AFTERBURNER DX-3

The Afterburner DX-3 is the third version of the Afterburner strike fighter series. Medium range, sub-warp operation. Features plasma launchers, dual phaser arrays, mini-torpedo launchers, and up to two antimatter bombs.

Afterburner DX-3 Parts:

25” LOC BT 2.56
1 LOC 2.6 Nosecone
10” 29mm Motor Tube
2 29/2.5” Centering Rings
1 Aerotech 32” parachute
1/8” Aircraft Plywood
½” Dia Shock Cord
¼” Launch Lug Material

Recommended Tools:

Razor Saw
Hobby Knife
Sandpaper
Epoxy
Mixing Cups
Mixing Sticks
Gloves
Ruler
Pencil
Masking Tape
Bondo Body Filler (Two Part)
Bondo Glazing and Spot Putty
Rust Oleum Gray Automotive Primer
Spray Paint (Black)
Rocksim 6 or higher (7 recommended)

Patterns and Guides Provided:

The attached patterns and guides should be used for this rocket’s construction. The pattern for the wing is in two pieces, you need to overlap the two sections together. You want to make the following:

2 Wings
2 Plasma Injectors
1 Vertical Stab
1 Sensor Array
5 Cooling Fins
2 Phaser Arrays

Introduction:

I have always loved futuristic, fighter style rockets. They look cool with all of their details, and I love the challenge of building them. Until recently, certain rocket kit manufactures lost their creativity after the 1980's, only releasing and re-releasing a few futuristic kits in the fifteen years that I been enjoying this hobby. They opted for the more simple traditional fins on a tube with a cone approach, and rockets that are plastic toys. What happened to the old favorites like the Strike Fighter, Black Hawk, X-Wing, or the Star Ship Enterprise? Well, I guess if they don't want to be creative, we'll have to be creative.

When I went to high school, I often "skipped" to help other classes with their model rocketry activities. In one of them, a student asked me to design him a cool looking rocket that was different than the other students. He had only a sort piece of BT-50 and 20 materials, and a nose cone. Two days later, the DX-1 was born. The next day, we flew the rockets. The afterburner flew several times with B4-4 motors. I just loved the way the model flew; it looked like a fighter plane with its afterburner on. Unfortunately, the DX-1 was lost that day after an exhilarating and high flight with a C6-5.

After I graduated, I moved to NH. A year later, I saw in a local hobby some Designer Kit Specials at 50% off, so I bought a couple. I started building some rockets, and joined CMASS. One of these rockets was the Afterburner DX-2. It was essential the same rocket that I remember from high school, but the body was longer, and the tail was slightly different. I flew the rocket several times, and decided that the C6-7 was made for this rocket. Unfortunately, the Afterburner was flown so may times, that the time to build a new one was approaching.

Around this time, I was working on another project utilizing a LOC Graduator, plugged F motor, and electronic sensors. Well, on the first flight, there was no ejection. I had to order a new LOC tubing to build a new payload section for the rocket. I only required a short piece of tubing. What do I do with the rest? I know … lets build the DX-3! So I called Countdown, ordered a LOC nose cone, and I went to the hobby shop and bought several sheets of aircraft plywood and a razor saw. I then loaded up the latest version of RockSim to enter the data for the rocket.

Assembly and Finishing:

As with most rockets that I built, the first part of the rocket to be built is the motor mount. The Afterburner's motor mount is made just like any other Mid Power motor mount. I opted for no thrust ring so there is no limit to the length of the motor I could use. For motor retention, I used an Estes D/E motor hook, and ground the forward tap down so that it would stick into the motor tube, but not touch the motor. I set it so it will lock over the rear closure of an Aerotech RMS 29/60-100 motor. The centering rings where attached in the normal manor using epoxy.

The most challenging thing about building the Afterburner was the wings and fins. There are a total of 13 different geometric shapes to cut out of the plywood. These parts turn into 1 vertical stabilizer, two wings, five cooling fins, and two phaser arrays. I had my work cut out for me. I used the razor saw to cut out the fins, which was not as difficult as I thought it would be. During the cutting phase, I noticed that I bought the wrong plywood. I bought the light ply, not the regular aircraft birch. I decided to stick with what I have, which proved to be a mistake later down the line.

Positioning the fins was a challenge. I used VCP to print out the fin positioning guides. Since the program is only designed to print templates for standard rockets, I had to do some cleaver tricks to get what I want. I printed a guide for three, four, and five fins. I also used the option of setting the fin thickness for the guides. Instead of displaying one guide line for a fin, it would display two. Each line was spaced the exact thickness of the fins. This was done for a good reason. Some of the fins did not go between these lines, but above them. For example, two of the cooling fins are centered between a phaser array and the vertical stabilizer. To save time, and prevent confusion, I have published the official fin position guide for the Afterburner.

With my bird, I just used the standard surface mounting method with all the fins, wings, and radiators. In future production, it may be a good idea to utilize through the wall fin mounting. The wings and stabilizer are pretty large, and they experience quite a load upon landing. I used regular epoxy to attach the wings, and the vertical stabilizer. The torpedo pylons were attached next. Finally the radiators were cemented in position. After all the epoxy cured, I made some fillets at all the joints with epoxy. After some sanding, I used some two part Bondo filler to add more fillets. I got plenty of exercise sanding between coats of Bondo. Finally, the fillets were finished with Bondo Glazing and Spot putty.

Once I was happy with the fillets, it was time to finish the rocket. I decided that I would use a normal ¼" launch rod with this rocket, since there is no clearance for a black sky rail. After the launch lugs were formally attached, I sprayed the entire model with Rust Oleum Gray Automotive Primer. I love this stuff. It fills in the grains of wood with only a few coats, and it is easy to sand. After applying a couple coats of primer, and sanding between coats with 400 grit sandpaper, I fixed all the imperfections with some Bondo Spot Putty. A few more primer coats later, I painted the Afterburner with Gloss Black Krylon.

To make sure all of my hard work comes down in one piece, I decided that my rocket will come down with a Aerotech 32" parachute. I used the LOC shock cord anchor method to attach the ½" elastic shock cord to the rocket. Finally the Afterburner DX-3 was ready to fly.

Flight Reports and Conclusion:

The DX-3's first flight was on July 31st, 2001, flown with an E30-4T. I chose this motor because I was launching it on a very small field, and I wanted to get it back. The flight was straight and true, and went up about 300 ft. The rocket landed on some gravel, which caused some minor chipping to the vertical stabilizer.

The next launch the Afterburner had the pleasure of flying at was the August 18th, 2001 CMASS shoot held at the golf course in Tewksbury, Mass. This field is also a fairly small field, so I decided to launch my bird with the smallest motor I had on hand, a F37-6W. The flight was very spectacular, but the landing showed me why it's a bad idea to use light ply for large fins. The vertical stabilizer hit a power line, which smashed its way into the fin. Force of the impact ripped the stabilizer off the rocket.

I cut out the damaged areas of the vertical stabilizer, and implanted fresh pieces of plywood. Then I epoxied the repaired fin back onto the rocket. After some more sanding, filling, priming, and painting, the Afterburner DX-3 was ready to fly again at the November 3rd, 2001 CMASS launch. That day, I launched it with a F52-8T, and a F25-6W. The afterburner had a slightly curved boost in the breeze, but it seems stable. The F52 provided a quick boost, but I do like the longer burning F25 with this bird.

The most recent, and final flight took place on December 29th, 2003 I was helping my teenage friend with his science fair project. We were using the Tewksbury field again. I launched the rocket with a F20-4W Econojet motor. The flight was picture perfect, but it landed in a tree. It was recovered sometime later, but has substantial weather damage. I do plan to repair this bird, maybe glassing the wings to protect them from damage.

Future plans of the Afterburner series include an improved version of the DX-3. It will feature laser cut parts, through the wall attachment, and will have slightly smaller phaser arrays. The DX-4 is already in the planning stage, which may be my next scratch built high power project. I may even build an even larger version for a Level 3 attempt.

Videos:

First flight. E30-4T motor.
http://www.gardei.com/PersonalLaunches/Pl73101/E30_Afterburner_DX-3.mpg

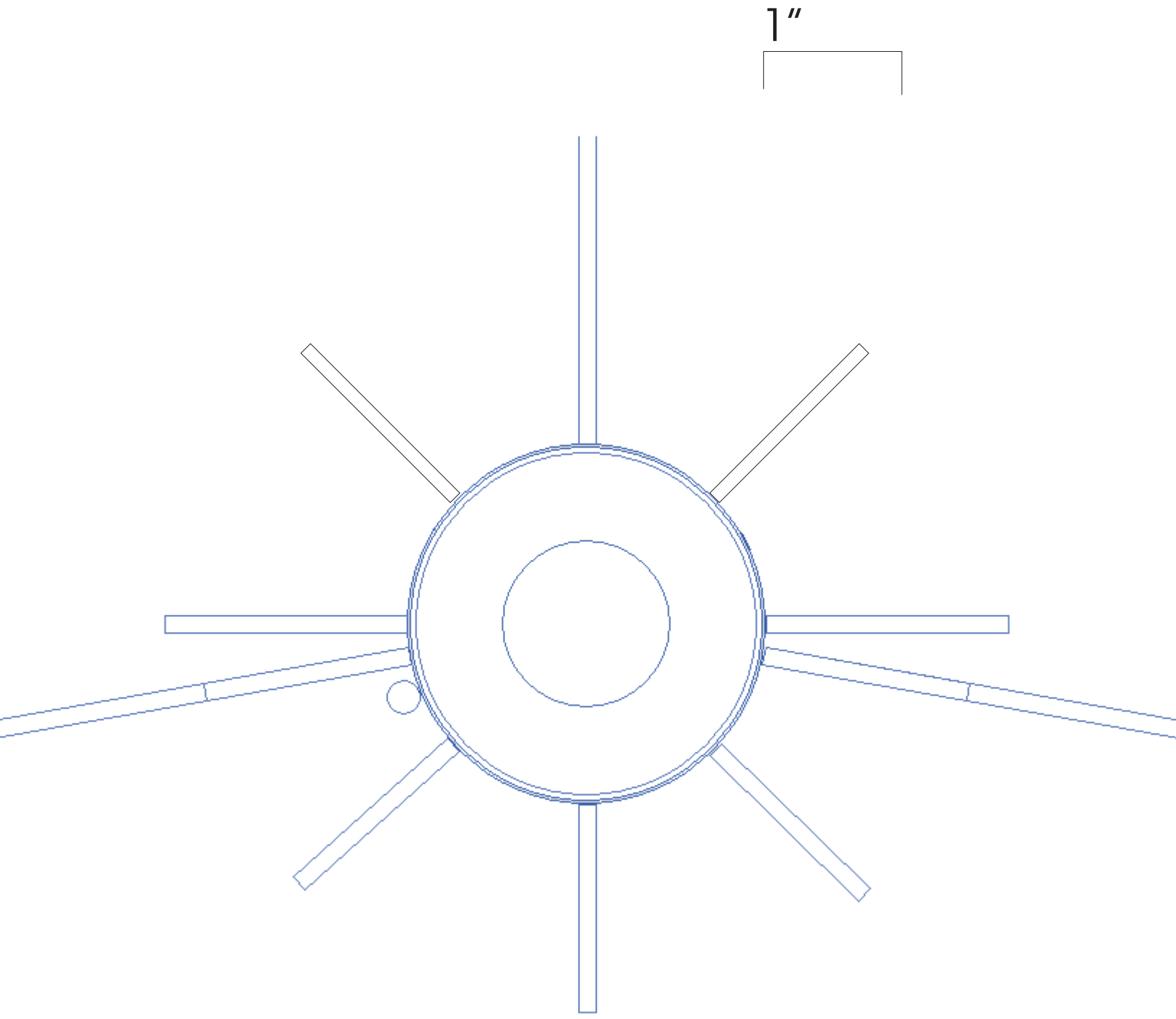
Second flight. F37-6W motor.
http://www.gardei.com/Aug182001/F37_Afterburner.mpg

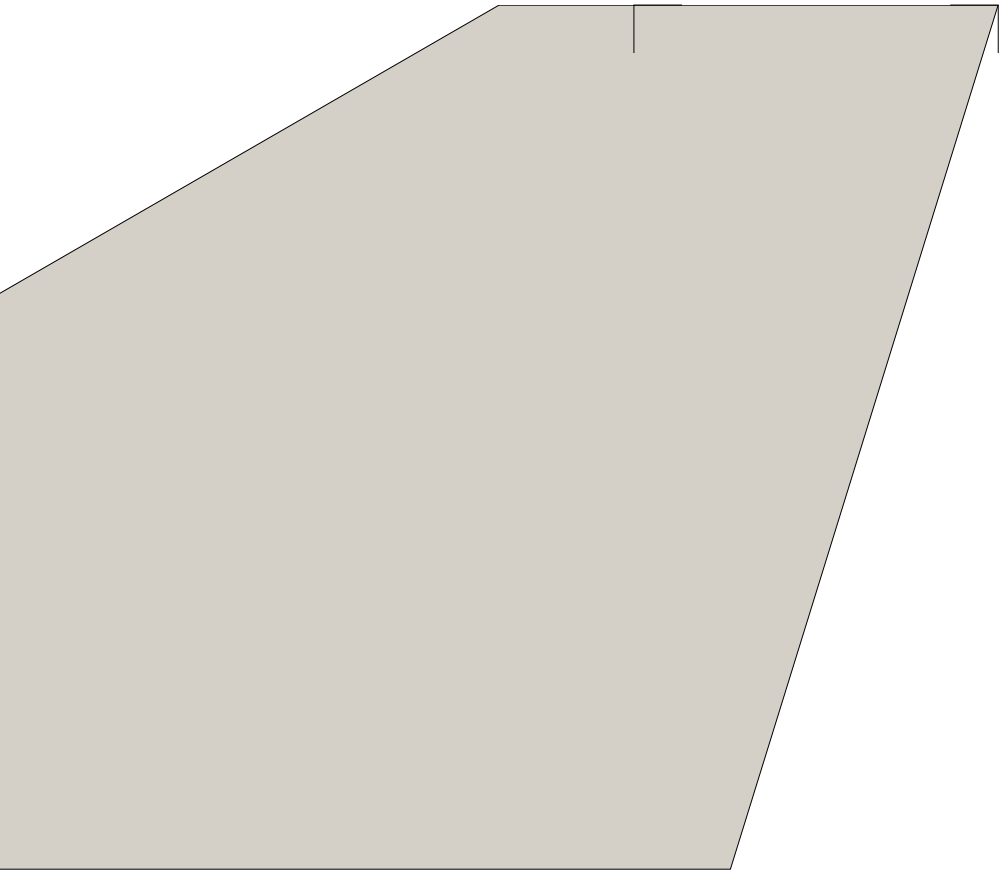
Third flight. F52-5T motor.
http://www.gardei.com/Nov32001/34_Dougs_F52_Afterburner.mpg

Fourthflight. F25-6W motor.
http://www.gardei.com/Nov32001/54_Dougs_F25_Afterburner.mpg

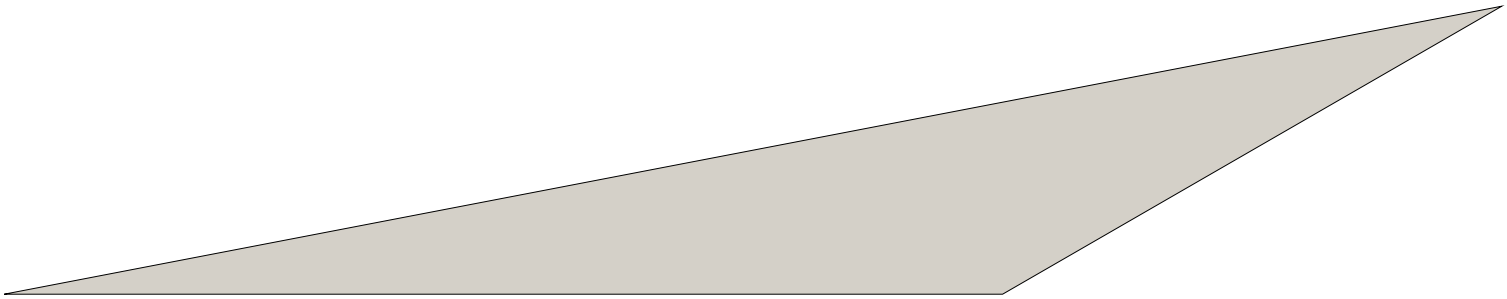
Fifth flight. F20-4W motor.
http://www.gardei.com/Dec292001/F20_Afterburner.mpg

AFTERBURNER DX-3 FIN LOCATION GUIDE

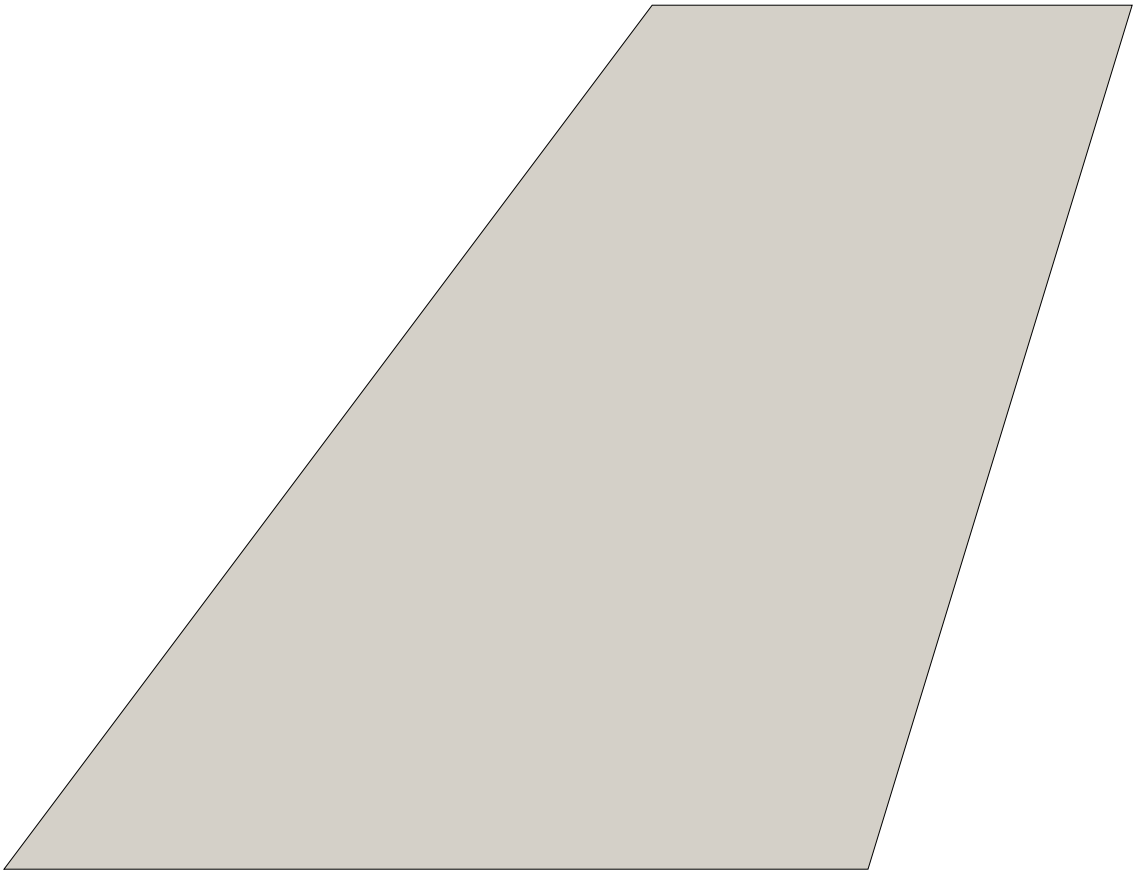




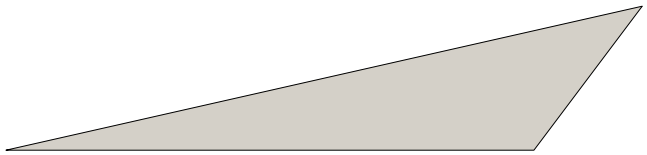
Afterburner DX-3 - Wings 2



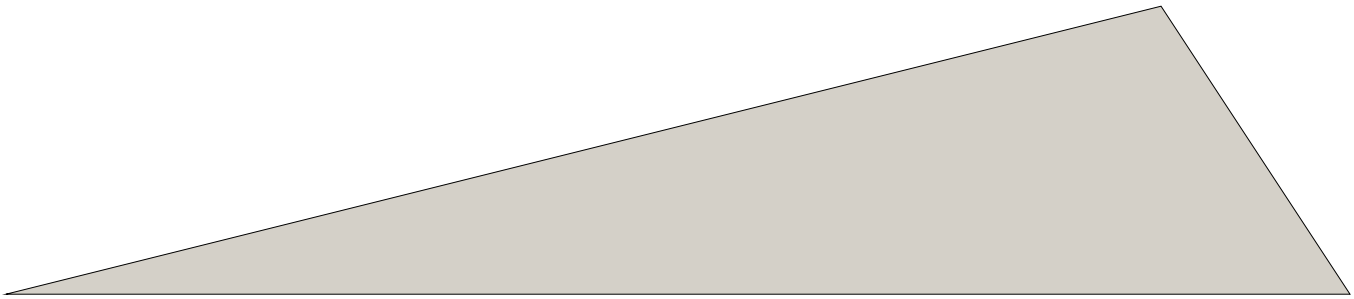
Afterburner DX-3 - Plasma Injectors



Afterburner DX-3 - Vertical Stab



Afterburner DX-3 - Sensor Array



Afterburner DX-3 - Cooling Fins

Afterburner DX-3 - Forward Phaser Array