



MiG 21 FISHBED

DESIGNED AND BUILT
BY TIM FARRELL

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THIS MEDIUM SIZE
RUSSIAN JET
FIGHTER IS A
CONTEMPORARY
OF THE
F-4 PHANTOM.
DOGFIGHT
ANYONE?

EDITOR'S NOTE:

We welcome Tim Farrell back to *Scale R/C Modeler*. I first met Tim at the AMA Nats at Westover AFB in Chicopee, Massachusetts several years ago. At that time Tim was flying a very nice Fokker D-XXI, and we ran the plans prepared by Mike Beaulieu. Although the response wasn't exactly overwhelming from modelers in the United States, we received a considerable amount of mail about it from R/C pilots in Finland, Sweden, and Norway; probably because these are the countries which had the aircraft in their

inventory, and some used them against Russian fighters even though they were obsolete at that time. The Fokker fought against a number of "enemy" fighters, including the MiG 1 and Mig 3s.

As is the case here in the United States, where any small plane is likely to be called a Piper Cub, *almost any Russian fighter* dating from World War II to the present time *is called a MiG*.

After seeing MiG 3 plans by Hal Osborne in *Scale R/C Modeler* a few years ago, master modeler Al Casey from the Phoenix area built one of these fighters,

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and has gone on to fly and win trophies in Scale Masters and other top scale contests with his beautifully crafted MiG 3.

Although Mr. Osborne passed away several years ago, his plans are still available from Hobby Horn in Westminster, California (see Advertisers' Index for address and phone).

Byron Originals also has a very popular MiG — the MiG 15; and only a few miles away in Chino, California, there are several MiG 15s being restored to flying status. One was recently test-flown by Reno-winning air racer and test pilot, Skip Holm.

At Army and Marine military training bases, troops are trained for combat, on a regular basis, by firing at MiG 27 drones. This one is called the Flogger. I'd just like to know *who* gives these great aircraft such horrible names like the Flogger, and the Fishbed.

It's a known fact that, during the Korean "conflict" it was the superior abilities of our pilots which kept the MiG 15s from downing them, not the superiority of our F-86s and F-80s.

For those of you who may not be familiar with the origins of the MiG name, it was the designation given to aircraft conceived by Soviet designers, A. Mikoyan and G. Gurevich, in 1938.

Their first piston-engine fighter was the MiG 1 of 1940, and their first jet was the MiG 9 with twin jet engines, first flown in 1946. When the MiG 21 was built under license in India, it became the first Russian aircraft ever built outside a Communist country.

Scale R/C Modeler would like to thank Tim Farrell and Mike Beaulieu for the article, design and plans for this seldom-modeled Russian Jet Fighter.

There are few jet aircraft which can conjure up the immediate image of one-on-one aerial combat, but among those few, the F-86 and the MiG 15 are certainly at the top of the list, with the Kfir and MiG 19 a close second. To my mind, though, the two which come closest to being the most evil and deadly opponents were the F-4 Phantom and the MiG 21 Fishbed.

The F-4 is a large and very powerfully engined aircraft with the look of a single-purpose killing machine. On sheer looks alone, it's a very intimidating airframe. By contrast, the MiG 21 is a small, not-so-very powerfully engined fighter. Its appearance, while not as intimidating as that of the F-4, is sinister, and leaves no doubt as to its designers' intent.



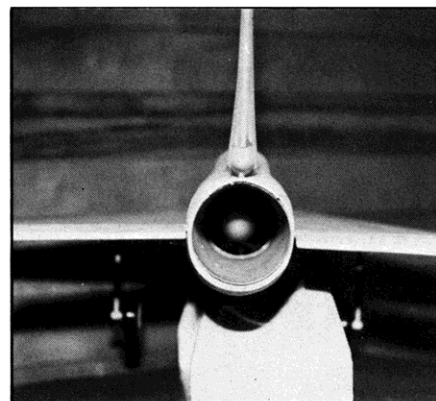
The MiG 21 was designed in the early 1950s at the request of the Soviet government. Specifications called for a fighter/interceptor which would attain Mach 2 speed, fly at a primary altitude of 20,000 feet (the figures based on what would be required to engage a B-52 bomber) and be able to carry radar. The armament was to consist of air-to-air missiles and two heavy cannon. Moreover, it had to be *smaller* than the MiG 19 — pretty stiff requirements, considering the standards of the time.

The design team came up with a tailed delta configuration with an area-ruled fuselage. The initial design was very successful. While lacking in huge amounts of power, its maneuverability and quickness soon won over the Soviet pilots. One major drawback to this small airframe was the lack of space in which to add on additional equipment as it became available. This led to many sub-types, with various sized-and-shaped dorsal spines — not good for the aerodynamics of the real aircraft, but a real plus on the model. The spine on the model actually allows the use of the smaller scale because it allows the head of the engine to be completely hidden. This means that the basic aircraft can be modeled into all of the later MiG 21 sub-types.

Many of the MiGs were exported to other countries — Finland, Egypt, Syria and Jordan, as well as almost all the Soviet bloc countries. This means that the modeler can choose from a large variety of colorful and differently marked aircraft (even a *pink* one (for the ladies) which bears an Indian registration).

The modeler has had a few F-4 kits with which to whet his appetite over the years. The Westcoast Phantom, while not a ducted fan, had a fine reputation as a good flyer; more recently, plans by Nick Zioli for the Kress RK 740; and Tom Cook's fabulous kit have also been available.

The Aviation Museum of Central Finland (located in Tikkakoski) holds an interesting inventory of historic aircraft including a Hawker Hurricane Mk. 1, Messerschmitt Bf-109G-6, MiG-15UTI, MIL Mi-4, Douglas DC-3, 11-28, Polikarpov Po-2, Fokker D.XXI, Bristol Blenheim Mk. IV, Bell P-39Q Airacobra, and the unique VL Humu (Brewster B-239 Buffalo fuselage fitted with wooden wings and a captured Soviet M-63 engine). Also located at the museum are a couple of aircraft not often seen on display, a MiG-21F-13 and MiG-21UTI. The MiG-21 series first entered Finnish service in 1963 and since 1979 the air force has been reequipped with the newer MiG-21bis. This view illustrates the two-seat MiG-21UTI coded MK-103 which has been retired from active service. Probably the most numerous of "modern" fighters, the MiG-21 is rarely on view for Western museum visitors so this exhibit is particularly welcome.



Design of the Fishbed allows for a straight-through flow of air, keeping building chores to a minimum.

However, the MiG 21 seems to have been overlooked, with the exception of a prop-driven .60-powered kit, put out by R/S a few years ago.

Well, this could not be allowed to go on! All those F-4s around, with nobody to play tag with. Unbelievable!

While working out the basic dimensions of the ship, it became apparent that there were a few drawbacks to this type of aircraft layout. The mid-wing design dictated that this be either a one-piece aircraft, or a more complicated, both detachable wing panel design. Being lazy, and a firm believer in the K.I.S.S. principle, it became a one-piece model.

Another problem was to keep the size and weight within reason for the Kress RK 740 (O.S. .46). I also planned to use this model as a trial run for the larger Byro-Drive (Rossi .81) powered model. So, if this smaller one worked out, watch out F-4s!

I finally settled on a 1/10 scale, which would allow a scale intake and exhaust size, and still allow the servos and batteries/receiver to fit between the intake/tailpipe and the fuselage skin.

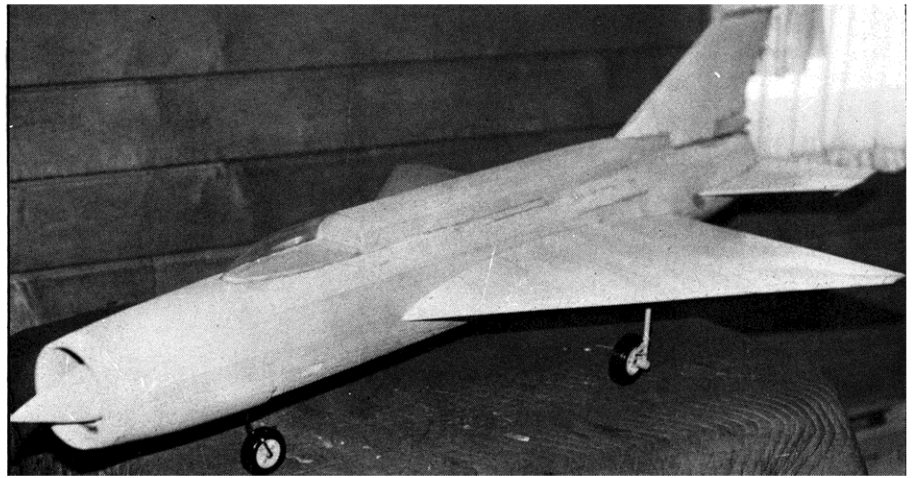
This model differs a little in the manner of construction from your normal R/C ships. On a ducted fan aircraft, the inside of the airframe is as important as the outside. The ship must be built to allow a very smooth flow of air through the internal structure. All the bumps and equipment, which get in the way and turbulate the air flow, take away from the thrust which the fan generates; therefore, we must try to keep *everything possible* out of the intake and exhaust tract.

In this model, all the R/C gear is out of the way, leaving only the fan unit, engine and pipe in the tailpipe.

After cutting out all the formers, two tubes of rolled 1/64 ply are inserted through the inside of the formers. These will hold together the fuselage, as you set it up on the jig. The jig is made by measuring from each former, to a line drawn parallel to the aircraft's centerline, and approximately two inches below the center of the fuselage. Each jig piece is cut to fit its appropriate former, and glued to the bench.

The formers are then tack-glued to the bench, then tack-glued to the jig pieces until the top half of the planking is done.

Mark the tubes as to the former locations, and glue them to the tubes. Locate and glue on the longerons. Notice that the left and right longerons pass through the *INSIDE* of the 1/8 ply fan mount formers. Also be sure to cut these formers



to allow the two fan mount 1/2 sq. maple supports to be inserted later.

The holes for the aileron, elevator, nose-gear-steering Goldenrods should be added *BEFORE* the bottom half planking is added. The fan unit is also installed at this time. As you plank the bottom, you must make all the access hatches needed for getting to the fan and R/C equipment. It sounds like a lot of work, but it goes quickly. The hatches are secured to the plane with small sheet metal screws. The blocks to which the screws are mounted are sleeved with inner nyrod to allow a good, non-loosening bite.

The wings, stab and fin are easily constructed and require no explanation. The flexible nyrod is installed before the wing sheeting is installed, and the appropriate holes are cut in the ribs and fuselage to let them pass through to the servo hookup area.

My aircraft has a light coat of .5 ounce glass and epoxy clear on the fuse. This was primed and sanded, after which the entire model was covered with burnished chrome Monocote (a technique which was covered in a previous issue of this magazine).

I can't give you a flying report because the model has not yet been flown. A combination of events had been holding back the first flight, not the least of which is the fact that our club field won't handle a model of this type. So, I'll let the editor of *Scale R/C Modeler* know the outcome, when it takes place (hopefully by the time you read this).

Good luck with your MiG, and don't let those F-4s get on your six! ●

Aircraft is built-up from wood, with a smooth ply interior to keep weight and drag to a minimum.