# #664

# STUKA STUNT

**Larger than the average ½A Stunter but still compact, this somewhat-scale Stuka with its 37¼-in.-span, 223½-sq.-in. wing is a real performer. It's quite competitive and tons of fun to fly.**

## ■Barry Baxter

IN THE EYES of most fledgling modelers, kit manufacturers are the indisputable experts on model design standards. After all, if you're going to invest time and capital into building models, you're certainly going to make sure they're thoroughly tested and that they deliver the best possible performance. Surely kit companies wouldn't produce second-rate equipment—or would they?

The average beginner unquestioningly assumes that manufacturers have proven their products through hours of flight testing. When he buys a kit, he takes it on faith he's getting the best performance attainable for that particular type of model. Ergo, when the kit companies build ½A models with 18- to 24-in. wingspans, that must be the correct size for ½A airplanes, right? Heaven forbid that we should question the commercial arbiters by considering anything with a wing area in excess of 120 sq. in.!

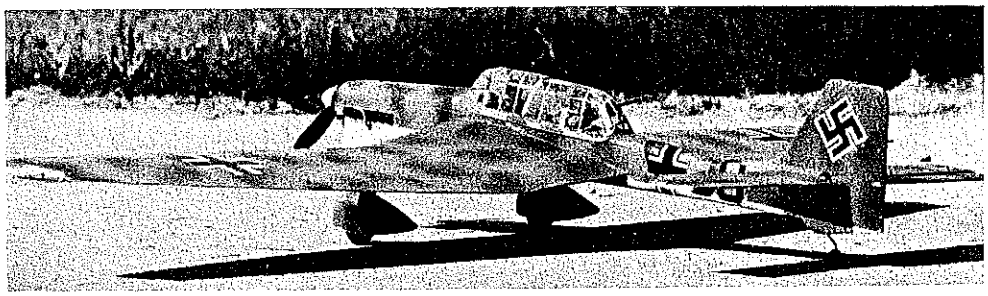
A little time in the hobby is usually sufficient to destroy that illusion. Manufacturers don't have all the answers, and they're often swayed by expediency. Smart builders discover that there are better ways to make airplanes. They've also learned that, generally, bigger is better.

Perhaps the Control Line manufacturers back in the Fifties figured that smaller models would be cheaper to produce. But could they fly? Just barely!

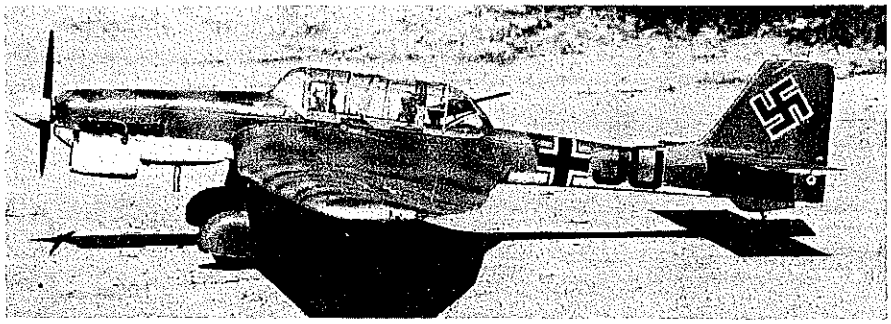
The small airplane syndrome was rampant throughout the industry. The .15-size kits were little bigger than current ½A Combat models. In fact some of today's .15 kits make excellent ½A models.

Combat fliers have probably made more advances in ½A performance than any other group. It's the most populous category of flying, and Combat competition places high performance demands on the model. The Combat pilot's experience has proven that airplanes with wing areas ranging between 180-200 sq. in. fly much better. I have seen an experimental Combat model with a 270-sq.-in. wing. Though it flew quite well, this craft was too difficult to build light enough for Combat competition, so it wasn't a viable design.

While an assortment of ½A Stunters have



**Top picture: The finished Stuka on display at a ½A Day contest. The model was completed only the weekend before and wasn't able to fly in competition because of a fuel capacity problem. It's powered by a Cox Medallion .049 engine swinging a three-bladed prop. The Stuka weighs 10-11 oz. and will fly the entire Stunt routine on short 35-ft. lines. Above: This shot shows the large, inverted gull wing. The model is painted with Polly-S plastic model paint.**



This side shot shows the fuselage to be very nearly scale in the nose and tail moment arms, although slimmer than scale in deference to performance. Decals are from a Guillow kit.

The author displaying the blue belly of the Stuka to show its relative size. It's considerably larger than the typical ½A Stunter.

been published, including some outstanding designs featured in the magazines from time to time, none has gained universal acceptance. Part of the problem is that most CL fliers have never *seen* really good-flying ½A's. Many, no doubt, recall those miserable ready-to-fly models (probably the single biggest reason that many people shun Control Line flying), and the solid wood kits that weren't much better. If you've never seen a small model that can really carve air, you've missed some exciting flying machine performance.

Here's your chance to catch up. With a 37¼-in. wingspan and 223.5 sq. in. of wing area, this Stuka is a great-flying ship. I'm hoping that it will whet the appetite of some of you Control Line fliers out there.

**The Stuka design** was influenced by one of my favorite .35-powered Stuka Stunt models created by Hi Johnson back in the 1950s. But the airplanes are just distant cousins. A scaled-down version of Hi's design wouldn't have worked as a ½A Stunter. His wing was far too thick, and the tail moment arm was too short for a scale-sized fuselage.

This ½A Stuka weighs 10-11 oz. and is powered by a Medallion .049. Though the 35-ft. lines—rather short compared with the 42-ft. norm in Stunt flying—tend to limit the actual maneuvering area, this model still flies the entire Stunt pattern with ease.

The wing has a 15.5% airfoil with an elliptical leading edge that maintains good laminar airflow at high angles of attack. The airfoil comes from a very successful ½A Combat design that negates the need for flaps and other high lift/drag devices. As long as the CG (center-of-gravity) is properly located, the small elevator is more than adequate for the task at hand.

The prototype was built in two weeks with the hope of being able to fly in a ½A day contest. Though it was completed the weekend before the contest, a fuel capacity problem couldn't be sorted out in time for the Stuka to compete. Three-quarter-ounce capacity just ain't enough to get through the pattern, folks!

## Construction

**Wing.** Begin by cutting the rib templates from aluminum, Formica, or other hard material. Place eight pieces of 1/16 balsa between the templates. A couple of pins or small nails through the templates will work nicely for holding things together. Be sure the nails are straight, so that they won't interfere when you trim the ribs to size.

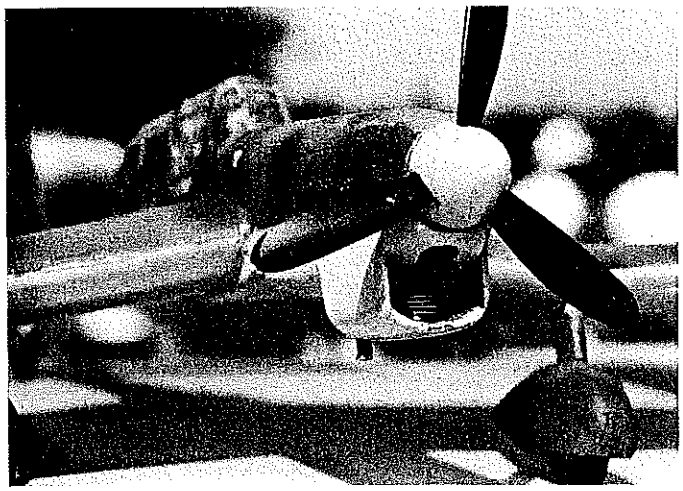
Place the tip template leading edge ½ in. behind the root template leading edge to align the spar slots. Carefully cut and sand the balsa outside the templates (cut away all balsa that doesn't look like a rib), then cut the spar slots. Remove the first set of ribs, and repeat the operation for the second set. Square off the edges as shown on the plans. Make four more #3 ribs, two of them from 1/16 plywood.

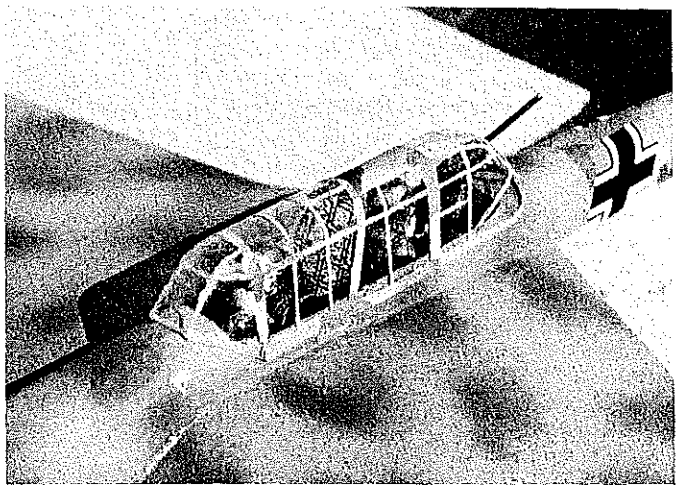
Form the landing gear wire as shown. Cut a slot in each plywood #3 rib (see plan), insert the gear wire, then make a sandwich with the balsa #3 ribs. I used CyA (cyanoacrylate glue) throughout the construction.

Install the trailing edges, ribs, and spars of the four wing panels. *Do not* glue in the two #3 triple rib assemblies with the installed landing gear wire yet. The inboard panel ribs (#1 and #2) must have their main spar notches extended forward to bring the leading edge spar back parallel to the main spars.

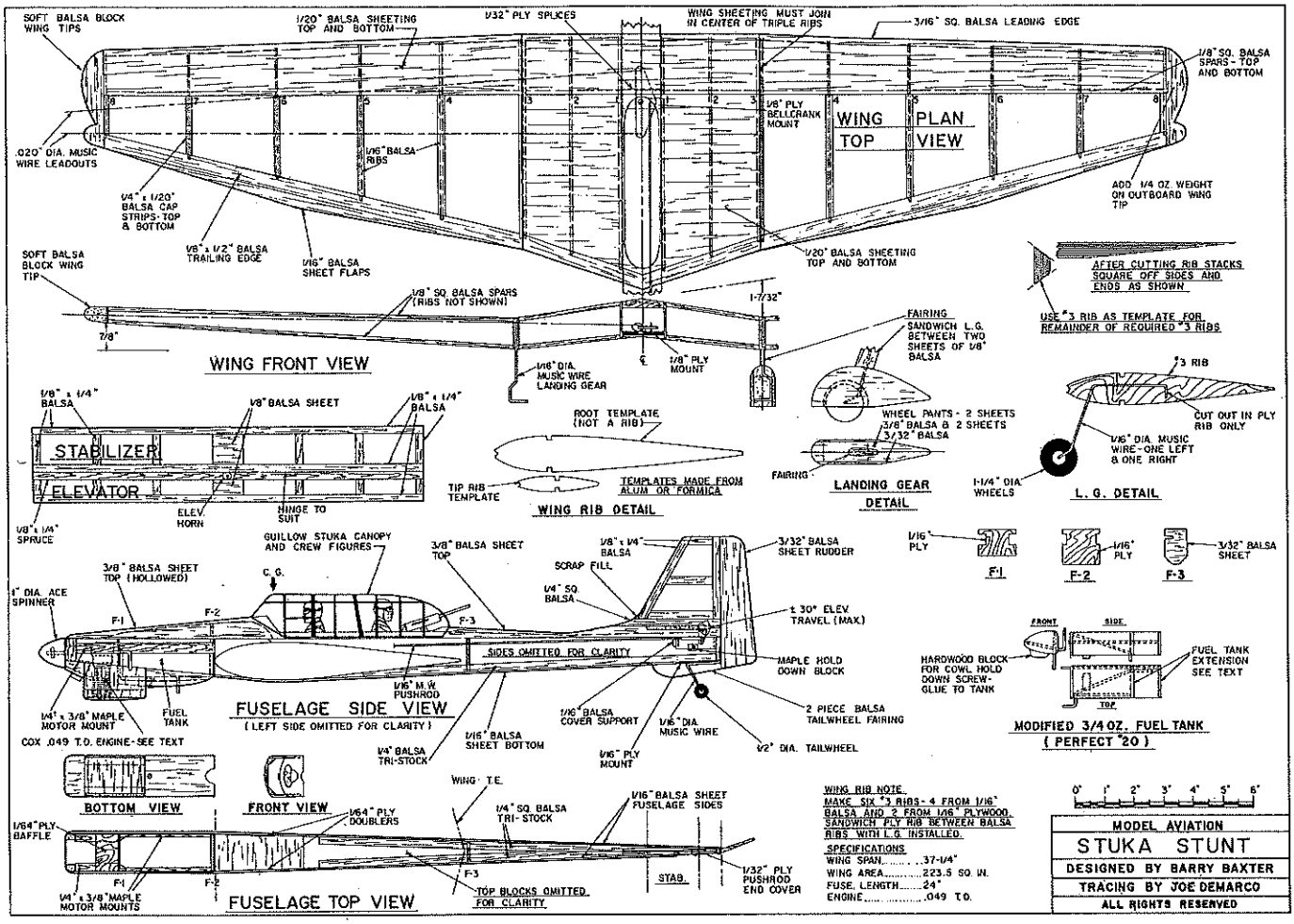
Working upside down, level the trailing edge of one inboard panel. Raise the opposite inboard tip 1 7/32 in., trim the center spar tips for correct dihedral, and glue the center section together. Add the spar joiners and bellcrank floor.

Turn the center section upright again, and level the panels. Because of the landing





Left: Close-up of the Stuka's business end. The model can be powered by a TeeDee .049/.051 or a Medallion .049. It flies quite well with the three-bladed prop but does better with a standard Cox 5 x 3 prop. Right: The canopy, crew, and bulkhead are from a Guillow Stuka kit. The canopy can also be heat-formed or built up. The machine gun is made from scrap balsa and brass tubing. All these photos are by Mike Keville.




gear wires, you'll have to work along the edge of your building table. Raise the outboard tips ⅞ in. and add the #3 rib assemblies, making sure the landing gear wires are parallel to each other and perpendicular to the ground. Trim the spars and the leading and trailing edges for correct dihedral angle, and glue the #3 rib assemblies and wing panels together.

Install the bellcrank, lead-outs, and pushrod. Trim and install the inboard and outboard leading edge planking so that it joins at the center of the #3 rib assembly. Install the tips, center section planking, and false trailing edges. Don't forget to add a ¼-oz. tip weight.

**Fuselage.** Assemble the right and left fuselage doublers, engine mount, and filler blocks to the fuselage sides. Slip the sides on the wing and add the bulkheads, making sure the fuselage remains square with the centerline and wing. Install the belly planking and tail wheel support. Install a 1/64 ply baffle plate on the maple engine mount bearers, then drill the mount and install the nut plates.

The baffle plate helps direct airflow over the engine, through the engine compartment, and out through the rear of the tank area, while eliminating the exhaust gases flowing through the engine compartment. Experience has shown me that air does not always flow well into an intake behind a spinner and cowl without a clear airflow through the compartment.

**Stabilizer, elevator, and rudder.** Construction here is simple and straightforward. Install the stabilizer and elevator, and set up the control system. Elevator up-and-down travel of 30° is more than adequate. If desired, you can install a pushrod end access door below the stabilizer, although this has proven to be a bit of a weak spot.

Install the upper fuselage blocks and rudder. Build and install the wheels, wheel pants, and tail wheel. The canopy, crew, and decals came from a Guillow Stuka kit, but a canopy could be formed over a wood block while the canopy material is heated in an oven, or one could be cut and bent from a flat sheet. The wheel pants from the Guillow Stuka kit could also be modified (shortened) and used.

**Covering and finishing.** The original was covered with preprimed Micafilm, painted with Polly S acrylic plastic model paint over automotive primer, and sealed with a coat of Black Baron clear. It worked well, and authentic colors are available from most hobby shops that carry plastic models.

A 1⅛-oz. fuel tank was built by adding a section to a Perfect #20 tank. The rear tank cap was removed, a piece of .010 tin bent to the shape of the tank and inserted into its end, and the original end cap reattached. The tank was replumbed for Uniflow as shown. A block of hardwood is glued to the tank to act as an anchor for the cowl mounting screw. Be sure the screw isn't so long that it penetrates the tank.

**Flying.** Balance the model as shown; the original required ½ oz. of lead in the nose. It will groove well but still have crisp response in the square corners. Loops require 25-30° of elevation to accomplish, leaving plenty of room to fly through the 45° pattern maneuvers.

The prototype is powered by a stock Cox Medallion. I found a 5 x 3 black Cox prop to be quite efficient. A couple of hints may be in order to assist you in operating the Cox rotary-valve engines.

Replace the stock needle valve on the Tee-Dees with the fine-thread version available from Dale Kirn, 283 N. Spruce Dr, Anaheim, CA 92805, or from Kustom Kraftsmanship, P.O. Box 3010, Fallbrook, CA 92028.

Shim the cylinder until its shoulder is flush with the piston at top dead center. This saves plugs and ensures proper port timing. Shims are available from Kustom Kraftsmanship, with installation instructions included.

Before starting ½A engines, clean the spraybar assembly thoroughly to remove old castor oil from the jets, especially if they've been sitting for more than a couple of weeks. Your initial start will be much easier, and you'll have fewer operational hassles overall.

A low battery can be one of the biggest frustrations in ½A flying, so make sure yours is fresh. If it isn't, the engine will pop and bang but resist your efforts to start it.

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couple of weeks at the Bladder Grabber?

**This year at the Northeast Regionals** they didn't fly Fast Combat because of the problem with fly-aways (the contest is held at the airport in Eugene, OR, and there are lots of expensive commercial jets cruising around). It's bad enough having a fly-away model come to rest in the flying area—but even worse if it ends up in an area inhabited by nonfliers. Let's hope that someone can come up with a reliable fuel shutoff that could be used in all the events—or at a minimum something that would destabilize the model to keep it within the confines of the flying area so the competitors are the only ones who have to dodge it.

**If you're thinking of buying** one of the Fox Mark VI engines, you'd best get on the phone to Duke Fox and do it now. The current price of the engine is $100, and it's only available from the factory (tel. 1-501/646-1656). The report I have is that there are only 100 of these engines left, and when they're gone . . . well, you know the rest.

**A giant leap in ½A technology:** The new Shuriken ½A engine seems to be just that, what with its 29,000-rpm red line and about 50% more power than the current Cox TD .049. Look for some very large models using this engine to appear sometime soon.

The word I got was that the manufacturer is totally swamped with orders for this little jewel, so even at about $200 a copy the fast guys are going to be going even faster. It will be difficult to fly one of them on our current 35-ft. lines, so we may be forced to move up to 42 ft. (or more).

**Somebody asked me** who I thought was the best Combat pilot in the world. In the U.S., we have *the* legend, Riley Wooten. Joining a very elite group would be guys like Richard Stubblefield and Howard Rush (who is entertaining to watch even if he doesn't win). We have a whole bunch of top-notch fliers in a category that is too close to call—people like Fluker, Cleveland, McFadden, not to mention the twin terrors John Stubblefield and Michael Willcox.

There's a bunch of foreigners who deserve to try out for world's finest, too. The British have Richard Evans, Dave Wood, Mick Tiernan, and the always-tough Mr. Vernon Hunt. How about the Soviet stars like Doroshenko, Beliaev, Necheutkhin—and reigning World Champion Faizov? No list would be complete without the Wakkermans and Fred Meyer, and we all remember Osteman's performance at the 1984 World Champs.

If John Madden can have his all-American team, I should be entitled to my all-world team. Maybe after the next World Champs I'll give it some thought. It may be safer to pick people who have already retired.

## Stuka Stunt/Baxter

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**Maybe you want** a weekend flier. Maybe you want a model that'll leave you with a smile on your face when those ½A day contests arrive. Or maybe you want both. Off the contest trail or on, the Stuka is guaranteed to be one of the most unusual ½A Stunt ships around—and one of the ablest fliers. This one is designed to win!

## USFFC/Oldenkamp

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Mother Nature's support system prevailed well into the late afternoon. Two very significant records were established: Paul Herbst broke the 1984 P-30 mark with a record 30:08. This in spite of being away on chase for the best two hours of the day, which weakened his crack at the six-minute flight barrier. And one of the oldest standards, Bobby Morgan's 31:09 in Junior ½A Gas (1977), fell to newcomer Jon-Mark Carman at 40:49. Finally, Terry Thorkildsen copped the Ocie Randall High Time Gas Trophy by posting 69:18, just shy of his own record in the category, with his *Model Aviation* plan ½A Astrostar. Outstanding climaxes to a great day!

As dusk approached, many of us were out to test and sport fly with an eye toward the night session and Sunday's even bigger slate. Dark scud on the horizon announced a change in the weather. Some periodic dust cells blew through, and the temperature dropped—but not before your author managed to sacrifice a brand-new Wakefield (BoomBox IV) to a violent thermal that liter-

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