

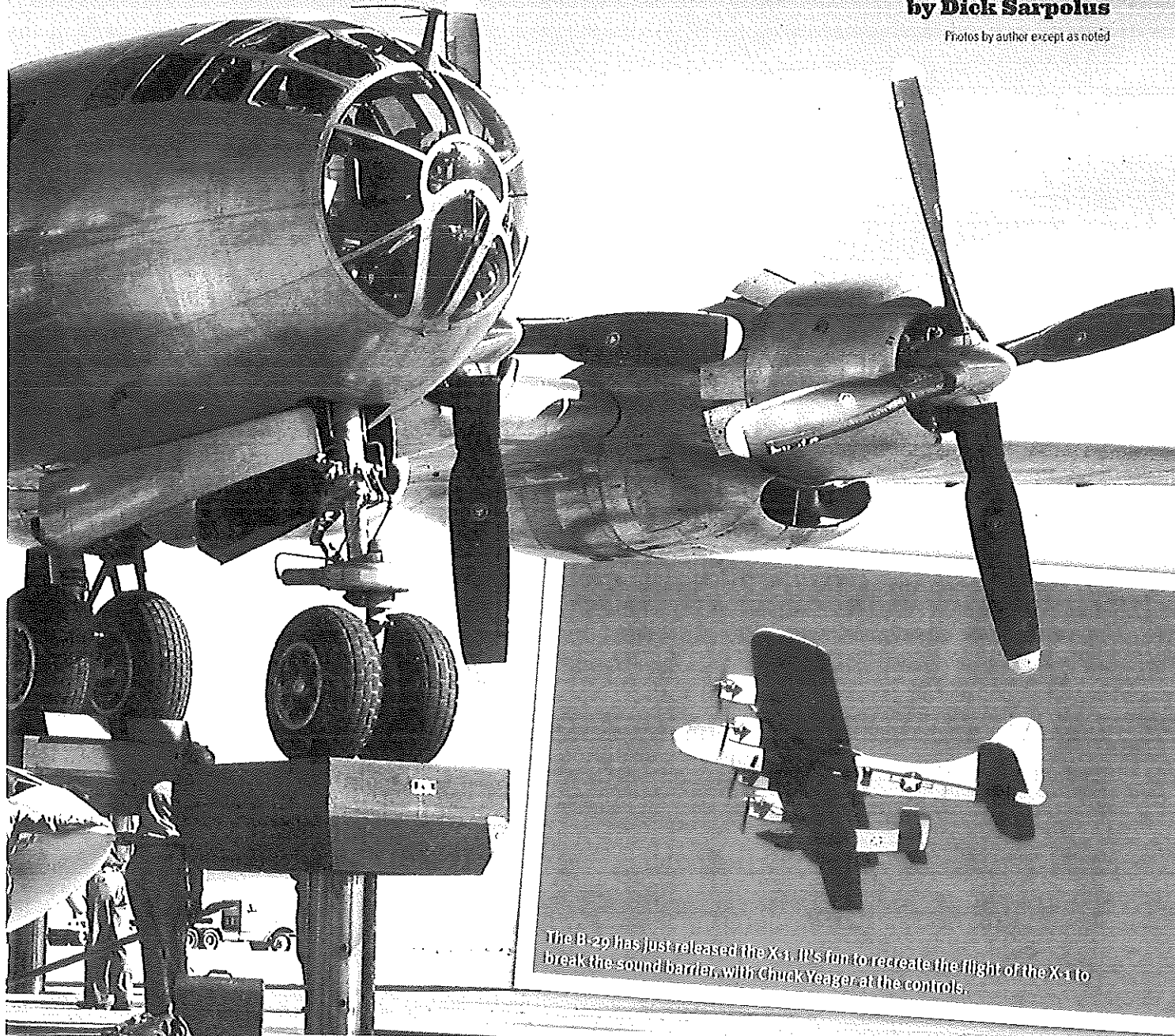
1095

B-29 and X-1

Relive the race to break the sound barrier

by Dick Sarpolus

Photos by author except as noted



The B-29 has just released the X-1. It's fun to recreate the flight of the X-1 to break the sound barrier, with Chuck Yeager at the controls.

The airplane had retracts and a smoke system, and in addition to carrying aloft and launching the rocket-powered X-1, it could drop parachutists. This airplane flew with seven receivers, 20 servos, and 16 batteries. Now *that* is some RC model airplane!

As I've gotten older, my airplane projects have become smaller and lighter. I enjoy building and flying compact, electric-powered foamie warbirds—no more large gas-powered airplanes for me.

Thinking about a new design effort, I knew I could do a

four-engine bomber, and to make it more interesting, so why not try a B-29/X-1 project such as Mac's, in a smaller, less-impressive size?

I've had a lot of fun with profile electric warbirds, all built around a "standard" hot-wire-cut foam wing core I've used for dozens of fun-fly airplanes. The wing core has a fairly thick, full, symmetrical airfoil, a slightly tapered planform, and a 48-inch wingspan. I cut down foam core to suit whatever design I'm working on at the time.

I laid out a profile B-29 with a 48-inch wingspan, 40-inch

Profile



Photo courtesy of NASA

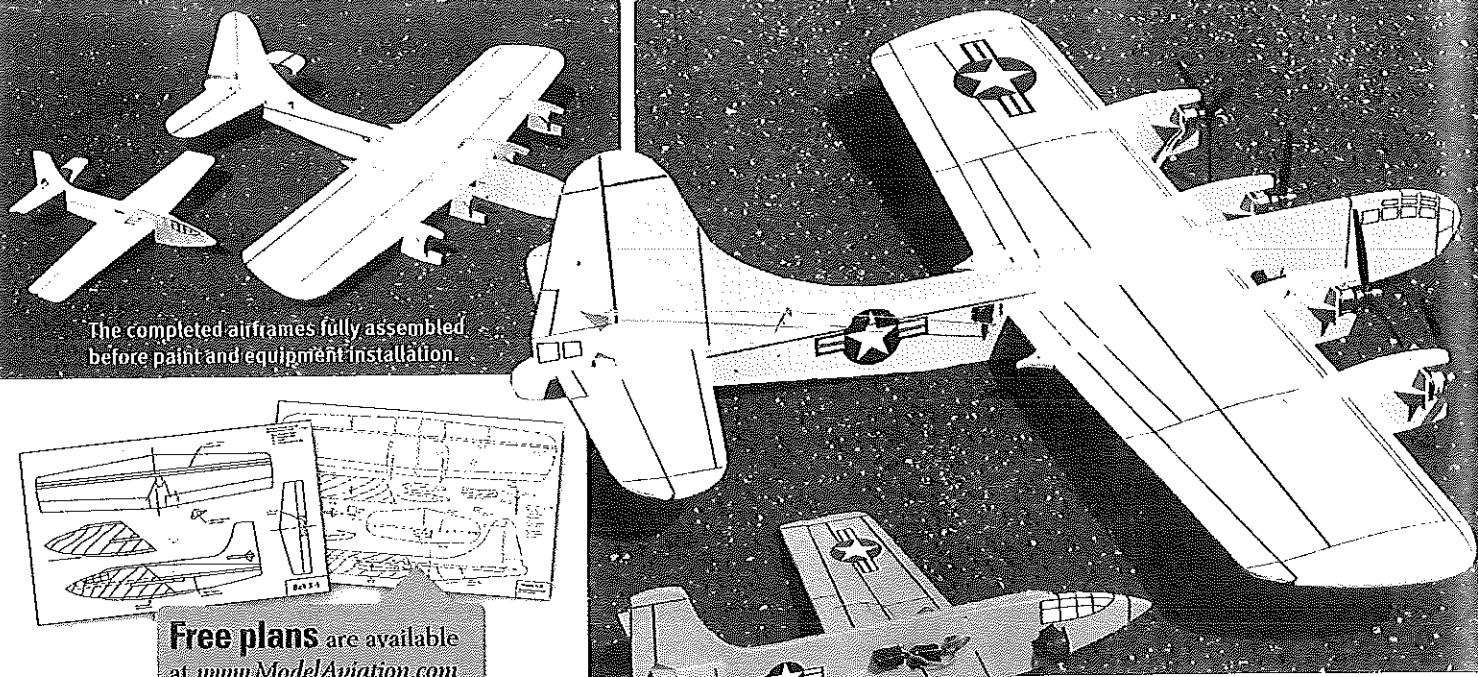
During World War II, our B-17s and B-24s were responsible for heavy bombing in Europe. When the B-29s came along late in the war, they did the heavy bombing in the Pacific. The B-29 bomber served again during the Korean conflict.

At that time, there was a demand for airplanes to fly faster, and Bell Aircraft built the X-1 as a supersonic research aircraft. A B-29 carried the X-1 up to altitude and dropped/launched it. Its pilot would then start the rocket motor and set about breaking the sound barrier. In 1947, Chuck Yeager piloted the X-1 and became the first person to fly faster than

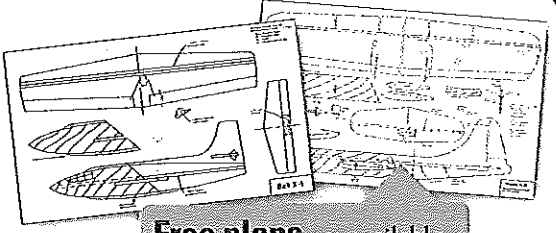
sound. Supersonic flight had arrived.

Most people know that aviation history, and many RC modelers are aware of the large B-29 model that Mac Hodges, from Georgia, flew for many years. He flew his B-29, including dropping a rocket-powered X-1, at RC aircraft gatherings, including Joe Nall Week and Warbirds Over Delaware.

Aeromodeling magazines have documented Mac's exploits with the large model, and many videos of his exciting demonstrations have circulated. His last B-29 spanned 20 feet, weighed nearly 100 pounds, was powered by four 80cc gasoline engines, and was fully aerobatic.



The completed airframes fully assembled before paint and equipment installation.



Free plans are available at www.ModelAviation.com and in the digital edition.

The author paints his foamie warbirds with low-cost, water-based acrylic craft paint, available in the arts and crafts stores in many colors. A black Sharpie marker was used for the panel lines.

length, and roughly 400 square inches of wing area. I planned to use four motors with approximately 120 watts each, for plenty of power.

I also laid out a 21-inch wingspan sheet-foam Bell X-1 airplane that I'd carry up to altitude with the B-29, release it, and another pilot would fly it back to the ground as a glider. If I could figure out a way to power the X-1 with a small rocket motor, it would be even better.

The project turned out fine. With four powerplants, the B-29 is slightly heavy, but it flies well and is quite aerobatic—rolls, loops, and inverted passes are no problem. It is fun to take that X-1 aloft, drop it, and have it glide down to the ground.

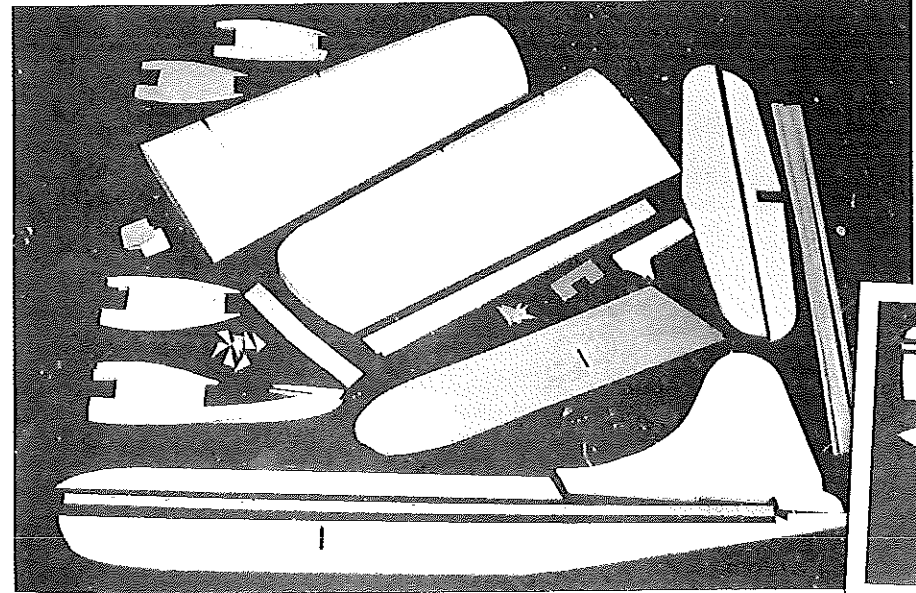
With the aileron and elevator control, its pilot said the X-1 was easy to control in the glide down to the ground. Unfortunately, it didn't glide so well—but hey, it was easy to

fly. My friend, Rich Border, built an X-1 from balsa and plywood, and powered it with a small rocket motor, which had an ignitor circuit on the airplane. The plan was to take the X-1 up with the B-29, drop it, and its pilot would ignite the rocket motor and climb the X-1 under rocket power, before a long glide down.

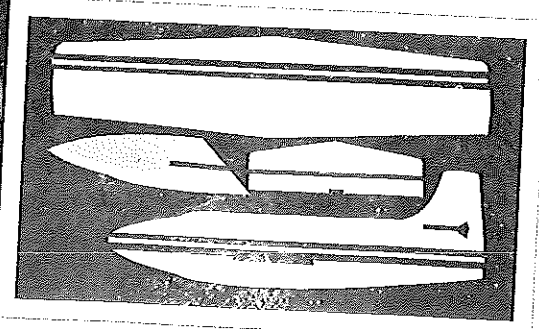
On the B-29's first try with the rocket-powered X-1, when the X-1 was dropped, the rocket motor didn't ignite and the X-1 was lost somewhere in the high grass and tough shrubbery surrounding our field, so no more rocket-powered X-1 flying for a while.

Then Matt Hamilton made a foam X-1 with carbon-fiber rod reinforcements. It was quite lightweight, even with the receiver, servos, batteries, ignition circuit, and rocket motor. We performed three test drops of the new X-1 so Matt could trim it out, adjust the throws, etc. He tried the ignition circuit on the ground, and the rocket motor happily came to life.

The first full test drop worked great. The X-1 was stable, the rocket fired, and the airplane flew rapidly straight ahead with an easily visible smoke trail. We



All of the parts are laid out for the B-29. The profile fuselage pieces, nacelles, tail surface parts, and ailerons are cut from 1/4-inch or 5mm sheet foam. The wing panels are hot-wire-cut foam, and are commercially available at low cost.



The X-1 is simply a small, sheet-foam glider with aileron and elevator control and doesn't require many parts.

have since made a half dozen successful drops. The rocket motor ignited on demand each time, and the X-1 was easily controllable. Those smoke trails were great to see! The burn time of the motors was one second. Now under consideration is a more powerful rocket motor with a longer burn time.

We had one near disaster. After the drop, the X-1 became tangled in the B-29's tail surfaces, and the airplanes went into a spiral dive. I cut the power on the B-29 and the aircraft separated. Both were easily controlled, and no damage was done.

The B-29 flies well, so consider this four-engine project. You don't have to carry along an X-1 to launch; you could have your B-29 launch your own Little Boy and/or Fat Man replicas.

The B-29's thick, airfoiled wing works well and certainly helps with the weight. The sheet-foam portions of the airframe are strengthened with thin plywood doublers and wood stringers, making the model rugged enough for active, practical flying. Things will likely break in rough landings, but this material is easily repaired with 5-minute epoxy.

Any commercially available 5mm or 1/4-inch foam is suitable for the airframe parts, even low-cost house insulation foam. For the hot-wire-cut foam wing panels, if you don't have access to a cutter, The Core House in Pennsylvania has a computer-driven cutting setup that does a good job. The company sells a box of cores at a good price.

I set the cores up for a 24-inch length and you trim them for the proper planform, tip shape, etc. I've made approximately two dozen profile warbirds, all using the same basic wing panels.

I cut the sheet foam parts out with a metal straightedge and a sharp, scalpel-type modeling knife. The 1/32-inch plywood doublers on the fuselage and the hardwood stiffener down the middle of the fuselage add the strength for the profile to work. Plywood doublers are also used on both sides of the sheet-foam engine nacelles, and 1/8-inch plywood firewalls/motor mounts are epoxied onto the nacelles with plywood fasteners.

There are more parts to cut out

for this four-engine project, but it is easy. I'm usually in a hurry and I often build with 5-minute epoxy. The type of sheet foam with thin plastic on both sides needs holes punched in it where the epoxy will go.

Cut slots into the wing cores for the strong, 1/8-inch plywood wing joiner. The wing spars are made from 1/8 x 3/8-inch basswood purchased at an arts and crafts store. They are epoxied into the foam cores. The two wing panels butt up against the fuselage sides. The joiner goes through a slot in the fuselage and into the wing cores between the upper and lower spars.

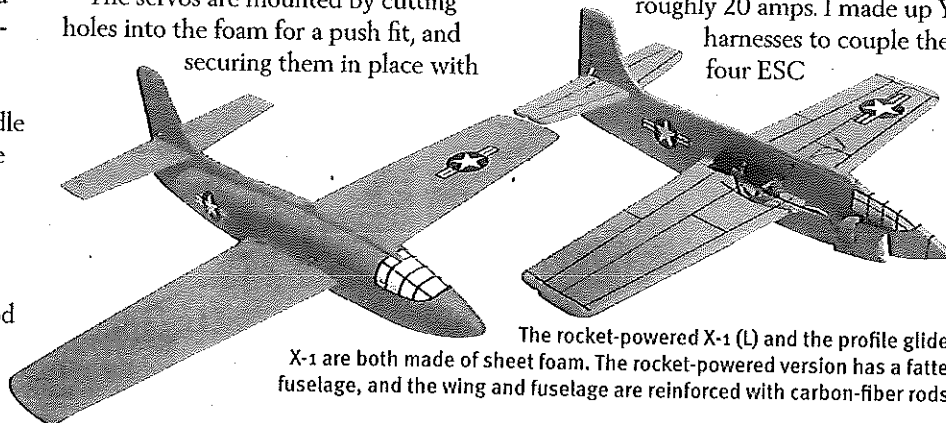
Done this way, there is not a large hole cut through the fuselage for the wing section. Slots are cut into the wing's leading edges (LEs) and back to the spar locations for the four engine nacelles.

The wingtips are sanded to a rounded shape and vinyl spackling putty is used to fill in the gouges and rough spots in the foam, which doesn't sand well.

The foam wing panels don't have to be covered for strength, but iron-on plastic covering keeps them clean and smooth, and makes it easy to achieve a good-looking paint job. I like SLC Covering sold by The Core House.

Hinging the control surfaces is done with 2-inch plastic packaging tape on both sides of all of the surfaces, as is customary on foamies. The LEs of the ailerons, elevator, and rudder are sanded at an angle, and the tape is first applied to the upper surfaces. Then, with the control surfaces folded upward, the tape is applied to the bottom, pushed into the hinge cap, and sealed to both edges. This allows free movement and provides a strong, completely sealed hinge gap.

The servos are mounted by cutting holes into the foam for a push fit, and securing them in place with



The rocket-powered X-1 (L) and the profile glider X-1 are both made of sheet foam. The rocket-powered version has a fatter fuselage, and the wing and fuselage are reinforced with carbon-fiber rods.

AT A GLANCE...

B-29 SPECIFICATIONS

Skill level:	Intermediate
Construction:	5mm sheet foam
Wingspan:	48 inches
Wing area:	400 square inches
Length:	40 inches
Weight:	40 ounces
Needed to complete:	Four 120-watt outrunner motors; four three-blade 7 x 4 propellers; four 20-amp ESCs; 3S 2,200 mAh LiPo battery; four-channel receiver; and four micro servos

X-1 SPECIFICATIONS

Skill level:	Intermediate
Construction:	5mm sheet foam
Wingspan:	21 inches
Wing area:	70 square inches
Length:	18 inches
Weight:	6 ounces
Needed to complete:	Two-channel receiver; two micro servos; 2S 500 mAh LiPo battery

dabs from a hot-glue gun. You can also epoxy plywood mounting pads to the foam and mount the servos with small screws. Slots are cut into the control surfaces and the plywood control horns are epoxied in place.

I used .047 music wire pushrods with a Z-bend on one end and a Du-Bro Mini-EZ link on the other end. Several plywood standoff supports for the pushrod along its length keep it from flexing.

Four brushless outrunner motors, capable of approximately 120 watts or so, are used. I like the BP Hobbies Cheetah A2208-14 motors with three-blade 7 x 4 propellers (I couldn't find any four-blade propellers). You will need an ESC for each motor, rated at roughly 20 amps. I made up Y harnesses to couple the four ESC

control leads together to plug into the receiver, and a heavy Y harness to couple the four ESC power leads together to plug into the three-cell 2,200 mAh LiPo battery pack.

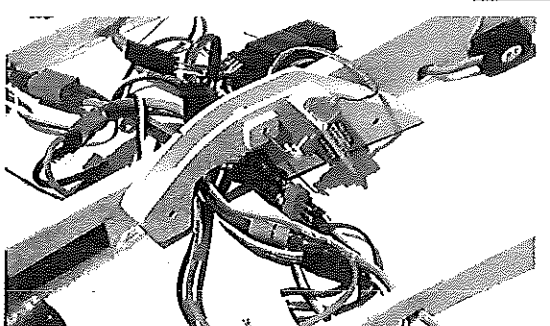
The ESCs, receiver, and battery pack are mounted to the wing surface and fuselage with hook-and-loop tape. I cut slots through the fuselage above and below the battery pack for a hook-and-loop strap to hold it in place. The four ESCs and all of the wiring on the bottom surface of the wing make a mess, and you'll need to put some holes through the engine nacelles and the fuselage for the wiring to connect.

I suppose you could bury much of the wiring in the wing foam core, but that seemed like too much trouble. With the wiring below the wing, the top of the airplane looks good and when it's flying, you don't see that mess of wiring. It doesn't seem to bother the airplane's flying ability, so I can ignore it. Hey, this is "fun-scale" stuff. Put on some scale detailing and have fun!

Four small servos and a small Y harness for the two aileron servos are needed.

I paint my foamie warbirds with water-based acrylic craft paint, available in most arts and crafts stores. It is inexpensive and comes in many colors. I couldn't find any silver/aluminum metallic paint that I liked, so I painted the B-29 light gray. An inexpensive airbrush or small spray gun works fine. It's easy to thin the paint with water.

I use a 1-inch wide foam brush to apply the paint by hand. It works fine, provides a decent finish with not too much work, and cleans up easily. A black Sharpie marker pen works well for drawing the panel lines and other scale



The release mechanism on the bottom of the B-29 retains the X-1 until it is released by the pilot.

details that add so much to the overall scale military appearance.

Military insignia is available through hobby outlets, but I've had plenty of insignia copied at local digital copy shops, enlarged or reduced, and printed onto peel-and-stick paper. The copier ink isn't waterproof, so I spray the insignia with flat, clear polyurethane before sticking them onto the airframe.

If you don't want to stop with the B-29, but want to build the X-1 for even more fun, it's easy to make it from the same sheet foam with some thin plywood and wood stiffeners. Only aileron and elevator control is needed to fly it back to the ground after it's launched from the B-29.

To carry and launch the X-1, I made up a plywood-and-balsa wooden carrier with a slot in it for the X-1 fuselage. It bolts onto the side of the B-29's fuselage below the wing. A small servo moves a wire pin in and out through the carrier and the X-1 fuselage to retain and then drop it.

You can add rocket power to your X-1, or another suggestion that might work out well would be to use a small, high-speed brushless motor in the rear

fuselage of the X-1 with a small pusher propeller.

The easiest way for me to launch the B-29 is with an underhand, swinging-arm launch (I can't do overhand javelin-throw launches anymore). This bomber has plenty of power to climb up and out of a hand launch. Because of its weight, when landing it's best to carry a good bit of power down to the ground, cutting power just before a smooth touchdown.

This is not a 20-foot wingspan, 100-pound gas burning, noisy B-29. It's small, lightweight enough, quiet, neat and clean, and can be flown nearly anywhere for plenty of fun. This B-29 looks good making a low-level inverted pass, a spin, and other good moves.

Hey this stuff is fun! 🛩️

—Dick Sarpolus
rsarpolus2@comcast.net

SOURCES:

The Core House
(717) 566-3810
<http://home.earthlink.net/~philcartier/webcat/catalog.html>

Du-Bro
(800) 848-9411
www.dubro.com

Spektrum
(800) 338-4639
www.spektrumrc.com

BP Hobbies
support@bphobbies.com
www.bphobbies.com

