

FOKKER D XXI,

THE LAST FOKKER FIGHTER

By Tim Farrell

The D.XXI was a unique aircraft in many ways. First conceived in November of 1934, it incorporated many advanced ideas for its time. The Fokker's fuselage was welded chromoly steel that was covered with aluminum and dural panels forward of the wing trailing edge, and covered with doped fabric aft. The wing was made up of wooden box spars and plywood ribs. It was skinned with a plywood-bakelite veneer. The landing gear had oleo pneumatic legs enclosed in alloy fairings which helped aerodynamically as well as aesthetically. The relatively tall gear giving the plane a "race plane" stance that made it stand out on flight line as well as in the air. The armament that the little fighter carried consisted of two fuselage mounted 7.62 cal. M.36 machine guns as well as two of the same mounted in the wings.

The D.XXI proved to be a delight to fly and a very stable gun platform. While not the fastest aircraft, it more than made up for this by being very agile, and had a turn radius more akin to a WWI biplane than a WWII fighter.

After witnessing the test flights, The Netherlands Government was impressed enough to place an order for 36 aircraft. The last of these being delivered on 8 September 1939, just one week after the German invasion of Poland. The Finns too,

were quick to see the potential of this good looking fighter and entered into a license agreement with Fokker. They purchased seven machines in 1937 and built 93 aircraft between 1939 and 1944. The Finnish Air Force had 41 on hand when Russian forces invaded Finland on November 30, 1939. During this "Winter War" the Fokker won the affection of the Finnish pilots as well as the respect of their Russian adversaries.

The Finns nicknamed the aircraft "ukkomokkeri" (old man mokker) due to its durability and reliability. Only 12 aircraft were lost during the fighting and of these, six were lost in actual combat. Unlike the D.XXIs that were used by the Dutch, the Fokkers in the Russian conflict did not have to contend with the much more advanced Bf 109s of the Luftwaffe. This no doubt greatly added to the longevity of the aging (by 1941) design.

Unfortunately, this was not the case on the continent. The German forces that invaded The Netherlands on May 10, 1940, found only 28 Fokkers ready for operations. Of these, nine were unserviceable by the evening of the same day. The last day of the war, May 14, eight machines were still active. Not a bad effort considering the number of German aircraft involved and the 100 km./hr. difference between the D.XXI and the Bf 109.

When it comes to choosing a sub-

ject for a new scale model, we modelers all have a few parameters which we seem to stick with. In my case I like WWII types. There is nothing better looking than a WWII fighter making a low pass. This presents a real problem for me because, I don't appreciate the many headaches associated with the mechanical problems needed for a realistic model (bombs that get hung up, retracts that get hung up, drop tanks that won't . . . you get the idea). So my choice gets considerably narrower as to the type of fighter to build. After searching through most of my reference material it was becoming increasingly clear that there were very few WWII aircraft that did not have retractable landing gear. Not to mention the other mechanical options needed to make it look and fly right. I had just about given up hope when Profile Publications #63 caught my eye. It took all of two seconds to realize that this aircraft met all the criteria. A small, good looking fighter with fixed landing gear, no bombs, no drop tanks and some of the best looking paint schemes I'd seen on a WWII aircraft.

As an R/C model the Fokker D.XXI has a lot going for it. In 1/5 scale it has an 86-inch wing with over 1000 sq. inches of area. The entire fuselage aft of the wing trailing edge is fabric covered, including the tail group (good for saving weight). It has a large radial cowl which

**This Very Advanced Thirties Fighter Was Used
In Combat By The Netherlands And Finland.
This Fixed Gear Fokker Fought Successfully
Against German And Russian Air Forces
In The Early Days Of World War II.**



Photo shows the detail in and around the cockpit of this large scale Fokker D XXI.



will completely hide the great Super Tigre 2500 engine. The only negative thing about this aircraft is the short nose moment, which requires a fair amount of nose weight ($3\frac{1}{2}$ pounds on my model) to balance the C/G.

As with any scale aircraft, wood selection is important. I believe several pounds could be saved over the prototype's weight of $19\frac{1}{2}$ pounds. Typically, this is constructed with the standard balsa and aircraft ply,

and uses Worldtex over the open areas. I used glass cloth and resin over all the sheeted areas. The cowl, spats, canopy, and cockpit interior kit are offered separately by the companies listed at the end of this article. The engine used is a Super Tigre 2500, and has proved to be a real powerhouse. The 16-oz. fuel tank allows about 15 minutes of flight time at about $\frac{3}{4}$ throttle. The large S-16 servos from World En-

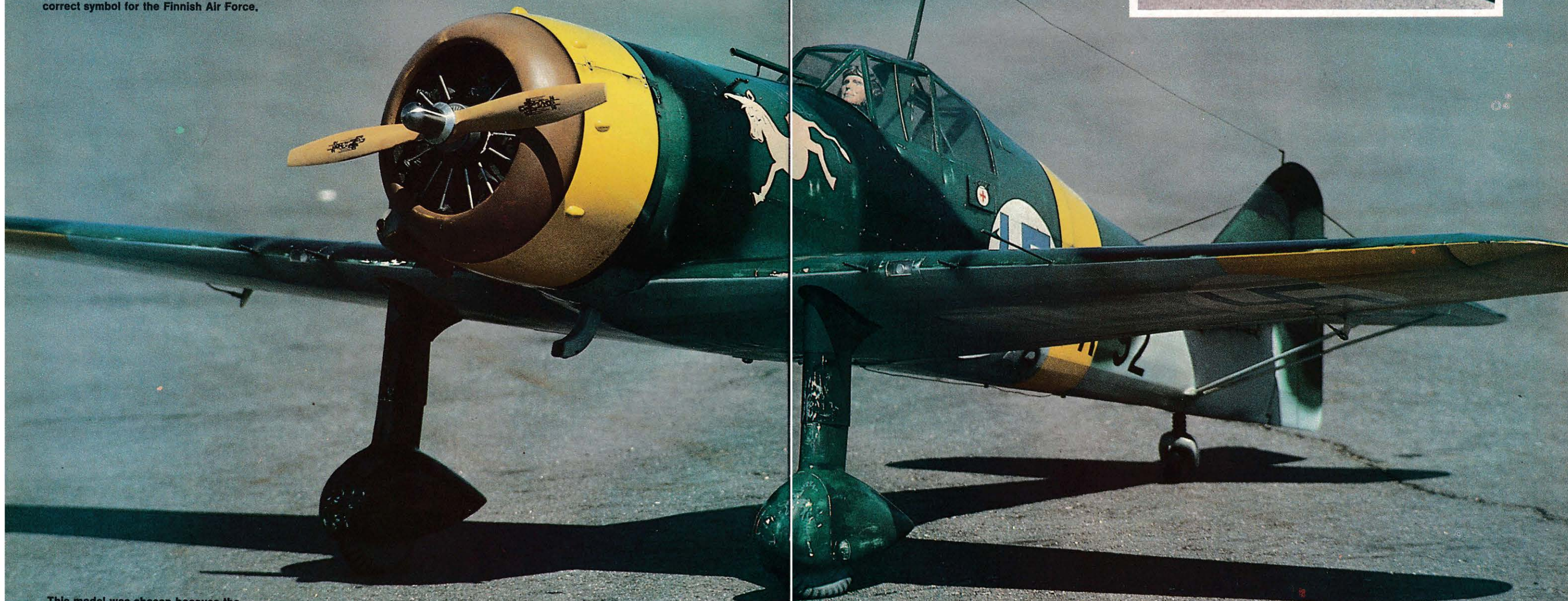
gines are used for all the flight control surfaces and I would not recommend anything smaller. A standard size servo could be (and was on mine) used for the throttle control.

The only known deviation from scale is the airfoil used. I had a really nice flying TopFlite P-40, and decided that the airfoil would contribute to the flying traits of the Fokker if it were enlarged. As it turned out, I could not have picked



The BACKWARDS swastika is really the correct symbol for the Finnish Air Force.

The long landing gear legs with their telescoping fairings make for an interesting stance on the long-legged fighter.



This model was chosen because the author doesn't like the hassles of retracts, but still enjoys the mystique of World War II fighters. This plane was entered in Giant Scale at the 1985 NATS held in Chicopee, Massachusetts.

a better performing airfoil. The ship has a very broad speed range and tracks well throughout. Flaps are not a necessity on this particular aircraft but their use is a benefit to those of us with smaller flying sites. One factor which makes a big difference in the flight of this aircraft is prop size. The two props found to work best are 16/8 and 16/10. These allow the Super Tigre to turn 7600 to 8000 rpm and gives the plane a realistic airspeed.

The ground handling on this model is very good, and the first time out a full tank of fuel was burned up just playing around on the ground. With the tail up it is fairly sensitive to rudder, this was a good reason for this pilot to use the dual rate function on the Futaba FP7GK.

Once in the air the controls are moderately fast, especially the ailerons. The $\frac{3}{4}$ -inch up from neutral and the same amount down is more than really needed. Pitch, within the C/G range, is controlled by one $1\frac{1}{4}$ -inch movement, can be made up to the "banging the stops" setting. If I were to pick the one maneuver that the aircraft does best, I would have to say the slow roll. You can stretch this out for a looong way. Landings without flaps are smooth and predictable. The sink rate is slow and may be attributed to the prop size. The idle setting should be as low as you can reliably make it. One note on the Super Tigre 2500, the carb that is on the engine always went rich in the mid-range. No amount of setting and resetting helped. The solution that finally worked, was to swap the Super Tigre carb for one from an OS 90. The carb is exactly the same mounting size, and drops right in. The mid-range response is now very good, and allows about 200 rpm more on the top end.

The construction of this model is a little different than the typical kind most often used. Not in the actual building of the airframe, rather in the setup. The fuselage is laid out on a jig as follows; first draw the centerline of the aircraft on the plan. Then draw a second parallel to the first one, one inch below the wing outline. Now measure the distance between the firewall back to the tail post. When you have done this, transfer these dimensions to your building board or if you don't mind cutting up your plans, use the top view to build on. Here's the different part; using pieces of scrap balsa lay them over the plan so that they rest on the top of the lower line you have drawn and fall under each former. These scrap pieces should have a flat bottom. Measure

the distance from the bottom of the balsa piece to the bottom of the edge of each former and mark it. Next draw a centerline vertically through the scrap piece perpendicular to the bottom. Now, using your plan top view or your marks on the building board, glue (using Zap CA+) all the scraps to the board. Make sure all pieces are in order and glued perpendicular to and on the centerline. Mark a vertical centerline on each former and tack-glue it to its individual scrap piece ensuring that it is lined up with the C/L mark and height mark. Use a triangle to make sure the lines mate up. After this is done it is a simple matter to lay in the stringers and keels. After all the stringers and keels are in place (except the bottom where the jig pieces are in the way) all the sheeting is applied. When the aircraft is taken off the jig pieces, the bottom keel and stringers may be added. Install the wing saddle ply at this time and the firewall. Although not shown on the plan the area behind the firewall could be filled with balsa blocks to make shaping this area a little easier. The tail wheel and pushrods are now installed. I used arrowshafts but you may choose your own method of control.

The fin and rudder as well as the stab and elevator can be assembled now. These are straightforward and should present no problem. They are installed during final assembly to ensure everything is lined up properly. The stab struts are made so that they are functional and I don't know if they are needed for strength. You may try them as non-structural at your own risk.

The wing building sequence is conventional in all respects. Pin the main spar to the bench and the rear spar to the washout jig. Make the jig from a piece of $\frac{3}{8}$ by 36-inch balsa. Using a Robart Incidence Meter at the root and then the tip, measure the difference to achieve a $2\frac{1}{2}$ degree washout at the tip rib. After all the internal structure is complete the wing is removed from the jig. The bottom sheeting is applied, and the wing is then put back on the jig and pinned down. The split flap outline is partially cut through to allow easier separation later. The top sheeting is now added. The tip formers and sheeting are now built onto the wing. Next the split flaps and ailerons are cut from the wing and faced up. They are installed after the wing is glassed and resined.

As stated earlier, sheeted areas of the fuselage are glassed after the open areas are covered. I used mask-

ing tape over the edges where the glass will overlap the covering. This leaves a nice edge which simulates a metal panel. The metal panels of the aircraft are primed with K&B primer and sanded. The entire aircraft is then painted silver. This base color is allowed throughout when weathering the finished aircraft.

Mike Beaulieu has done a super job on the plans and they are available from him. The price is \$24.95. Mike's address is: M. C. Beaulieu's Plan Service, 84 University St. Presque Isle, Maine 04769, telephone (207) 768-3471.

Avco Model Supplies, 1885 Dyson St., Muskegon, MI 49442, telephone (616) 726-3400. Has canopy and cockpit kit.

T&D Fiberglass Specialities 30925 Block, Garden City, MI 48135, telephone (313) 421-6538. Has cowl and spats.

Bob Shattleroe, 31985 John Haulk Street, Garden City, MI 48135, telephone (313) 261-9064. Has landing gear.

Prices for the items listed can be obtained directly from above manufacturers.

My address is: Tim Farrell, R.D. 1, Box 187a, Lake Katrine, NY 12449, telephone (914) 336-6125. I would be happy to help out if you have any difficulties in constructing your model. Please call after 6 p.m. Eastern.

The other reference book used in the preparation of this presentation is a Finnish work entitled Fokker D.XXI by Kalevi Keskinen, Kari Stenman, and Klaus Niska. This book must rank as the definitive work on this aircraft and offers us 128 pages of which 118 contain clear black and white photographs. It also has six pages of color profiles and 3-view drawings. I obtained the books from Sky Books Inc., East 50th St., New York, NY. Unfortunately, the text is in Finnish, but the photographs are worth their weight in gold to us modeling types. It is a soft covered book and is fairly inexpensive.

A friend made the prop nut for the S.T. 2500 and might make them available. Contact me for info on them. Additional photos by Lee Henderson. ●