

# THE NIKITIN-SCHEVCHENKO IS-4

*The last of the Soviet folding-wing fighters is inherently stable with low drag and good moments, making it a fine project for WW II combat events; this one qualified at the FAC Nats.*

by Mark Fineman

## IS-4

**TYPE:** Rubber Scale, FAC Combat

**WINGSPAN:** 18 inches

**WING AREA:** 55 square inches

**LENGTH:** 17<sup>7</sup>/<sub>8</sub> inches

• Among the many pleasures of modeling is the ability to create a flying replica of an obscure or experimental aircraft. Watching such a craft take wing provides insights into what the designers and engineers of its full-size counterpart must have felt watching their creation as it flew. The subject of this article was just such a unique project, a short-lived but attractive Soviet fighter that reflected the conflicts among its creators.

The high command of the Soviet Air Force remained enamored of biplanes long after other air services had abandoned them in favor of the sleeker monoplanes.

Such was the intensity of the biplane-monoplane controversy, that a series of peculiar aircraft was commissioned that could be flown in either form. These "folding fighters" were designed in such a way that the lower wing could be retracted into recesses in the fuselage and upper wing, thereby allowing the maneuverability of a biplane or the speed of a shoulder-wing monoplane as the circumstances required. This early example of variable geometry was eventually dropped in favor of more conventional configurations, notably the low-wing monoplane.

The last of the folding-wing fighters was the Nikitin-Shevchenko IS-4 (named for its principal designers). It is an ideal subject for a flying model because of the inherent stability of the shoulder wing in the monoplane configuration, the narrow

frontal cross-section afforded by its water-cooled engine, and good nose and tail moments. Photographs of the IS-4 have never appeared in print, but a good 3-view and perspective drawings were published in *Soviet Air Force Fighters, Part 1*, by Green and Swanborough (Arco, 1977). The real aircraft did indeed fly in the summer of 1941, but appears to have been abandoned in the face of the rapid advance of the Wehrmacht.

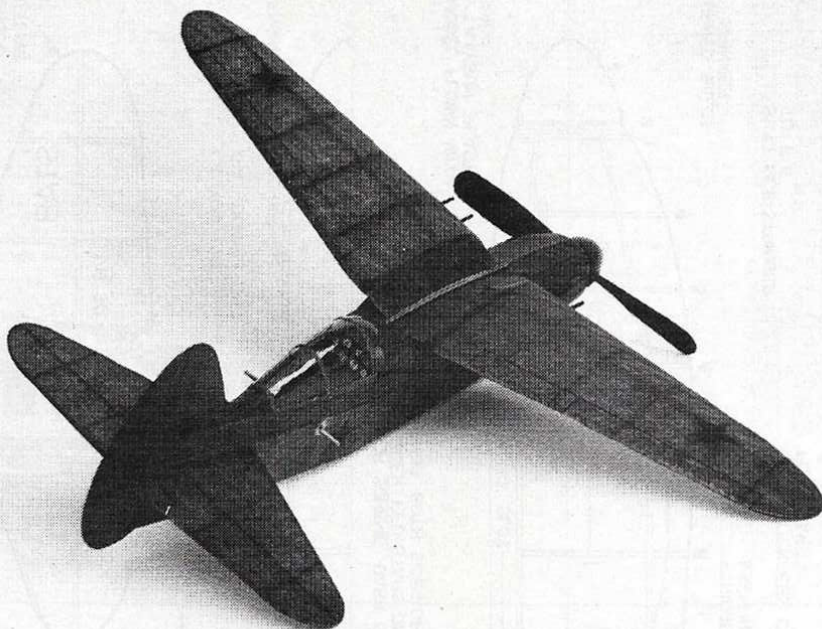
My 18" span model was specifically designed with mass-launch WW II combat competitions in mind. Most of my low-wing model fighters have exhibited suicidal glides once the power ran out, so the Chambermaid-like proportions of the IS-4 had an irresistible appeal. The model recently won the WW II combat event of the Glastonbury Connecticut modelers and was one of a dozen models to qualify for

the event at the 1980 FAC Nationals (nearly 50 were entered)! It is an extremely stable plane that regularly turns in times in excess of a minute; its best time to date is about 1½ minutes, but I may be flying it slightly underpowered.

**Fuselage.** Lay down the longerons and uprights for one side of the fuselage and build the second side directly over the first (separate the two sides with plastic wrap to prevent sticking). The side ladders are glued together at the rear and crossmembers added. Work carefully so as to avoid warping the structure. Next, glue on the formers; side formers are present only in the nose area and top formers are omitted between stations 6 and 9 in order to form a slot to accept the wing. Because the real aircraft was decidedly slab-sided, not many side formers are necessary for the model. When the formers have thoroughly dried, the stringers are added. The two side stringers in the nose area are butt-glued to the uprights at station 6.

**Tail surfaces.** These are quite conventional except that I used bamboo tips. Bamboo makes an extremely fine, strong outline, and a single piece can be bent over a warm soldering iron and then split to produce two tips—a great work-saver. Should you be unfamiliar with the fabrication of bamboo tips, substitute 1/16" sheet or laminated outlines.

**Wing.** The wing is the only unusual feature of the IS-4. Begin by building the two wing panels (note that there is no center rib), and when these are dry block up each tip 1¼", and glue the spar, leading and trailing edge joints to obtain the correct dihedral. When this structure is thoroughly dry, indent the leading edge



**Unusual wing configuration of the Nikitin Schevchenko IS-4 is apparent in this photo. Plane is specifically designed for mass-launch WW II combat competitions.**

1/16" so that it will accept the leading edge wing former; glue in the spar former. When properly positioned, each former should extend ½" beneath the wing ribs abutting it. Both the leading edge and the spar can then be shaped and sanded to conform to the former outlines (this is the basis for the gull-wing shape). The trailing edge wing former is simply glued beneath the trailing edge. Then attach the side pieces so as to form a box; the missing corners are filled in with scrap and eventually sanded to make a smooth contour that

blends in with the fuselage. The photographs will help you to see how the center section of the wing was constructed. If the wing is to be detachable, bits of 1/16" scrap should be added to the interior edges of the wing box, extending down at least ¼" to prevent the wing from shifting from side to side in the fuselage.

**Finishing.** The canopy was vacuum-formed and black tissue applied to the top of the cockpit area so that rubber lube would not splatter the canopy. I also added an instrument panel to dress up the appearance of the model. The entire model was covered with domestic tissue, dark green above and light blue beneath. This color scheme is a best guess since photographs of the IS-4 have never been published; pictures of the earlier IS-2, however, strongly suggest this coloration. Inked control surface outlines and red stars should be added, along with 1/16" diameter dowel cannon muzzles in the wing and scrap balsa exhausts.

The spinner was turned from a balsa block, hollowed out, and notched to accept the propeller. The free-wheeler is a length of 1/16" o.d. brass tubing that extends through the propeller and the spinner so as to mimic the cannon that fired through the prop hub on the real plane—carefully notch the end of the tubing to make the free-wheeler. Better still, solder a small length of 3/32" o.d. tube over the narrower tube and notch it. This practice allows the prop greater freedom of movement and minimizes the chances of binding the prop shaft.

**Flying.** The IS-4 should float, not zoom. For this reason, start with modest amounts of rubber and then work your way up. My plane is currently being flown on four strands (two loops) of 3/32 FAI, 25



**Mark Fineman's smile clearly shows he is pleased with his creation. This unique bird recently won at Glastonbury, Connecticut, WW II combat event; qualified at FAC Nats.**

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## IS-4

inches long. At first the model tended to fly in a nose-high attitude, but this was corrected with nose weight (the balance point is the customary one-third aft of the leading edge). The plane also required a few degrees of down and right thrust adjustment, accomplished with shims. The model weighs in at about 1¼ ounces, minus rubber, and exhibits the tractable glide that I had hoped for.

I've come close to flying this ship out of sight on several occasions, so have fun, but be careful!

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