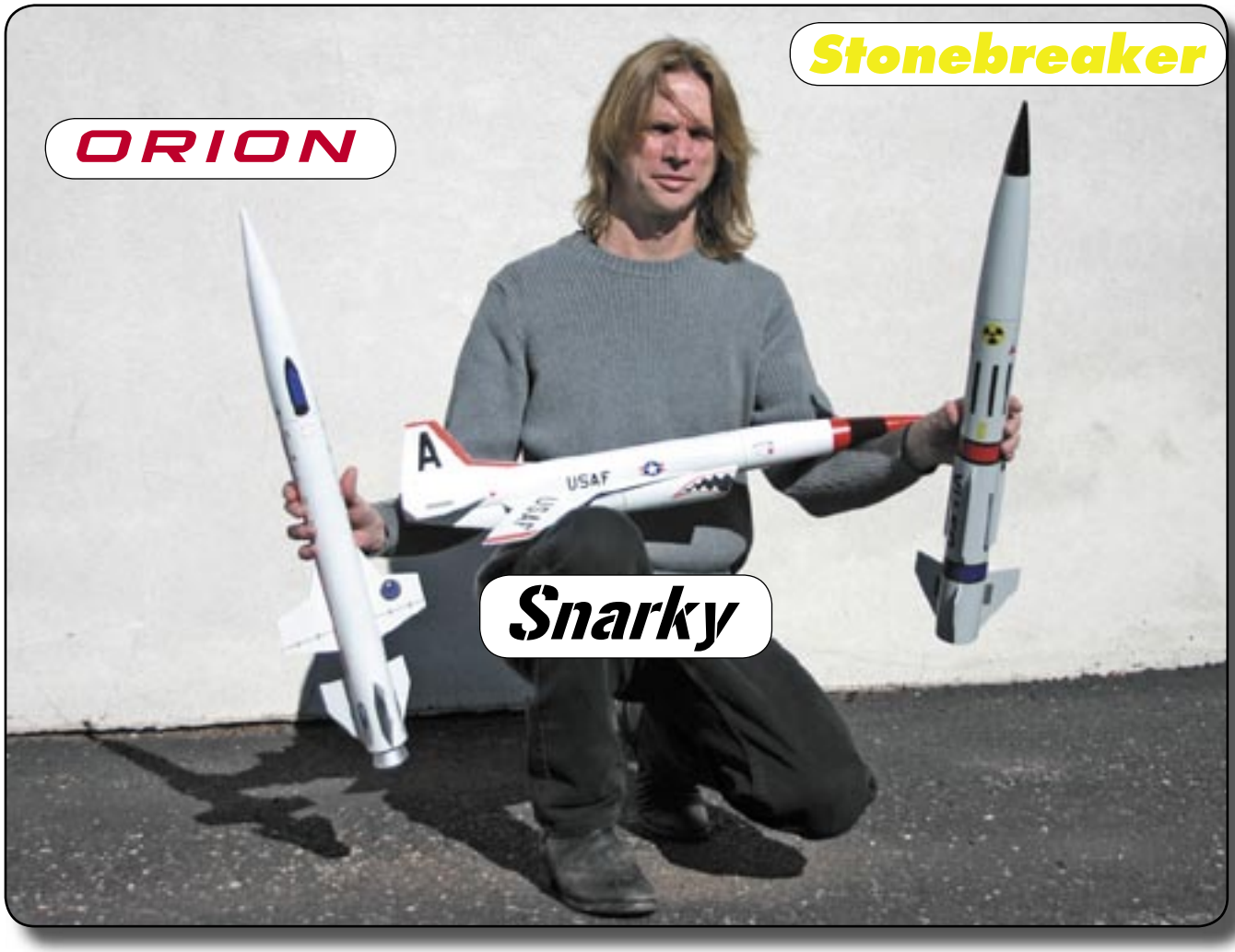
The question for this issue comes from Jeff Heberling and has to do with Snarky engine selection. Jeff says, "I just received my Snarky kit. The engine mount tube instructions has you sizing it for a 2 3/4 in or 3 3/4 in engine lengths. If I select the 2 3/4in size can I shoot the longer engines by just letting them hang further out? If I choose the 3/34 in size is there an adapter or can I make an adapter to shoot the shorter engine? I would cut off a used engine to fit. I am hoping not to have to choose one or the other."

Jeff has a couple of different options. First, it depends if you have the rocket already built or not. If you don't, then the answer is easy. I would just leave the engine block out. Then you would be able to adapt the motor tube to accept different lengths of motors. You would just build up a ring off tape on the end so that the motor has its own thrust ring that acts as an engine block. This is the same function that the larger aft closure on reloadable motors has (see photo at right).

Then you insert the motor as normal and tape it to the motor tube. This will prevent the motor from moving up or getting kicked out at ejection.

The other option is if you already have the rocket built. You would take a dowel and try to knock the engine block loose and remove it. Then continue with the rest of the first option.

If you have a question regarding rocketry, send it to johnm@apogeerockets.com, and I will do my best to find the answer for you!



Dynastar IS

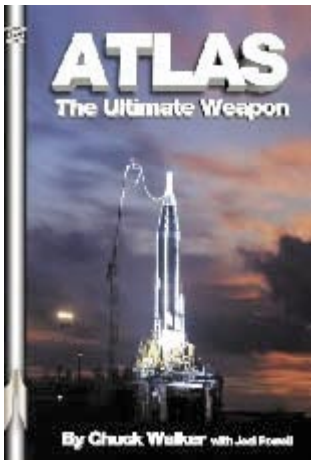
DYNA STAR
Mid-Power Rockets

Mid - Power Rocketry!

SHROX DOES ROCKETS!

Shrox stopped by for a visit while passing through Colorado and, as shown in the picture above, he practices what he preaches. He designs them and he flies them! From left to right, the Dynastar Orion, Snarky, and Stonebreaker are the preferred choice of one of the premier designers and artists of the day!

If you would like to own a piece of his futuristic world, please visit the Dynastar website at http://www.dynastar-rockets.com. You'll find these three kits there as well as two others and a choice of 24, 36, or 58-inch Dynastar nylon parachutes in brilliant colors!



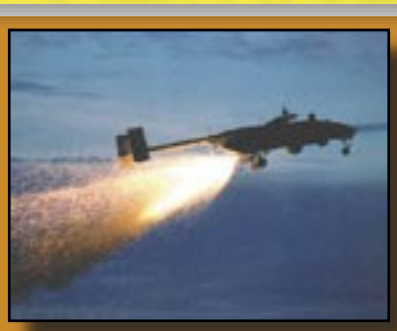
If you want to build ***REALLY*** big rockets try these two great books from Apogee Space Books

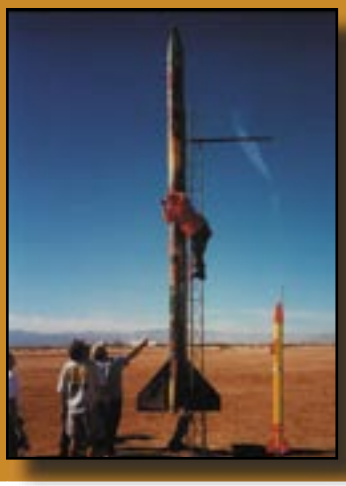
www.apogeebooks.com
905 637 5737

"Apogee Books" is not affiliated with Apogee Components. But they do sell some nifty space books, and we do recommend them.

WEB SITES WORTH VISITING

I would like to honor a serviceman and fellow rocketeer who was in Operation Iraqi Freedom. This issue's website worth visiting is J. E. Thompson's at http://rocketaholic.blogspot.com/. This site is a blog and has a lot of good information and along with links to various subjects that are rocketry-related. He is a Marine who is involved in UAV squadrons. UAV meaning Unmanned Aerial Vehicles. They are primarily used for Reconnaissance Surveillance and Targeting Acquisitioning, or RSTA for short. They are also used to adjust for artillery on the enemy. There is some rocketry when it comes to deploying the Pioneer UAV plane. It can be launch one of three ways. A rolling take, catapault launch from the back of a truck trailer, or rocket assisted which is the coolest way to launch them. It does not require much area to launch them with a rocket motor. J.E. says, "My site is mainly focused on Space Interests, meaning anything from Space History, Human and mechanical. I am a real model and High Powered Rocket enthusiast. I also love music and other interests. I grew up near the Johnson Space Center and the interest in Space has stayed with me ever since. I have been in the military since 1987." He seems to have taken a liking to Q-Modeling kits such as the Nike-X. If you would like to purchase this mid-power kit, please visit our webstore at http://www.apogeerockets.com/Q-Modeling_NikeX.asp. J.E. thinks highly of us; as he says, "I think Apogee is one of the best companies around when it comes to educational products and software. Practically everyone I know in the hobby has used RockSim software." The weekend before he was deployed he was able to launch his big rocket. It was 23 feet tall and 12" in diameter. The center 98mm and the outboard 54mm motors reached an altitude of 12,357 feet.

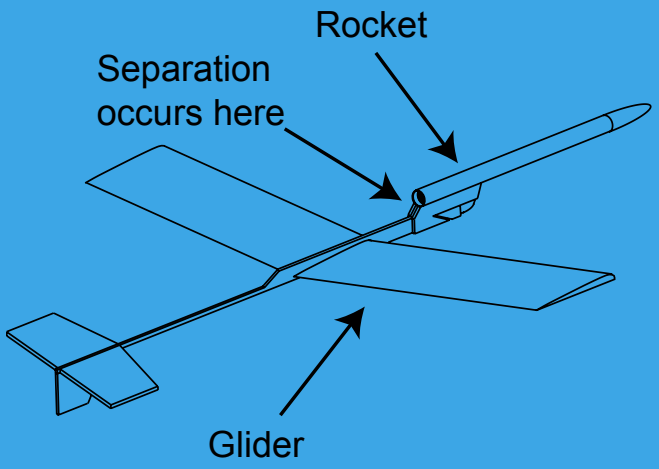




Thank you for the blog J.E.! We here at Apogee bid you a salute and thank you for serving this country!

DEFINING MOMENTS

A ***Boost Glider*** is a glider which is boosted to altitude by a rocket motor. The pod containing the expended motor may separate from the glider at ejection to be returned by streamer or parachute (see illustration at right). The more aerodynamically clean glider section is then free to glide more slowly. Gliders accomplish more than typical sport rockets and give extra excitement to a rocket flight. Moreover, the added complexity of these models creates additional challenges to the rocketeers who want to expand their skills into other areas of aeronautics. The glider has two phases of flight; boost and glide, and it must be aerodynamically stable in both phases. During the flight, the CG must switch from being forward of the CP during the boost phase to being in the same location as the CP for a stable glide. This shifting of the CG is the key to successful glider operation. If you would like to try this form of rocketry out, we have the Quest "Q E-Z Glider" available for purchase at http://www.apogeerockets.com/Quest_Q-EZ_glider.asp. It is rated to boost to 500 feet and glide for up to 2 minutes!



Boost Glider Illustration from Model Rocket Design and Construction www.apogeerockets.com