The PET MISSILE
by Scott Tyrrell

The design for this rocket was inspired by an old American Spacemodeling article about oddroc flights at NARAM or some other regional meet. The article briefly mentioned someone who liked to take throw-away household items and turn them into something more than flying debris. Since that time, every time I see common objects and materials, I evaluate them for rocket applications. (In other words, in my mind I see chairs, bottles, boxes, shipping containers and every other object flying around.) [Ed. Note: Hummm...the landlord must really like him!] When this model was conceived my roommate was building big rockets he had designed, and was pushing me to do the same.

The plastic soda bottle seemed like a natural to convert for a model rocket application. It has a reinforced nozzle, is lightweight, four inches in diameter and about 15 inches long. The nozzle opening is just larger than a BT-20 size tube.

I set out to build my rocket using an engine hook, a shock cord, two BT-20s, a tube coupler, two 2-liter plastic soda bottles out of the trash, a sheet of 1/8" balsa, some balsa strips, a BNC-20 nose cone with most of the top cut off, three AR-2050 centering rings, and an 18" parachute. I wanted the appearance of the model to be as rotund as possible, so I designed the rocket to use nose weights and small fins for stability. Centering rings were peeled down and glued to the BT-20 so they would pass through the nozzles of the two soda bottles. I cut a hole in the top of the upper soda bottle as an exit point for the BT-20. I joined the two bottles with CA, but they broke apart while being handled during assembly. To make the joint secure, I spot welded the plastic together by pushing a hot pin through both pieces of plastic at the seam. I then filled the holes with epoxy and sanded the joint down. The fins and the balsa tube supports are joined to the body with epoxy. Weights were added to the tiny nose snub until the rocket's spin test was stable.

The first flight was an interesting one. I thought the rocket was stable, but I had no idea of how heavy it was, so I launched with a C5-3. The peak altitude was about 10 feet, and the landing dented the nose in nicely. Back to the drawing board. I bought a small 0-16 oz. home food scale, and the rocket weighed in at 8 oz.! Plastic soda bottles? The three liter version will have to have less ornamentation and less paint. Fortunately, AeroTech has saved those of us who build rockets without weighing all of the pieces. Time for some composite power.

After a quick and dirty repair job, I launched it with an 18mm D21-4. Whoops! This time I got a nice powered arc which smashed the front end of the bottle and about 4 inches of the BT-20.

Time to face facts. I had a very smashed, very un-aerodynamic rocket. The damage looked bad, but the fix could also give the rocket what it needed; a larger nose cone with its nose weight further from the fins. This also allowed for a larger parachute "stuffer" tube (Have you ever tried to pack an 18" Estes parachute into a BT-20?). I cut the entire smashed end off the front end of the soda bottle and also removed the 4 inches of crushed BT-20 body tube. I replaced the removed section of BT-20 with a section of BT-60 using a pair of RA-2060 centering rings. I then epoxied a new soda bottle end with a hole for the BT-60 onto the open front end of the rocket. I still wanted a somewhat rounded appearance, so I picked a Big Bertha nose cone (PNC-60MS). I then epoxied the nose weight to the inside of the nose cone. After final assembly, the rocket looked the same except for the larger nose cone.

I shelved the project during the winter while I moved, and past failures kept me from trying this version at the first two PARA launches I attended. Before I tried version three, I thoroughly spin tested it for stability. It tested very stable, as fast as I could make it go. I used another D21-4 to launch, and finally all of the work and aggravation paid off. I couldn't believe it! It finally worked, over a year after it was first completed. It weathercocked slightly. The newly installed 24" parachute puffed open, and it settled to the ground. It won't break any parachute duration records [Ed. Note: I don't know, how about a 36" mylar 'chute?], but a large bit of fun of rocketry is seeing something you planned and build actually work.

PARTS LIST

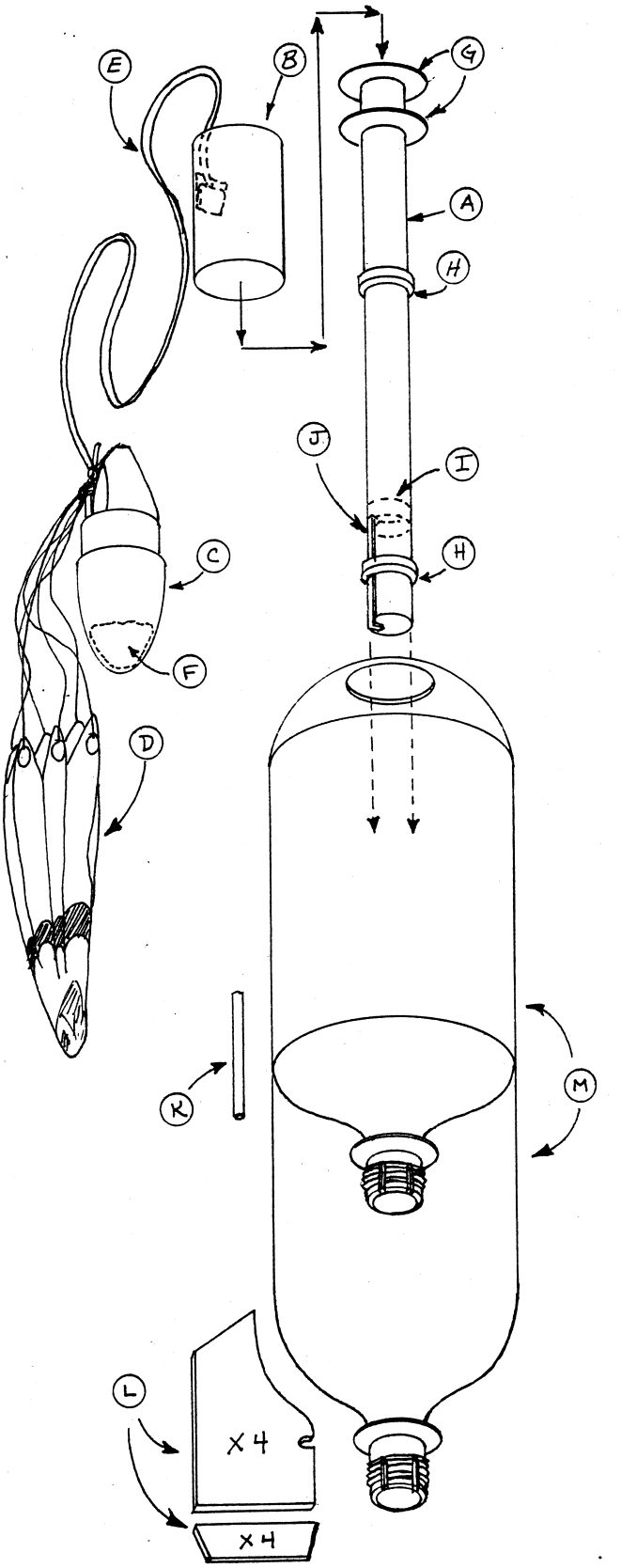
A. BT-20 Body Tube - 16"*
B. BT-60 Body Tube - 4"*
C. PNC-60MS Nose Cone
D. PK-24 Parachute Kit
E. 18" Elastic Shock Cord
F. 1 oz. Clay Nose Weight
G. (2) RA-2060 Centering Rings
H. (2) AR-2050 Centering Rings
I. EB-20 Engine Block
J. EH-1 Standard Engine Hook
K. LL-2 Launch Lug
L. 3/32" x 3" Balsa Sheet
M. (2) 2 liter Soda Bottles with Round Ends (Black Base Capped)

Engines recommended: D21-4, E25-4

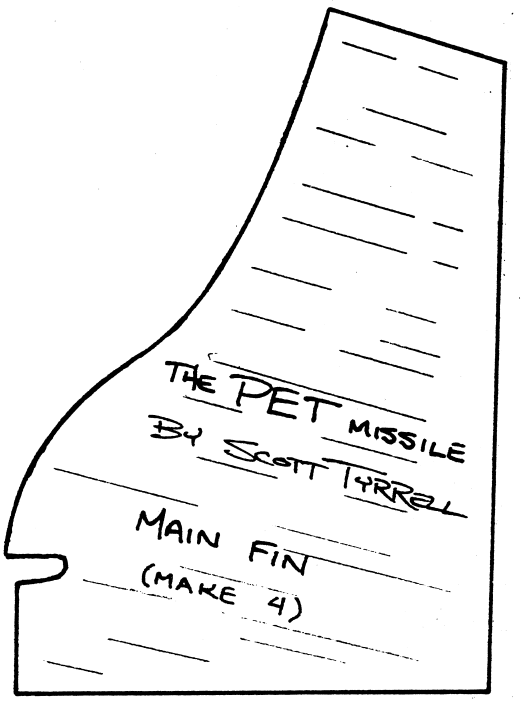
* Approximations. These lengths may vary depending on the length of the twin bottle assembly.

PHOTO IN NEXT EDITION!

FIN PATTERN on Next Page.....



FIN PATTERN * PET Missile



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TRIM FIN (MAKE 4)