PEAK OF FLIGHT NEWSLETTER

ISSUE 509/NOVEMBER 26TH 2019

IN THIS ISSUE

HASSLE FREE FIN SEALING PRESS

LAUNCH CONTROLLER MODIFICATION

F-1 STARFIGHTER FREE PLAN Available in This Issue!

https://www.apogeerockets.com/Rocket_Kits/Skill_Level_4_Kits/Hydra_VII

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APOGEE COMPONENTS

PEAK OF FLIGHT

Hassle Free Fin Sealing Press

By Bill Heath

Have you ever heard the expression “Necessity is the Mother of Invention”? Well, for me the expression is “Laziness is the Mother of Invention”. While I am perfectly capable of getting a nice smooth surface on balsa fins, the ordeal of seal, sand, seal, sand, and repeat as necessary gave me no joy. Papering the fins was just as tedious and never gave me the results I was looking for. After trying several ideas and getting mixed results, I came up with something that I think you will love. While the edges of the fin still need sanding, the faces come out very smooth with a satin finish that is ready to paint. If you are going to sand airfoils on your fins, this won’t work for you, but for square or rounded edges it’s a simple solution.

You will need the following items to build your Hassle Free Fin Sealing Press:

FIGURE 1 - ALL ITEMS IN ONE PICTURE

Qty.	Item
1	Flexible Plastic Cutting Board (the kind that comes in 4 packs at your favorite retailer)
2	1” x 6” x 12” boards or 6” x 12” x ¾” plywood pieces
1	Staple gun and 3/8 inch staples
4	C-clamps (4 minimum, more is better)
1	pair Nitrile or Latex gloves
1	30 minute Epoxy or 20 minute Finishing Epoxy (I use Bob Smith Industries brand)
1	disposable paint brush (the foam kind)

The first step is to cut the flexible cutting board into two pieces that will cover your boards.

Next, staple the cutting board pieces to your wood boards. Make sure to only staple around the edges, as any surface dimple or scratch on the working area of the press will show up on your finished fin. You can use small nails if you wish. However, don’t try to glue the cutting board to the wood. The reason for the flexible cutting board is that glue won’t stick to it. If you don’t believe me, just try it.

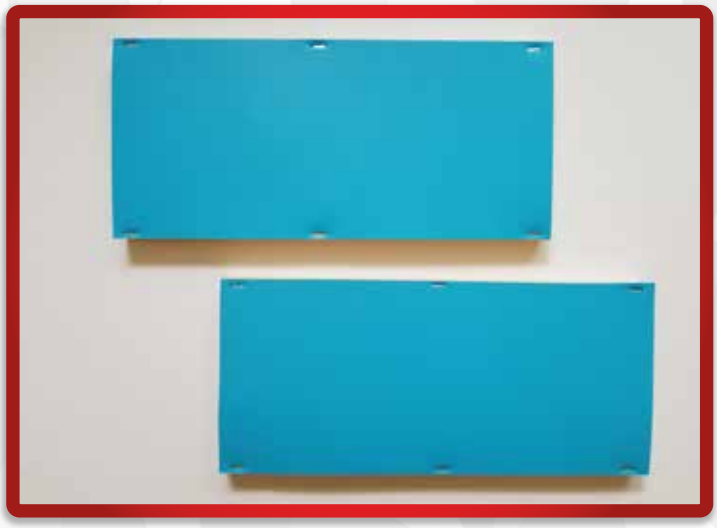

FIGURE 2 - CUTTING BOARDS ATTACHED TO WOOD

And now, we are ready work the magic!
Wipe down the fins that you wish to seal to remove any surface dust.

Mix enough epoxy to liberally coat all sides of the fins. Use 30 minute Epoxy or 20 min Finishing Epoxy. The Finishing Epoxy is thinner and seems to have a longer working time than the 30 minute Epoxy. Brush the epoxy on with a disposable brush and then work it into the fin surface with your fingers. Make sure to wear disposable gloves, as epoxy can be messy and with repeated skin contact you run a real risk of developing an allergic reaction to the glue. Lay the coated fin onto one of the press sides and repeat for the remaining fins that you are sealing. Make sure to leave at least 1/4 inch of space between fins to allow for excess glue to be squeezed off the fin surface. If you place the fins too close together, you will end up with one giant fin and you won’t be happy. Be forewarned!

Continued on page 3

About this Newsletter

You can subscribe to receive this e-zine FREE at the Apogee Components website www.ApogeeComponents.com, or by clicking the link here Newsletter Sign-Up

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Hassle Free Fin Sealing Press

Continued from page 2

FIGURE 3 - EPOXY COATED FINS LAID ON FIN PRESS HALF

Once all the fins have been coated with epoxy and placed on the press half, place the other half of the press on top of the fins creating a "sandwich". Now, carefully clamp the two halves together, using at least four clamps. More clamps are better and will apply a more even, all around pressure.

FIGURE 4 - PRESS CLOSED AND CLAMPED

And now for the hardest part of the process. Set the press aside for 24 hours. YES, 24 hours. If you open the press early, the epoxy won't be fully cured and the whole idea here is to get it right the first time. It's a good time to start a new rocket from your build pile or work on one of the many that you have in progress (don't fib, we all have several rockets in various stages of completion).

Now that you have waited the proper amount of time, remove the clamps and carefully separate the two halves of the press. Inside you will find your fins with a surface finish that mirrors the finish on the cutting board and they will be much stronger and stiffer than the original wood fin.

Continued on page 4

Hassle Free Fin Sealing Press

Continued from page 3

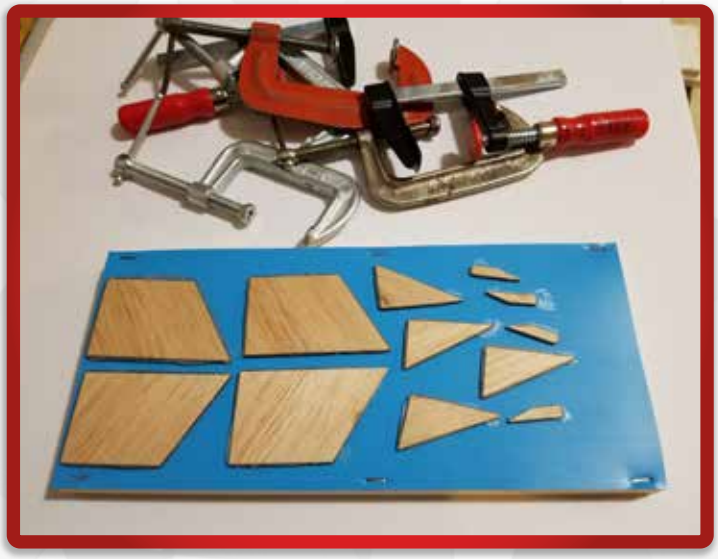

FIGURE 5 - PRESS OPEN, FINS CURED

All of the excess glue has been squeezed out to the fin edges. Using your favorite method, sand the edges square. I then slightly round the leading and trailing edges of the fins, mainly to remove any sharp edges.

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FIGURE 6 - THE FIN ON THE RIGHT IS FRESH OUT OF THE PRESS. THE FIN ON THE LEFT IS EDGE SANDED AND READY TO GO.

If you have followed directions, made proper offerings to the Rocket Gods, and not had a visit from Mr. Murphy, you will now have a "paint ready" set of fins.

The final step is to VERY carefully remove any glue residue from the faces of the press. Any scratch, no matter how tiny, will show up on the next set of fins that you press. Even rub marks from using your fingernail to scrape the residue will show up. I hope you find this to be as great a time saver as I do.

Need Rail Buttons And Stand-Offs?
www.apogeerockets.com/Building_Supplies/Launch_Lugs_Rail_Buttons/Rail_Buttons

Continued on page 5

FREE SUPER BONUS
54 PART SATURN 1B
https://www.apogeerockets.com/Rocket-Kits/Skill-Level-5-Model-Rocket-Kits/Saturn-1B-1-70th-Scale
ASSEMBLY VIDEO SERIES // CLICK HERE

Hassle Free Fin Sealing Press

Continued from page 4

FIGURE 7 - BILL HEATH

About the Author:

Bill Heath is in his third rebirth as a rocketeer. He got his start in model rocketry in the mid-70s, building and launching rockets from a ship in the Gulf of Alaska. He picked up the hobby again in the early 80s in New Mexico. After moving to Colorado in 2000 and discovering that there were high power model rockets, he joined NAR and Northern Colorado Rocketry. Bill achieved his Level 2 Certification and again left the hobby. After moving to Northern Wyoming to retire, the bug struck again. A Level 3 Certification may be in his future (a Bucket List thing), but for now, Bill is concentrating on mid-sized complicated rockets that can do all the things that the big rockets do. He finds scaling down to be more of a challenge than scaling up!

Launch Controller Modification

By Allen Wallace

Here is a simple modification that may appeal to the more adventurous electronic minds.

The economic simple blue Sky Launch Controller (https://www.apogeerockets.com/Launch_Pads/Sky_Complete_Launch_System) supplied with the Apogee Apprentice Starter Set (https://www.apogeerockets.com/Rocket-Kits/Skill-Level-1-Model-Rocket-Kits/Apprentice-Starter-Set) and similar single igniter systems is unable to supply enough current for a cluster of rocket engines. It is very suited to your first single rocket engine with one igniter but the small AA type batteries do not have enough energy to reliably fire two or three igniters. By fitting a small DC socket to the hand controller and feeding it with 12 volts from a small Lithium pack (cheaply procurable from eBay these days), the Sky Controller can be used for clusters of igniters as well as single motors with the internal batteries. Attached are some photos and wiring diagrams to achieve this.

The biggest challenge is to fit the DC socket into the limited space of the hand controller, which is filled with four batteries. The position shown is not ideal but is very handy for the positive wiring, and by running two wires on the inside edge of the battery compartment all can be tucked away nicely and fastened with quick fix glue. The trick is to find the smallest switching type DC socket available from your local electronics store.

FIGURE 1 - WIRES ARE RUN ALONG THE BATTERY SECTION

I used a warm solder iron to melt the inside housing a little to mould the plastic into shape for sufficient space, but this could be done with a sharp hobby knife. Once the socket is fitted, rotate it so the lugs are in convenient position for soldering the necessary wires. The DC sockets are made to switch the negative leads from battery or other supply while maintaining the positive connection. The socket center pin in our case needs to be soldered to the controller switching metal strip (positive), which is conveniently very close by. Two wires need to be run from the other (socket negative) terminals to the input wire and negative battery connection. You may want to take the opportunity to up the current rating of the launch wire cable and

Continued on page 7

Launch Controller Modification

Continued from page 6

fit five alligator clips so an extra cluster cable is no longer needed.

FIGURE 2 - FINAL WIRING

Security wire, which has four independent wires, is usually of higher current carrying capacity and suitable for the task. Terminate three of the wires with clips and solder all of these positives to the terminal in the controller. The negative lead can be doubled (or tripled) up to supply two/three negative clips for the cluster connection and the other end connected to the negative connection in the controller. The only other suggested change is to increase the size of the 240 ohm resistor to say 470 ohm to suit the increased 12 volts supplied to the high output LED light and prevent over voltage to the LED. It will still glow fine on internal batteries at a slightly lesser current (not to exceed about 20ma for LED safety).

FIGURE 3 - BATTERY PACK

In summary, by using a small 12 volt LiPo or Gelcel car battery or whatever you may have, you can now very economically power your multiple engine rockets for take off just by using your simple launch system, without needing to procure a high current power supply,. Ensure your power source has a suitable fuse, say 5 amps or so. I took the opportunity to re-label the hand controller and fit an Apogee label, as the blue controller is rather plain in appearance. So now you have a higher current cluster cable with an adequate power supply to fire off those multi engine clusters with your old single igniter controller.

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Continued on page 8

Launch Controller Modification

Continued from page 7

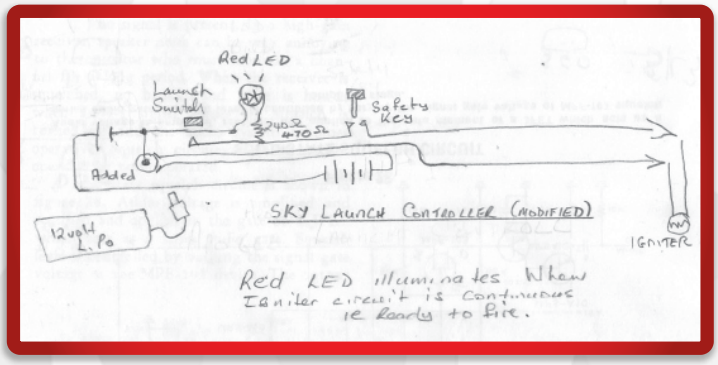


FIGURE 4 - MODIFIED CIRCUIT DIAGRAM

For the technical minded, I have attached the modified circuit diagram but I believe the photos are worth a thousand words. Of course by removing the DC plug from your power source to the Sky Controller it all reverts back to its original format for single igniter portable self-contained use. It will pay to test the unit on your igniter for the first time to ensure it does not fire off when the key is inserted. I say this as, through measuring the resistance of the various igniters I have noticed they vary considerably in resistance, which changes the amount of quiescent current before the launch button is depressed. The original Sky white clip lead cable can be used for the power source to say a 12-volt car battery just by fitting the mating plug and maybe a fuse. Note, if you have an early controller with an incandescent lamp bulb (or a different brand of launch controller that has one), you will need to figure a suitable resistor to operate with 12 and 6 volt which does not fire off the igniter prematurely. I would suggest upgrading to a high output LED as in the present Launch Controller.

About the Author

I may not fit the normal Rocket profile but have always been interested in anything that flies, probably through my Father who was a radio operator in the RNZAF during WW11. So I am a radio Engineer among others; ex Motorola for 20 years and this gives me a great interest in electronics and Ham radio. I am also a semi professional Astronomer. Many years ago building free flight gliders and later building simple radio control to operate with them. These days in my twilight years I have come back to RC gliding and of course a new hobby for me of racketeering, although I had a go at rockets when young by manufacturing my own fuel/engines and basically making controlled/uncontrolled bombs. Attached some recent photos of the ever increasing collection of the latest fun stuff. Hope you all enjoy the article. I have since added a small analogue ammeter to monitor the current at launch. This can indicate if all igniters are firing.

FIGURE 5 - ALLEN WALLACE

FIGURE 6 - ALLEN'S ASTRONOMICAL OBSERVATORY

F-1 Star Fighter Rocket Plan

Continued on page 10

F-1 Star Fighter Rocket Plan

Continued from page 9

By James Bassham

The Tri-Planet Union F-1 Starfighter

"Here's your fighter, Recruit. Try not to break it."

You stare dumbfounded at the pile of parts. Sarg sees your look and laughs.

"You didn't actually believe all that nonsense they taught you in basic did you? Adventure? See the solar system? Well put away those silk-scarf notions – this is a war we are fighting here. The best way for you to survive it is to know your spacecraft inside out – and there is no better way to do that then to put it together yourself." He hands you a folded set of instructions covered in hand-drawn illustrations, and motions to a scruffy-looking mechanic in greasy overalls. "Listen to what Charlie tells you – He's the best we've got."

Sarg walks off to yell at someone and Charlie shakes your hand as he motions you over to the pile of parts. "The TPU F-1 is the Confederacy's front-line fighter. It's the fastest thing in the solar system, but not very agile. Your main advantage is that it's all engine – hit the afterburner and she runs like a scalded dog – you get in trouble and you point for clear sky and hit that motor – understand?" Charlie stares at the parts with you. "We've been losing a lot of good pilots lately… The Alliance seems to strike out of no where and then are gone…"

You look at him wide-eyed and speak for the first time, "then are the rumors true? Did they find something on Ceres?"

Charlie bristles and storms off, "Ah, you've been reading too many stories, kid. There's no such thing as a cloaking device – Now, get to work!"

The Asteroid Alliance Raider {See Newsletter 508 for plans https://www.apogeerockets.com/education/downloads/Newsletter508.pdf }

Your first dogfight couldn't be going better. You spotted a lone Raider all by himself near Deimos and got the jump on him. He's fast and there's so much electromagnetic interference coming from that ring around his engine that your missiles won't lock - but you're faster. You close to cannon range before he knows what happened. You line him up in your sights, just like in gunnery school and…. He's gone….

You look around wildly, and scan your radar… nothing….

The hair rises on the back of your neck as you flash to the stories you heard of an abandoned alien craft found on Ceres – the stories of gene splicing and radioactive engines that drive pilots mad… "Stop it!" you shout to yourself – "he's out there…"

The radar is useless, so you shut it down – you don't need to make any emissions of your own – so you kill that huge engine of yours and let your ship drift, scanning the stars.

You're in orbit around Mars, patrolling Deimos…. Your ship slowly swings around as it drifts and the orange-red planet shifts into view… You first catch it out of the corner of your eye… a slight ripple across the face of Mars. Like someone putting a piece of glass on a poster – just a slight distortion… carefully you bring your nose around and point it at the ripple…

The railgun roars to life as you let out a burst. Out of nowhere there is a fireball and the ripple vanishes to be replaced by flying debris.

Charlie was wrong. There is such a thing as a cloaking device…

About the Tri-Planet Union

The Tri-State Confederacy was an alliance of Earth, Mars and the Lunar Colonies formed during the Asteroid Wars. The flag of three crescents represented the three strongholds that held out against the alliance.

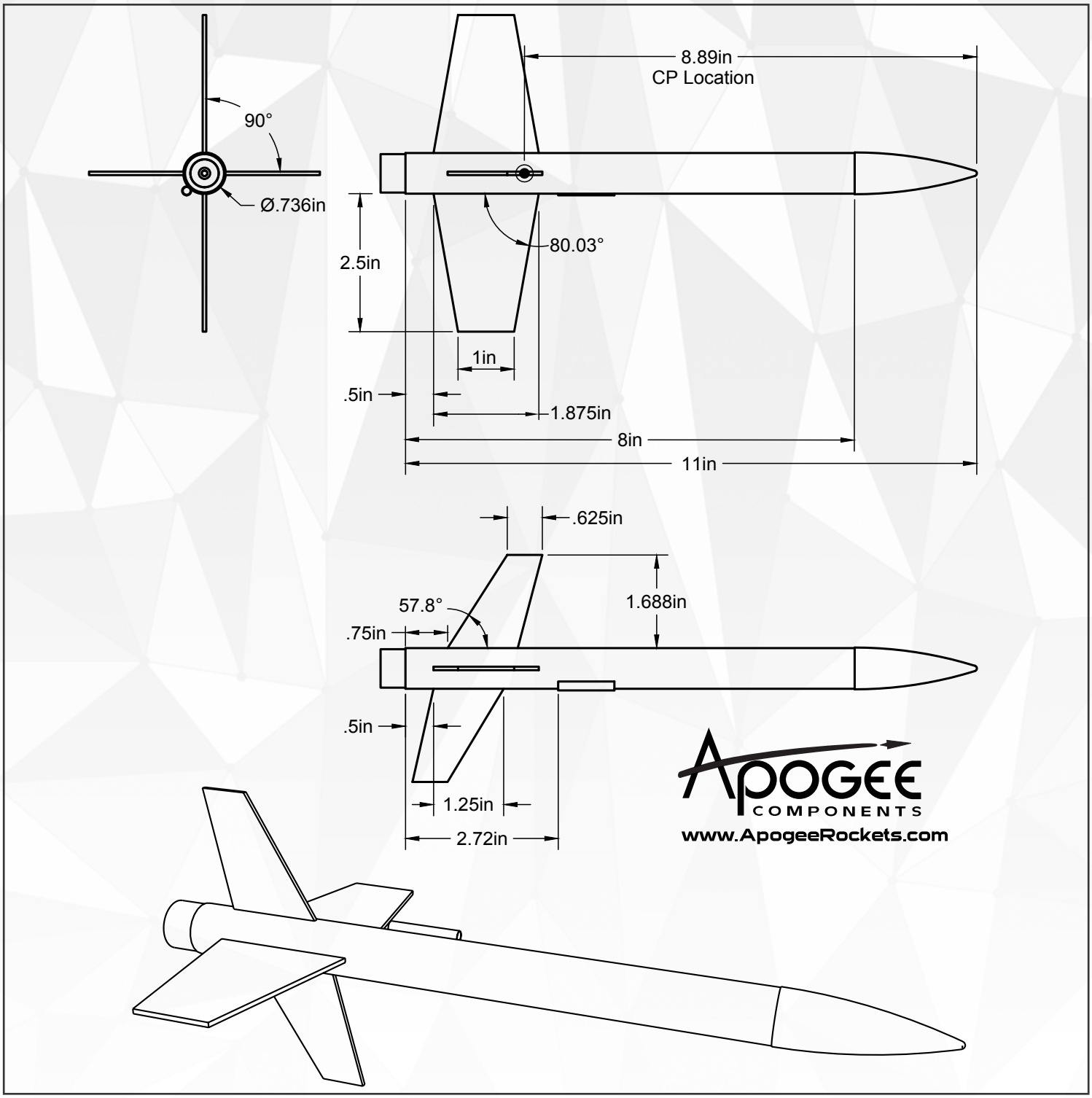
About the Asteroid Alliance

The Asteroid Alliance was a coalition of nomadic tribes that roamed the asteroid belt during the Asteroid wars. Possessing advanced alien technology found in the ice of Ceres and an unhealthy appetite for destruction they brought the Tri-Planet Union to the brink of collapse during the war.

Continued on page 11

F-1 Star Fighter Rocket Plan

Continued from page 10



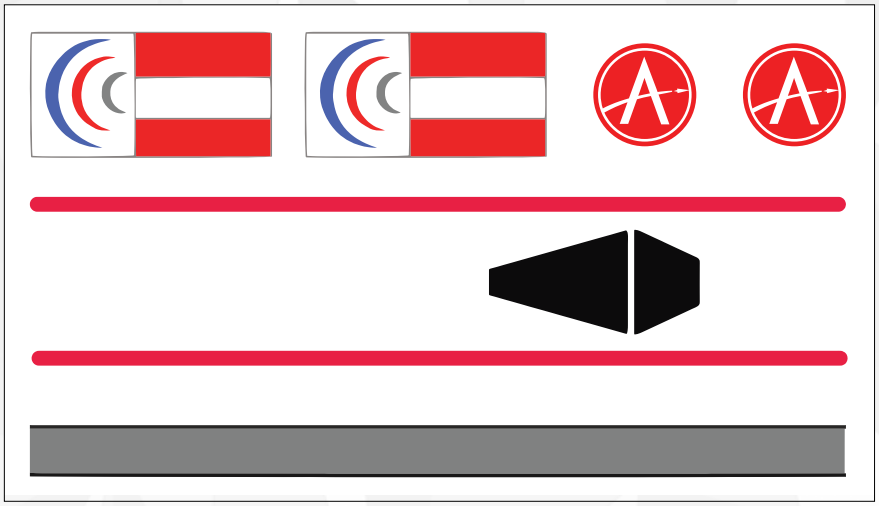
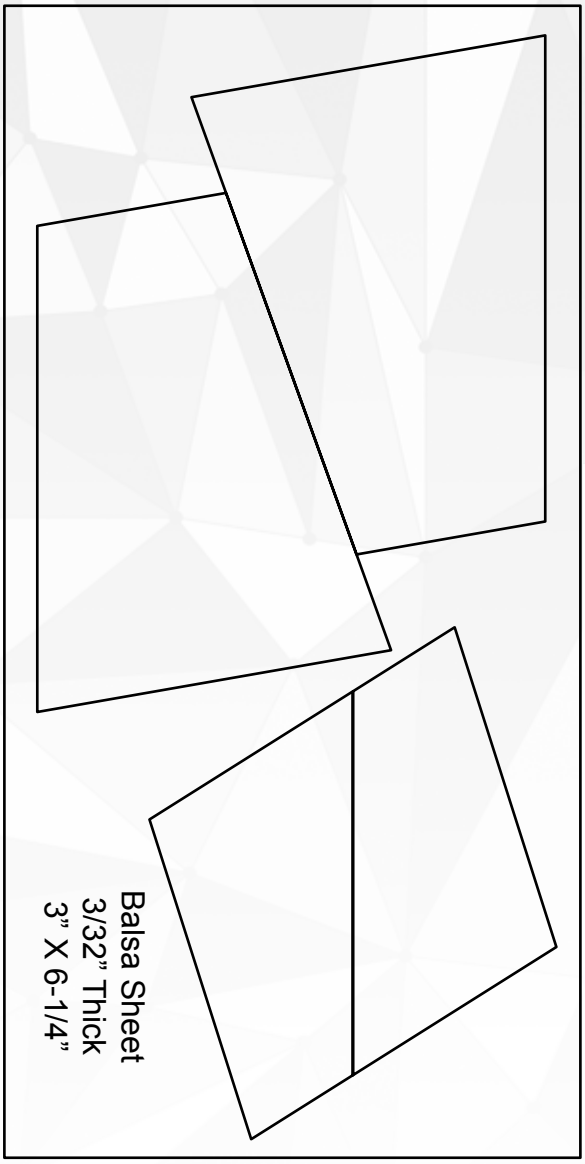
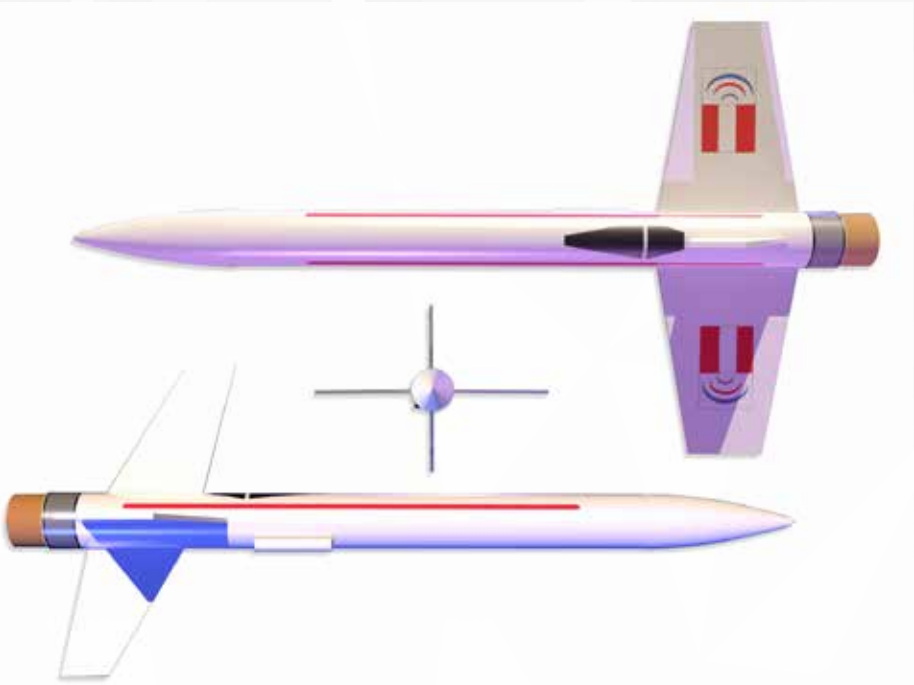
Continued on page 12

F-1 Star Fighter Rocket Plan

Continued from page 11

Download the ***RockSim*** design file for the F-1 Starfighter at: https://www.apogeerockets.com/Peak-of-Flight-Rocket-Plans

Alliance Raider Parts List

19802 - (1) PNC-18C
10086 - (1) 18mm Body Tube (8-inch long)
13028 - (1) Motor Block CR 13/18
30303 - (1) Apogee 15” Plastic Parachute kit
30325 - (2) 2” wide Mylar Streamer - 24” long
13052 - (1) Apogee Launch lug - 1/8” X 1”
14097 - (1) 3/32” X 3” X 18” Balsa wood fin stock

Decal Sheet
4-1/2” X 2-1/2”