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PEAK OF FLIGHT

NEWSLETTER

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Cover Photo: Mad Cow 4”-Dia. Nike-Smoke rocket kit.
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3355 Fillmore Ridge Heights
Colorado Springs, Colorado 80907-9024 USA
www.ApogeeRockets.com e-mail: orders@apogeerockets.com

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Build The Condor Boost Glider

Chris Michielssen

{Ed. We'll try something different in this article. We'll walk you step-by-step through the construction of one of the models that we sell. This is the Sky Condor boost glider rocket kit. If you'd like to build one too, visit our web site at www.ApogeeRockets.com/condor_glider.asp to place an order.

Now follow along as Chris Michielssen gives us his tips to make this cool rocket kit. You will need the instruction sheet, because he uses the part numbers listed in it. The instructions can be downloaded at: www.ApogeeRockets.com/education/downloads/Condor_instr.pdf}

PARTS:

This was a very quick build, the perfect first time boost glider kit. With the self-aligning plastic Wing Mount piece, the hardest part of glider construction is easy. Even though most of the hard work is done for you, a novice builder would still get a feeling of self-accomplishment through assembling the glider and pop-pod booster.

This pop-pod glider could actually be built in 15 minutes. There's nothing to paint! Before I start the build, I should comment about how surprised I was by the quality of the parts.

What I initially thought was hard balsa is actually a lightweight hard wood from the Chinese Tung tree.

The two stabilizer pieces (parts 3 & 4) are about 1/20" thick and far stronger than comparable balsa of that width.

The body tube and launch lugs are convolutely wound. The pop-pod body tube walls seem thinner than a BT-20 tube but is much stiffer. It's pre-printed with stars and a roll pattern so there is no painting involved. The Sky logo and two Chinese characters add to the design.

The Glider Nose Piece (part 1) has holes in the front to help hold any trim clay in place.

The Wing Mount (part 6) is very well designed. It already has the wing dihedral molded into it. The bottom trough is angled for the proper line of attack when glued to the glider body (part 5).

Every plastic piece is molded in a medium blue color. The nose cone fits both a BT-20 and the ST-7 body tubes very well.

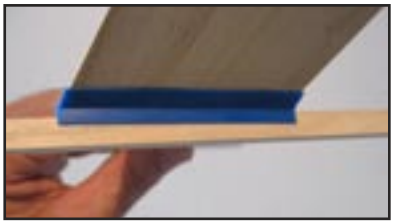
The Streamer Tube Mount (part 8) is a simple, smart solution to secure the streamer and eliminates any worry of it tearing during a hard ejection.

The Glider Hook (part 13) locks into the glider Nose Piece easily and securely.

Before construction I sanded any machining lines off the pre-airfield wings, stabilizers and glider body. While I sanded the wood pieces smooth, the glider could be easily built right from the bag.

CONSTRUCTION:

I used a slower drying super glue to allow for a little positioning time.



STEP 1: The wings are simply glued to the wing mount using super glue. This couldn't be easier, there is no angle sanding of the wing root edge or blocking of the wing for

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Newsletter Staff

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

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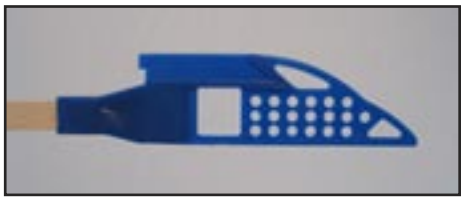
the dihedral. It's all taken care when glued to the plastic wing mount.

STEP 2: The Horizontal (part 3) and Vertical Stabilizer (part 4) are super glued to the back end of the glider body.

TIP: Before gluing the Horizontal Stabilizer, measure and mark the center for quicker visual positioning when gluing on the Glider Body with the fast drying super glue.

TIP: It's easier to glue the Horizontal Stabilizer on first, then follow with the Vertical Stabilizer.

STEP 3: The Glider Nose Piece (part 1) is glued onto the front of the Glider Body. The fit was very good.



STEP 4: The Nose Cone (part 16) and Nose Cone Base (part 15) are glued together. The Nose Cone Base is a little shorter than what is shown in the illustrations.

TIP: It would be cleaner to apply the Super Glue inside the nose cone instead of on the shoulder. This way any excess glue stays inside the Nose Cone instead of being pushed out onto the shoulder.

STEP 5: The instruction are a little unclear at this step, so I'll help you out. It says: "Measure 5/8 inches from the body tube / tail cone joint and mark it. Make sure the mark is between two fins."

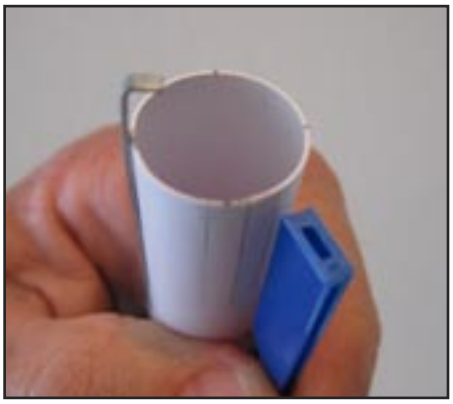
There is no fins or tail cone on this rocket. Obviously something was "lost in translation from the Chinese."

If you follow the illustration you'll be fine. Be sure the engine hook overhangs the rear of the body tube by 5/16".

TIP: Look ahead to the next step before cutting the Engine Hook Slit to plan ahead so the printed "SKY" name and characters are on the opposite side or 180 degrees on the other side of the Engine Hook. In the end, the "SKY" name and Chinese characters will be opposite the Engine Hook. (part 13)

TIP: Use clear Packing Tape as directed in the instructions. Regular Scotch Tape won't be as strong. The Engine Hook is actually very secure with the Packing Tape wrapped in place.

STEP 6: TIP: Set the Glider Pod Hook (part 13) in position on the tube without glue. With a pencil, trace around the base of the Hook so it'll be easier to line it up when the glue is applied. Be sure the square back is at the rear of the tube.



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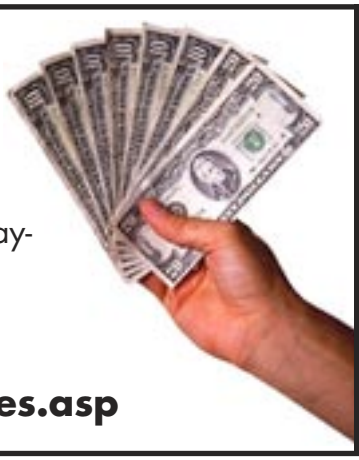

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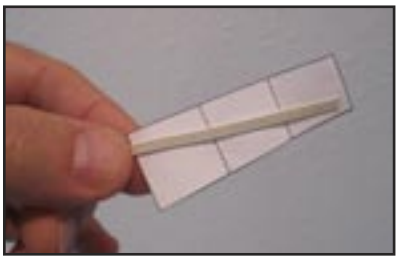
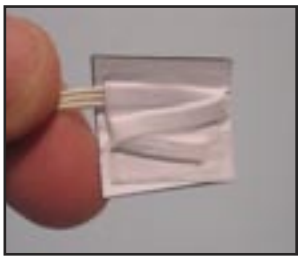
STEP 7: I had to move the forward Launch Lug (parts 12) placement forward and around the SKY Logo. I should have had it facing to the side and not at the top. Rough up the body tube a little for better adhesion. Sand off just enough to remove the gloss.

TIP: Use a 1/8" dowel or short launch rod to align the two separate launch lugs.

STEP 8: Glue the Shock Cord (Part 10) down the Shock Cord Mount at the angle shown in the picture. This will make your finished mount flatter than if the elastic was folded directly over itself.

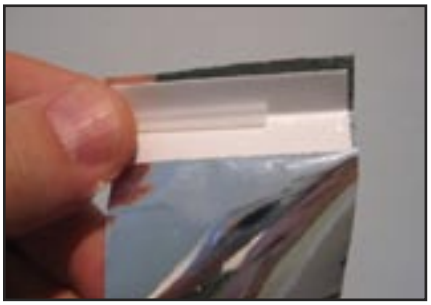
This seems like a very short shock cord, but on a Glider like this, it helps with the separation from the Pod at ejection.





TIP: Use a pencil or dowel to press the mount and form it to the shape of the inside tube.

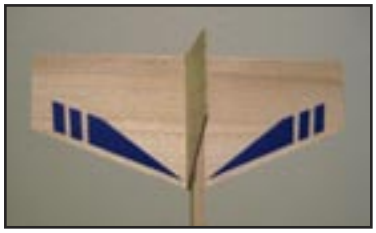
STEP 9 TIP: Before pulling off the adhesive backing off the Streamer (part 7) Fold the adhesive tape in half to make a "valley" for the Streamer Tube Mount (part 8) to sit in.



Remove the backing, set the Tube in the trough then fold the adhesive area on top of the tube and onto the Streamer. Be ready, the adhesive is strong. You'll have one try to get it right.

TIP: I would recommend using the supplied stickers to decorate the bottom of the wing for easier tracking during recovery. The instructions don't mention the peel and stick pieces, but use them to your advantage in recovery.

The Condor Boost glider is ready to fly before you know it!



Reader Comments, Questions and Answers

Tim Van Milligan

Competition Rocketry Revisited

We got a few comments from the article about competition rocketry in our last issue (www.ApogeeRockets.com/Education/Downloads/Newsletter268.pdf).

Joe Avins writes: "*Your article on competition rocketry provided a great deal of food for thought. So, I've been thinking, and would like to share some of my ruminations.*

"On the subject of recognition, my first thought was to give something small, such as a pin, to everyone just to recognize participating. But after chewing it over, I think that would cheapen the experience. Merely participating isn't really achieving anything, and if all one has to do is drive up with a rocket and collect the pin then is doesn't mean anything. So instead, I propose setting some kind of threshold for what constitutes "a really good showing" and give pins, or some other small thing, to everyone who achieves that mark. The threshold should be something technically challenging but not too hard to manage. For parachute duration, for example, there could be a pin for beating, let's say, 90 seconds (or some other time that is appropriately challenging.) A trophy still goes to the winner, which is something everyone can strive for, but anyone who truly does well can come away with something. This would be comparable, in a way, to HPR certs; it provides recognition for a personal achievement that is not competitive, making it possible for anyone to gain while still being meaningful. And associating it with a contest (which one didn't win) makes it both recognition of an achievement and a spur to do better next time."

I like the concepts of giving pins or performance stickers. I think we can do something better: little chevrons or other small do-dads for doing the same thing multiple times. For example, you might get a tiny star pin for competing in a contest. You'd get one for each contest. Then after 10 contests, you could trade the ten silver-colored pins in for a gold-colored pin. The recognition of performance would probably be a big draw for a whole lot of people.

They do something similar in the military. My dad, a WWII veteran, received the Silver Star for galantry in action. The second time he earned the award, he got a tiny little pin called the oak-leaf cluster that was to be attached to his original Silver Star ribbon. It is a tiny little thing that isn't really flashy. But to other people that understand the significance of it, the tiny little copper-colored oak-leaf in the middle of the ribbon is profound. They looked at him with extra admiration, even though he never rose higher in rank than a Private First Class. To them, it meant that this was a guy that you'd like to have next to you if you had to go into battle.

I still stand by my original thought, that we don't do enough to reward modelers for their efforts. Tiny little things can make a big difference to the hobby.

DynaStar Parachute Goes To The Edge Of Space

Peter Justin from the state of Georgia sent me this link to his YouTube video showing his high-altitude balloon flight. The balloon rose up above the atmosphere and took some spectacular photos of the curvature of the earth.

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What I found cool is that the payload was recovered one of our 58" diameter DynaStar parachutes. (www.ApogeeRockets.com/parachutes.asp#Mid-Power_chutes) I would have never thought that one of our chutes would have gone to the edge of space and come back safely, landing more than 62 miles from where it was launched.

Check out the video at: http://www.youtube.com/watch?v=IEZL7AgOLlo. Look for the DynaStar chute at the beginning of the video.

Also, this past weekend, I wanted to see how durable the big 58" DynaStar parachute really was. As a test, I packed it into a heavy 5.3 lb rocket (the all-fiberglass Nike-Smoke rocket kit - www.ApogeeRockets.com/Madcow_4in_Nike_Smoke_FG.asp). It performed flawlessly, bringing down the rocket nice and slow for a damage-free recovery.

Now before you go and do this yourself, I did want to minimize the stress on the chute as much as possible. So the first thing I did was to use a gradual-dereefing device on the shroud lines as shown in Peak-of-Flight Newsletter

143, page 7 (www.ApogeeRockets.com/education/downloads/Newsletter143.pdf). You can see in the photo that the parachute at this point in the flight was semi-reefed, where the canopy was about 80% inflated.

The other thing I did was to wrap the shroud lines around the chute several times so that it would take some time to unwind before inflating. As it was unwinding, the rocket was flopping around and generally slowing down on its own. So it was going a bit slower by the time the parachute began to open. This is a good technique if you want

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to minimize the stress on the lines, and you don't have a deployment bag handy. I would probably use a deployment bag (www.ApogeeRockets.com/Deployment_Bags.asp) in the future, but I forgot to bring it with me.

Using RockSim for Trebuchets?

"I just thought I would let you know of a rather novel use for my Rocksim 8 that I recently came up with.

I am supervising the VFX for a historical feature film where a castle is being seiged. We have plenty of visual effects shots where giant siege engines, such as trebuchets, are launching large stone boulders at the castle. Also big volleys of arrows.

Though we built actual working trebuchets, of course we didn't really launch boulders 400 yards! : We used CGI to create them.

However, after having several different computer animators attempt to replicate the flight paths, they just weren't looking real to myself or the director. Its such a nuanced thing, animation.

It was then I had the idea to try out my Rocksim 8. I basically constructed a 16" hemispherical nose cone and hemispherecal reverse transition... and then a very skinny body tube and fins... A mass object brought the weight up to the required 160lbs. I even gave it a rough stone texture and set the lattitude, air density and altitude to match our filming location in Wales. Then I built a library of custom engines in EngEdit that had very short bursts of thrust, matching the length of time they would have been accelerated by the sling. I made a selection of about 20 different thrusts and launch angles, exported the xy data off to our 3D animation package and VOILA! They looked absolutely perfect.

It's actually uncanny how realistic the motion is. The subtle speed variations and the exact flight path would have been impossible otherwise.

I ended up doing the same for some of the other missiles, arrows etc.....

Anyway... thanks again for some great software!"

David Kuklish
VFX Supervisor / Director of Photography
www.airshippictures.com

Showing Motors In RockSim Designs

Steve Schulte asks: *"I am preparing a number of RockSim files to submit for a launch. I save the design after running my simulations, but when I open them again, the files all show "SHOWN WITHOUT MOTOR"!!*

"Of course I want the motor to show! How do I get the rocket to appear WITH the motor I've used in previous simulations without starting all over?"

This is pretty easy.

When you open a RockSim design, it doesn't know

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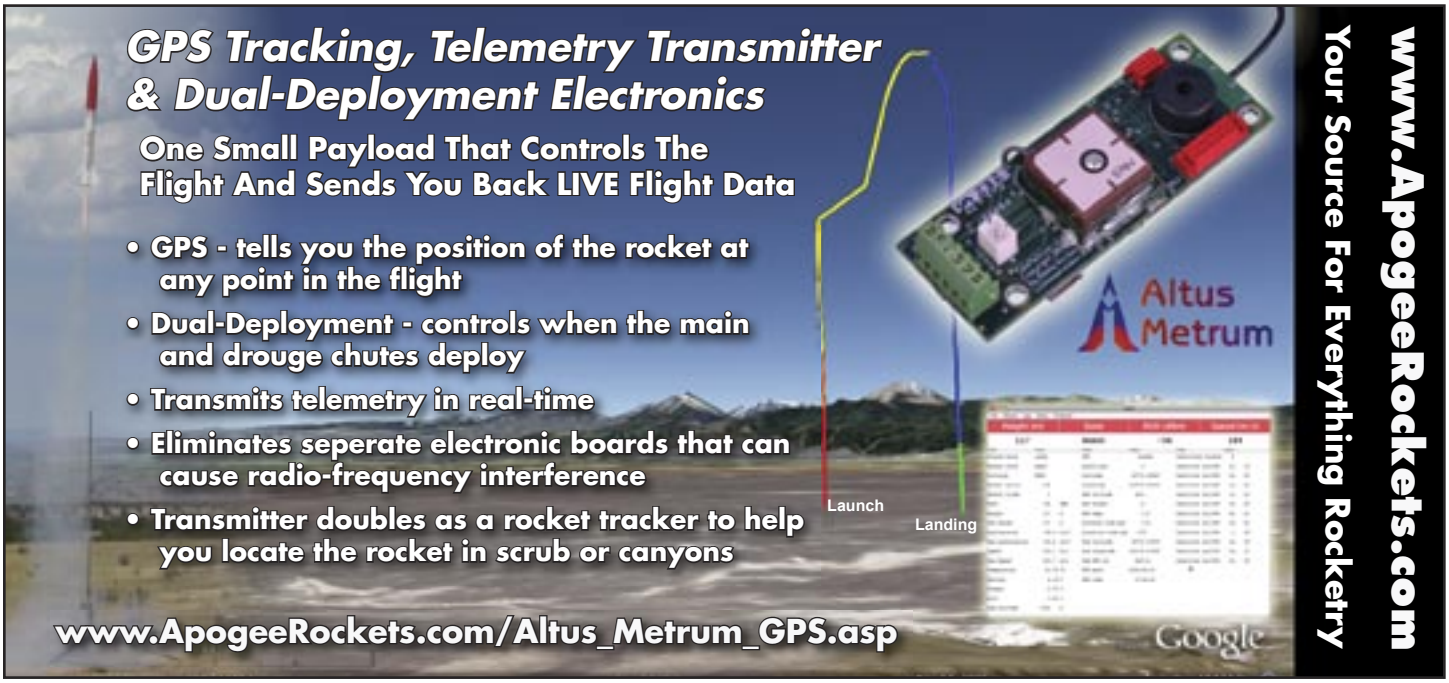

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which simulation to display, as there could be dozens. That is why it doesn't automatically load a motor.

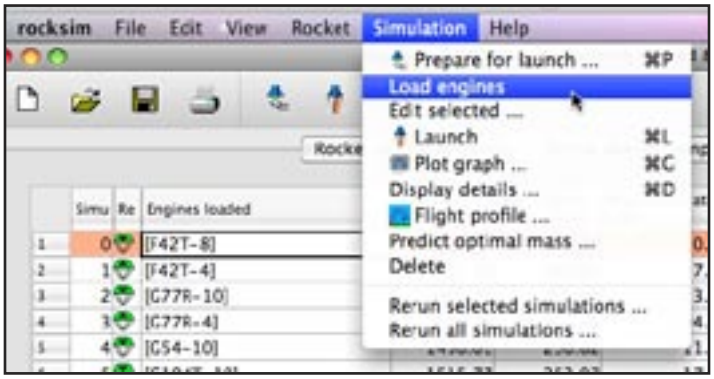
But you can easily select the simulation yourself. First, hi-light the simulation you want in the simulation summary screen (just click on it one time).

Next, go to the "Simulation" menu, and choose "Load Engines." This will load the engine that created that simulation. See how easy that was?

Did you see that you also had the option of choosing "Edit Selected" from the Simulation menu? Making this choice will also load the engine that you had for that simulation you selected. Plus, it temporarily changes the launch conditions to those that were used when the simulation was first run.

So if you hit the launch button after choosing the "Edit Selected" choice, it should give you results that are similar to the original simulation.

However, please note this. As soon as RockSim completes the run, it will revert back the launch conditions to what was previously stored in memory. So if you run the simulation a second time, you can get different results (if you changed the launch conditions from when you first ran the simulation).



We revert back to your original conditions because often you don't know what the conditions are. You'd hate to find out that someone sent you a file with launch conditions that are different from where you fly rockets, and have it make those the default conditions on subsequent launches. It may take you months to notice the change. So RockSim doesn't force the change to be permanent.

The "Edit Selected" choice was really put into RockSim for me. That way when people send me a RockSim file and ask me why their results are all screwed up, I can run the simulation the exact same way that they did. I often find that they had done something weird, like changing the atmospheric pressure or temperature to something extreme. Then they forgot to change it back, and they can't figure out why the results are all over the place.