THE ALBATROS SPORTFLUGZEUG

By JEFF BREECE . . . Though of conventional construction, this model still manages to be just a little different in many subtle ways, not the least of which is the clever engine set-up . . economical and quiet.

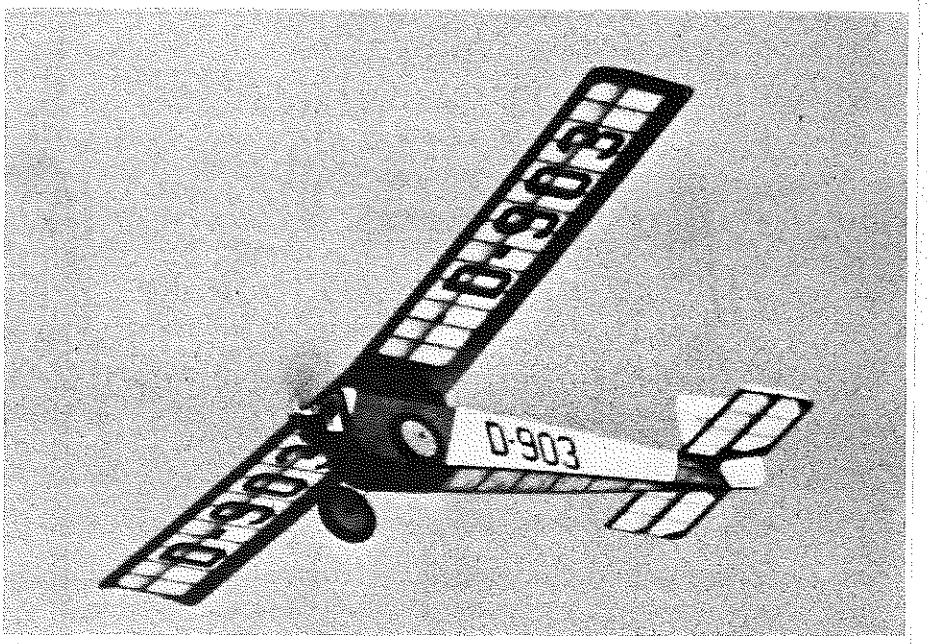
• Albatros Sportflugzeug (Sport-flook-zoing) means "Albatros Sport airplane." Powered by an uncowled 30-40 hp. Bristol Cherub engine, the Albatros was designed to get a piece of the ultra-light airplane market which was expected to open up after the Great War. The model presented here is essentially a blow-up of a 1953 Cal Smith design which appeared in Air Trails. My machine was designed to fly for fun, with the minimum of controls, to serve as a trainer, and to fly at air shows.

Model specifications are: span 74 inches, length 39-1/2 inches, and wing area 703 sq. in. At a weight of 4-1/4 lbs, the model is powered by a muffled Fox .36 turning 5,000 rpm on a 12 x 6 maple prop. Engine speed is controlled by prop size and exhaust restriction. Fuel economy is unbelievable . . . over six minutes on one ounce of fuel! Noise reduction is dramatic too.

Among special features are: the simple, straight 3/16 music wire landing gear with snapring wheel keepers; bike spoke wing hold-downs and pop-out wing strut mounts; removeable firewall (mounting engine and tank) for radio access; and full-flying rudder. Most notable too, is the two-cylinder engine, which is really a Fox .36 with a dummy cylinder welded to the crank case. No throttle is fitted, and all landings are dead stick. Radio installation is designed for inexpensive 2-channel bricks mounted transversely behind the firewall, with batteries underneath. The prototype presently sports a Hobby Lobby 3, with the servos mounted on a 1/8 plywood plate.

Construction is conventional and, for the most part, no comment is necessary, as the plans have been carefully prepared to illustrate difficult areas of construction. The airplane was designed as a complete system, and every element was tailored to fit the special requirements of the machine. For example, the engine/firewall/tank assembly weighs 21 ounces, and produces the power of a .15. The use of a smaller engine will make balancing difficult and performance will suffer.

The fuselage must be built first, as the size of the cabane assembly determines the location of the brass tubes in the wing center section. Select four very hard pieces of material for the longerons. Careful fitting of the fuselage parts adds considerable strength and makes a most attractive structure. Use



You gotta be an iron man to resist this little tub! Well . . . not so little. With a 74 inch span, it's a proven thermal hitch-hiker. Dare we say, "A great trainer?" Photo by Dave Katagiri.

Wilhold or similar white glue for all construction except for installation of F-4, F-5, F-6, F-7, the cabane assembly, and the landing gear mount, where Hobbypoxy Formula II is used.

Bend up the cabane struts and install the .025 brass wing strut mounting tabs. Don't bind and solder the cabane assembly at the top until it is securely fastened into the fuselage and the fuselage is complete. When installing the cabane, check and re-check to insure that the front of the cabane assembly is a 1/4 in. higher than the back, as this establishes the longitudinal dihedral of the ship. Use HobbyPoxy II for this.

Omit the 1/16 sheeting at the rear of the fuselage until the elevator is finished so the elevator hold-down blocks can be accurately drilled and the blind nuts installed.

Cut two bike spokes 3 inches long and bend one at 1/8 below the threads and the other at the base of the threads. When the fuselage is completely sheeted, bring the cabane struts together and bind with fine copper wire. Insert the bent spokes into the inverted "V" formed by the cabane. The spoke with the bend 1/8 from the threads goes in front. Bind together with fine wire and solder well, using a torch, paste, and acid core solder. The spokes should be tight into the "V" front and rear.

The wing is conventional spar-and-shear-web construction. DON'T OMIT THE SHEAR WEBS UNDER ANY CIRCUMSTANCES OR THE WING WILL FAIL! Note that W-2 is 1/32 ply, contact cemented to W-1 before assembly. The leading edge is hard balsa, the spars are spruce. The wing strut bracket screws to a 1/16 ply plate epoxied to the span outboard of the 3rd rib.

The wing strut bracket is fabricated from .025 brass sheet and 3/16 O.D. brass tubing. Use soldering paste and acid core solder. Mount with No. 1 x 1/4 screws. Insert medium sized black fuel tubing into the tubing and press the wing struts into the tubing. The fit should be quite tight.

The 3/16 O.D. brass tubes to receive the bike spoke nuts can be installed after the wing halves are joined and before the top sheeting is installed. The front one is a 1/2 inch back from the leading edge, and the rear one is positioned by taking the dimension from the finished cabane assembly. I cut the holes with the sharpened end of a 3/16 brass tube.

The tail surfaces are built of light balsa, except for the leading edge and spars, which are hard. Both are built flat and sanded to airfoil shape later. Note that the leading and trailing edge of the rudder must be blocked up during assembly to be on the center line. Note also the filler between the rudder spars to receive the hinge. Modify three Klett aileron linkage bearings as per the plans, and install them in the rudder and the

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fuselage. Install the rudder with a 3/32 music wire hinge pin.

The Engine is a modified Fox .36 X. Look at the photos of the engine carefully and you can see how crudely I modified it. The dummy cylinder is from a Fox .35, as I couldn't find a worn out .36. In spite of the mismatch of the two cylinders, some people never catch on, and most have to be told that it's a phoney.

Aside from the false cylinder, the engine is only slightly modified. Engine speed is controlled by exhaust restriction. Drill and tap the exhaust port web of the .36 to receive the 4-40 mounting screw. Make two restrictors as per the plans and install. Slip a piece of aluminum into the bore of the dummy cylinder and drill and tap it for the mounting screw when the dummy is finally welded on.

To increase fuel draw at the low speeds the engine will turn, you'll need to lengthen the venturi. Remove the needle valve and stock venturi. The Fox .36 X has a square venturi, so we're in business. Make a lengthened venturi as per the plans. Insert the new venturi and reinstall the needle valve, making sure the hole points down. Seal around the venturi with silicone where it meets the crank case, to insure good draw.

Remove the sleeve, piston and crank from the donor engine. Cut the cylinder away from the crankcase along the join line with a hacksaw. Leave a little extra material. With a Dremel sanding drum or a sharp knife, cut away the cylinder until it fits tightly to the crank case of the good engine. When the fit is good, find someone who can Heliarc, and have the dummy SPOT welded on. In most metropoliton areas there are aircraft welding places which can do this. The welding was the only thing I couldn't do on my own. Install the restrictor with a screw into the bored and tapped bar in the dummy bore.

Fasten the engine to a radial mount (I made my own from "T" stock) and install a 12 x 6 Power Prop. Use a standard long-reach plug, open the needle valve about three turns, and prime by flipping 10-15 times with your thumb over the venturi. The engine is impossible to prime by any other method. Ten percent sport fuel seems to work just fine with the plug mentioned. This arrangement should give a reliable engine run at about 5,000 rpm. I realize that the engine was not designed to operate in this manner, but two years and 200 or so flights haven't seemed to have hurt mine. I've been using Cox Glow Power fuel lately with good results. A couple of times I've used Cox Red Can, but I've got a hunch the milder fuels are better, as lubrication is minimal at best with the hotter fuel. Over six minutes per oz. of fuel is my usual run.

When the engine is adjusted, mount the firewall and install the fuel tank. Modify a 1 oz. rectangular U-control tank by removing one of the overflow tubes and soldering a small brass plate over the hole. Solder two little tabs to the tank and mount it to the firewall with No. 1 x 1/4 screws. Check the photos for this detail.

To cut the slots for the 1/8 inch E-rings in the landing gear wire, mount your Dremel tool in the router attachment and clamp the router attachment vertically in your vise. The shaft will be horizontal, with the chuck to the left. This will give you a conventional cut . . . a climbing cut will be fatal. Install a No. 409 cutting disc and move the fence up to a within a couple of thousandths of the disc, and lock tightly. Lay the 3/16 music wire on the fence and make a few practice cuts. You will find that, with care, a fine, square slot can be made by rotating the wire against the disc with a light pressure. Check with your E-ring such that the slot doesn't get too deep. The disc will cut rather quickly. As the wheel wears, move the fence up to maintain the distance from the disc. I use this method to cut off the ends of large gauge wire. The cut end looks as if it has been machined. Solder the .025 brass landing gear mounting tabs to the axle and mount with No. 2 sheet metal screws. Regular 3/16 set collars position the wheels on the inside.

The prototype is finished naturally, just like they used to be. The fuselage is covered with silk and received 20 coats of Aerogloss clear. The wing is covered with heavy Silkspan and received about 12 coats of Testor's clear. The rudder and elevator are covered with medium Silkspan, and doped with 20 coats of Aerogloss clear. No kidding about the dope, it just wouldn't fill. Heat-shrink film cannot duplicate this finish, but it's a heck of a lot cheaper. The letters on the tail are Chartpak Velvet Touch Lettering rub-on letters applied over the dope. "Machine" style is used in 60 point and 24 point. The letters on the wing and fuselage are cut from Monokote trim sheet, 5 inch letters on the wing, and 3 inch letters on the fuselage.

The pilot is a 7440 farmer doll head I got from the hobby store. This head was pushed onto an Ivory Liquid dish washing detergent bottle, and then the bottle was cut to fit in the cockpit with scissors. An old Argyle sock was cut to form a turtle-neck sweater. Craft fake fur makes the hair and mustache. Glue in the pilot with silicone sealer.

When the model is done and the radio is installed, it should balance at or slightly ahead of the spot indicated on the plans. Put a Goldberg short horn on the rudder and a long horn on the elevator. The rudder should have about 1 to 1-1/4 inch of throw each way at the trailing edge, and the elevator 3/4 to 1 inch each way at the trailing edge. The engine is offset about 3 degrees to the right.

Start the engine and check the controls. The radio is pretty close to the engine in this installation and may show symptoms of vibration sickness. I put 80 to 100 flights on my Kraft brick in this plane and never experienced even the slightest twitch. The Hobby Lobby 3 has worked flawlessly also. If it tachs 5,000, and the radio is working, let her go. A little up trim and a squeeze of right rudder will hold her straight. The tail comes up in couple of feet and the rudder is very effective. Be gentle on the rudder corrections on takeoff. Let her roll until she gets light and starts to bounce on the gear. Now, SQUEEZE the elevator and climb out at about 15 to 20 degrees, no more. All climbouts should be shallow. Turns should not be banked beyond 30 degrees until you become accustomed to the craft.

I like to make low passes 3 to 4 feet off the deck and then climb to 10 feet or so and make 180 degree turns and come back on the deck. A loop can be done. Start at about 50 to 75 feet of altitude, hold a shallow dive, pull back at about 20 feet and hold. You should come out at about 20 feet. If you plan to do loops, inspect the rubber tubing in the wing strut brackets to insure that the struts aren't pulling. I found that mine were hard and not holding tightly after about a year or so, replace them every season just on general principles.

After 4 or so minute flying time, go for altitude and get set up for landing when the engine quits. I use the same trim for a gentle climb and for glide, which keeps the fuselage about level with the horizon and will maintain a good rate of sink. I always make a conventional approach with a down-wind, cross-wind, and a final leg. I personally would rather land a little short than overshoot, so I make my approaches low, under 60 to 70 feet, on the down wind leg. A proper approach will have the model touch on the mains with the tail high. Roll-out will be about 30 feet. If too hot or over-flared, the Albatros will bounce, but heck, she screams across the fence at a blazing 15 m.p.h. and you'll catch on fast. In a breeze, zero-roll landings are no trick, in fact, I land across the strip in a severe cross wind, no sweat! Cross wind takeoffs are surprizingly easy, both on grass and pavement. ●