

DarkStar - Parachute/Streamer Duration (18mm)

U.S. Record Holder (Pending)

C Parachute Duration: **3 min, 8 seconds**

By: Mark Talkington, NAR# 29275

Materials Needed for DarkStar:

Item	Source	Part #	Price
Balsa Nose Cone	ASP Rocketry	BNC 20B	\$2.99
12" Body Tube 18mm	ASP Rocketry	T-20/12	.79
1/32" Plywood	Your Hobby Store	N/A	.00*
Aluminized Polyester Tape	ASP Rocketry	TAAM72	.00*
30" OF 100 lb. Kevlar Shock Cord	Pratt Hobbies	SL1-C	.25
Small Screw Eye	Home Depot	N/A	.25
18mm Thrust Ring	ASP Rocketry	CR-520-6	.22
15" Hang Time Mylar Competition Parachute	ASP Rocketry	CP25-15	3.25
Snap Swivel (comes with parachute from ASP)	ASP Rocketry	N/A	N/A
C/A glue	Your Hobby Store	N/A	.00*
Tite-Bond Wood Glue	Your Hobby Store	N/A	.00*
5 min Epoxy	Your Hobby Store	N/A	.00*
Total Cost:			<u>\$7.75</u>

* Cost of these materials are negligible because only a small quantity of what you purchased is used. 8"x12" piece of Plywood is \$1.69. 72 yard long roll of Aluminized Polyester Tape is \$12.95.

You can order most of these materials online at:

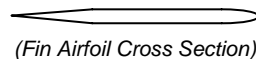
ASP Rocketry: www.asp-rocketry.com

Pratt Hobbies: www.prathobbies.com

Aluminized Polyester Tape is wrapped around shock cord at CG (with spent engine casing) so model descends parallel to ground

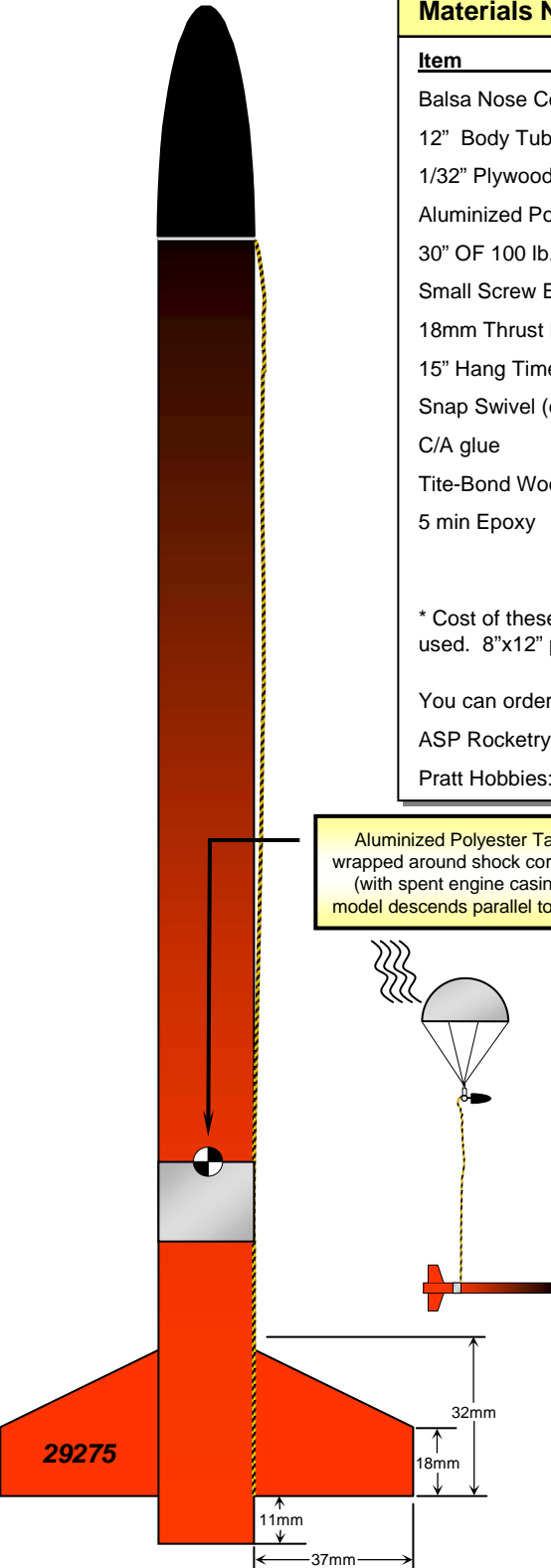
How to Build DarkStar:

1. Sand nose cone with 320 sandpaper, apply 50/50 thinned dope. Let dry and repeat two more times. Finish by sanding with 400 sandpaper.
2. Paint nose cone with a light coat of gray primer. Sand with 320 sandpaper until almost all of the primer is off. Use fine steel wool and polish until glossy.
3. Sand body tube with 200, then 320, then 400 sandpaper.
4. Cut fins out and sand to streamlined shape with sanding block and 320 sandpaper. Apply 50/50 thinned dope (only 1 coat). Let dry and sand with 400 sandpaper.



(Fin Airfoil Cross Section)

5. Glue fins to body tube 11mm from end with C/A. Apply small Tite-Bond fillets to both sides of 2 fins, and ONE SIDE OF 1 FIN ONLY (After painting the model, the shock cord will be attached to the other side of the fin with an epoxy fillet).



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How to Build DarkStar (Cont'd):

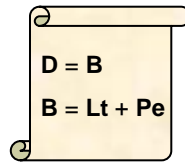
6. Glue thrust ring in rear of tube so that the engine sticks out about 7.5mm (or about $\frac{1}{4}$ inch). **NOTE:** The theory about moving the fins away from the end of the tube and having the engine stick out a little bit is that this creates a "boat-tail" effect and reduces drag. You can use this on other models with this formula:

D= Diameter of Body Tube

Lt = Distance of Fins from end of Body Tube

B = Optimal "Boat-tail" length for model

Pe = Distance of Engine protrusion from Body Tube



7. Insert nose cone into tube and paint model with light coat of paint (I used florescent red on bottom and feathered gloss black onto the top so that the model can be seen easily in the air **AND** on the ground).
8. Once paint is dry, sand entire rocket **LIGHTLY** with 400 sandpaper until a thin coat of paint remains. Then rub rocket with steel wool until shiny. **OPTIONAL:** Apply small amount of rubbing compound to model and work into paint. Remove any excess.
9. Sand the 1 remaining fin root that does not have a fillet until there is no paint in the root.
10. Place end of Kevlar cord into the root. (I taped it on the model and bent it around the fin so it lays flat). Apply a small amount of epoxy and make a fillet in the remaining fin root. Once epoxy is dry, remove the excess Kevlar from the base of the fin with an X-Acto blade. **DON'T CUT THE PART OF THE KEVLAR SHOCK CORD THAT IS TO BE CONNECTED TO THE NOSE CONE!!!**
11. Place an expended 18mm engine casing into the rocket and balance model (without nose cone attached and with no parachute in model). Once you have determined the CG, mark with pencil and wrap a strip of aluminized polyester tape so the model is once again balanced.
12. Screw the Screw Eye into nose cone. Remove and put small drop of C/A into hole. Re-Screw into nose cone.
13. Tie Kevlar cord onto Screw Eye. Put small drop of C/A onto knot and let dry twice as long as you think it should take.
14. Assemble Parachute according to instructions from ASP, and connect Snap Swivel onto Screw Eye.

How to Fly DarkStar:

1. Squirt talcum power into inside of body tube. Shake it all out. **OPTIONAL:** Do the Hokey-Pokey because that's what it's all about.
2. Insert 3 or 4 small wads of wadding into body tube. Each wad should look like a small ball and easily fit into the body tube.
3. Use your favorite poking device (pencil, launch rod, dowel, McDonalds® straw, etc...) and push wading about 3 or 4 inches into tube.
4. Wind Kevlar Shock Cord up on a pen or pencil and push into tube.
5. Z-fold the chute (then coat with a little talcum power) and push into tube. Make sure that the end with the shroud lines goes in last.
6. Put shroud lines into tube.
7. Add a very small amount of wadding, and then squirt a little bit of tracking powder into tube. Push in remaining bit of Kevlar and insert nose cone.
8. Friction fit (with tape) engine into rocket. Depending on the PD or SD impulse class, use a B6-6 or C6-7.
9. Fly from a Tower for best results. Make sure to rub off any residue from previous flight out of the tower with some steel wool.