YOSHIOKA: PROFILE OF A WORLD CHAMPION

The reigning World Pattern Champion tells his history.

by Tsugutaka Yoshioka / translated by R. Honda

Photo courtesy Model Rectifier Corp.

Yoshioka holds his modified Blue Angel, as he and his mechanic show happy faces of victory.

My inborn nature pushed me to aeromodeling even in my childhood. I do not recall the exact age when I started to build and fly rubber models.

Immediately after I entered middle school in 1959, at the age of twelve, I purchased a glow plug engine for the first time. During the following two years, I concentrated on control line models. All the while, I was saving money with an iron will in preparation for radio equipment.

At last, I bought a single-channel radio with 20,000 yen (about $70.00), which was a large sum of money for a boy of 14. Signals were transmitted by a button and drove a rubber-powered escapement. The plane, called Over the Rainbow, really flew well with this radio.

Two years later, I obtained a multi-channel radio. Thunder Bird, with a ten-channel read system, was my first adventure in aerobatics.

Technological development in radio control systems has been very rapid, adopting many achievements from other fields. It was not long ago when the age of the proportional system set in, and reed systems reached their culmination. I began to use a proportional radio when I was 19 years old. That was an Orbit analogue system with a single stick. I can still recall the first feeling of response on a proportionally controlled model.

After a year and a half, I switched to a digital proportional system with dual sticks and, as my flying skill advanced, the thought of competing in aerobatics entered my head. During that time, I went to see the Japan National RC Aerobatic Championships, and learned much.

In 1969, my dream was realized. My own flying site was set up! This enabled us in the Shikoku region to hold contests regularly. I also took a course at the Aerobatic Judges' School in Tokyo, to study FAI rules, judging methods and contest organization.

I participated in the Japanese Nats for the first time in 1972. I passed the Regional Elimination contest with a sixth place position in May (nine fliers passed). I placed seventh at the Japanese Nats in November. Thus I was allowed to proceed to the Qualification Contest for the World Championships.

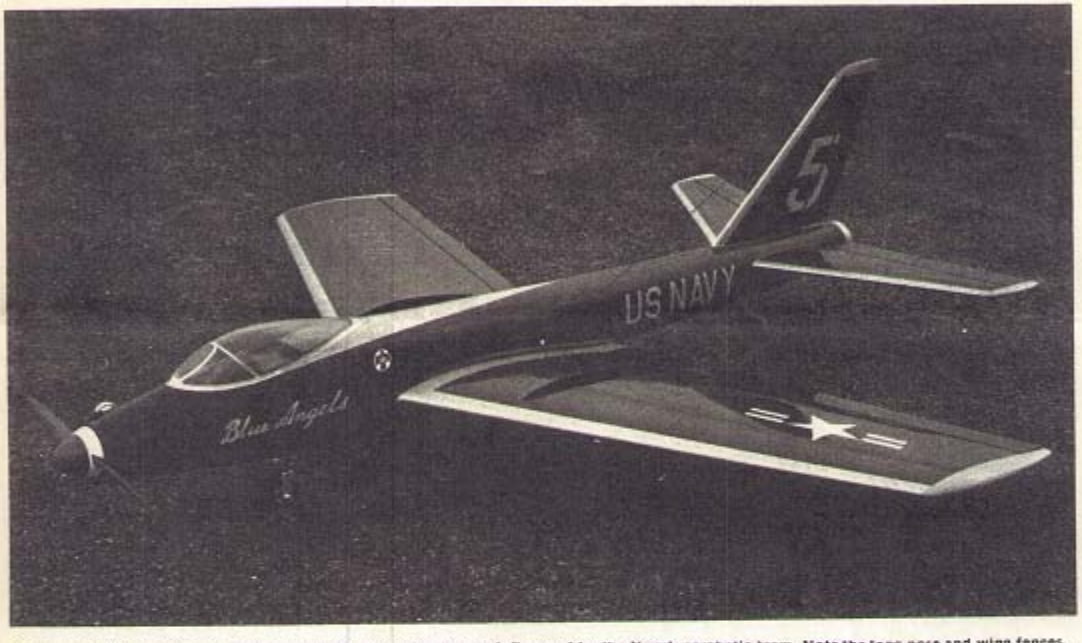
Eight candidates competed to choose three delegates to the World Championships at the Qualification Contest on April 22, 1973. Yoshiki Takahashi was first, Tetsuji Okumura second, and I was third by a narrow margin over Masahiro Kato, the designer of the Blue Angel. My score in the sixth round was the best round-score in the contest. I think it was only luck that I qualified as a delegate to the World Championships at my first participation in the Nationals.

The luck accompanied me, even when a model helicopter crushed the Blue Angel on the ground in August. The damage was only on the right wing and I managed to repair it by the time of departure to Italy. Furthermore, my Enya 60 with a YS carburetor seemed

to be affected by the Italian climate and it ran so hot that the plug melted away in the first practice flight. Therefore, I had to set the fuel mixture slightly rich during the World Championships.

Anyhow, my Blue Angel, the 21st RC model that I had ever built overcame several handicaps and flew quite well in the beautiful, blue Italian sky. This alone was sufficient for my pleasure. But surprisingly, the title of World Champion fell upon me.

Let me take this opportunity of thanking my modeler-friends all over the world, from whom I have absorbed and learned much. The victory is a result of an accumulation of efforts by all modelers. So, the glory must be attributed to them, the FAI officials, and especially to the kind Italian people who were so warm and hospitable.



The prototype Blue Angel, as designed by Mr. Kato after he was influenced by the Navy's aerobatic team. Note the long nose and wing fences.

THE BLUE ANGEL

The evolution of a championship model, as told by its designer.

by Masahiro Kato/translated by R. Honda

Blue Angel, an RC aerobatic model, stems from the Blue Angels Navy aerobatic team.

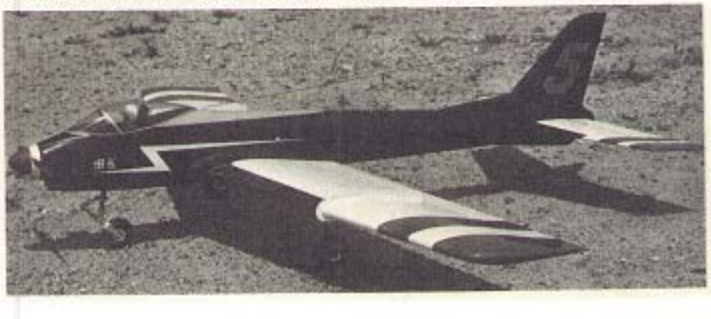
It was at the AMA Nationals that I saw, for the first time, formation aerobatics by the jet planes of the Blue Angels. For me, this was a real shock! That speed, that hedgehopping, that dynamic precision, and those jets! Revelation fell upon me like a bolt from the blue—the model and performance for RC aerobatics must be patterned after this. Here is a completely different type of aerobatics from those of a light plane.

I believe that American RC fliers also like speedy and large aerobatics. But my goal was to add the feeling of a jet plane. Even the characteristic maneuvers of takeoff and landing—running on the runway with the main gears only touching and the nose gear off—should be patterned.

This inspiration was the departure on a long trip to the realization of my dream. For ten years I have been concentrating on this task. I set up the basic idea as follows: (1) To design a semi-scale aerobatic model with swept-back wings copied after a jet plane. (2) To add speed and dynamics to the performance of maneuvers copied after jet aerobatics.

Prototype: In early 1963, the year following my participation in the World Championships in England, I started designing a semi-scale model, the prototype of the present Blue Angel. A long fuselage with a long nose, wings with a large swept-back angle and a short span, was the outline of my image. The proto-

The Second Blue Angel saw some changes by Mr. Kato, namely a more normal nose moment, more extensive wing fences, revamped vertical fin and a sub-fin.



Photos by R. Honda

type Blue Angel was built in 1966, after several partial tests had been completed. The model was painted after the color scheme of the full-size counterpart of the model.

In flying this model, rolling patterns were really beautiful, and I could imitate a long run on the ground, touching the main gears only in takeoff and landing. But it was not suitable for loops, due to the small wing area; and the lateral stability at low flying speed was bad, with a mortal stall tendency.

Second Blue Angel: In the second Blue Angel, the area of the wings was increased, the swept-back angle decreased, the nose shortened, and a thick wing profile used. These modifications resulted in a more aerobatic, but slow and heavy, model. This was not the model that I had intended. The wing profile was changed to a thinner one and the whole weight was decreased to 2800 grams. Thus modified, Blue Angel was too fast to fly the then-revised FAI rules, within the limits of a 100 meter distance and 45° altitude.

Third Blue Angel: I know that ordinary straight wings are much more easily controlled, but I was determined not to abandon swept-back wings and speed, and, by means of my flying technique, to overcome those difficulties characteristic of swept-back wings. The third Blue Angel reached the best compromise between the model and my flying.

The latest version of the Blue Angel shows an even shorter nose, with a deeper profile to accommodate retracts, the absence of any wing fences and a redefined vertical tail.

Although this brought me the title of National Champion of Japan, I placed 30th at the World Championships in Doylestown, Pennsylvania in 1971. It may be a poor excuse to say that I almost fell down on the flight line because of sickness (the translator can attest, as the Team Manager, to this). Much interest from modelers caused Blue Angel to be kitted after it was redesigned to suit average modelers, but still retaining its swept-back wings.

At the World Championships in Italy, Mr. Tsugutaka Yoshioka won the title, using a Blue Angel modified and built from a kit. I was very much pleased at the good news. He has my hearty congratulations.

The goal which exists in my mind is still far away—an ideal that must be pursued forever.

BLUE ANGEL MODIFIED

Yoshioka's mods to Mr. Kato's airplane design. / by Tsugutaka Yoshioka

The original Blue Angel was designed and flown by Mr. Masahiro Kato, former National Champion of Japan. The reason this model attracted me was his philosophy of RC aerobatics—a dynamic and speedy performance of maneuvers by a modern jet-type model, instead of a slower performance by a light plane. And the fact that Mr. Kato had devoted himself constantly to the improvement of the design toward this particular goal was another reason I was attracted to it.

Blue Angel was kitted after the designer, Mr. Kato, flew it at the 1971 Doylestown Internats. I first built and flew one from this kit version. As the result of my experience with this model, I modified the kit as follows:

(1) The original tail part of the fuselage was shaped like a twin jet engine pipe. This semi-scale arrangement caused a twofold problem. The one is, of course, a tail-heavy tendency coming from the weight of additional material, and the other is difficulty of pushrod attachment to the elevator due to a wide tail. The pushrod must be bent more than usual to reach the elevator. The swept-back angle of the stabilizer adds to this problem. The most serious problem is elevator flutter. The simple

and only solution is to shave off the wide tail part of the fuselage.

(2) Another difficulty was the inefficiency of the rudder. More rudder area was necessary to do FAI maneuvers. Shaving off the fuselage tail sides enabled me to extend the rudder to the bottom of the fuselage. Along with this extension, I modified the shape and size of the whole fin to meet my needs and taste.

These two modifications resulted in a light tail (and a light model as a whole), a more positive elevator and an efficient rudder. The model is now called Blue Angel Modified.

Blue Angel Modified has these characteristics due to its swept-back wing and stabilizer: (1) Stable straight and level flight. (2) Good cross wind tracking. (3) Larger fuselage angle of attack in knife-edge flight. (4) No wing drops, especially during loops. (5) Large angle of attack at slower slying speed. These characteristics must be taken into account in performing maneuvers, and the pilot can make good use of them.

The fact that swept-back wings require more effort and perseverance in construction than ordinary ones should be taken into account.

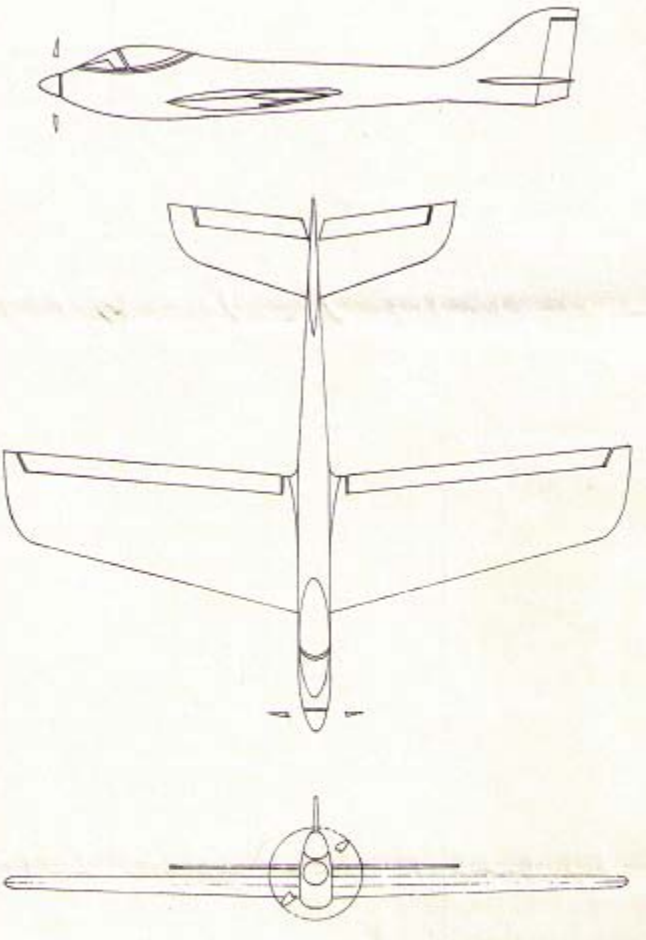
(1) The difference of angle between the ribs at the root and tip of the wing is difficult to detect due to the swept-back angle. Special care must be taken in frame construction. (2) Stress occurs in unexpected places and directions in the wings which are swept backward. In addition, the parts are composed obliquely. Joints must be fitted perfectly, and sufficient cement must be applied. (3) If the ailerons flutter, they should be tapered at the wing tips, and more hinges should be added. (4) In case of elevator flutter, the same procedure should be taken as for the ailerons.

The full throw angle of the ailerons is set based on the time necessary to complete the three rolls. Incidentally, the ailerons of this model are 9 mm thick at the leading edge and 40 mm wide. Such thin ailerons are flexible and have a kind of automatic adjustable effect. They are bent to a smaller angle when the model is flying at high speed, and return to a larger angle when in slow flight.

The up-limit angle of the elevator is set in accordance with the minimum angle necessary for entry into the spins. The down-throw limit must be a little less than the up-throw in order to compensate overcontrols in inverted flight.

When I am flying the model straight and level, my elevator trim is set a little to the down side. That is to say, I am pulling the elevator stick slightly to hold level flight. The exact position of the trim is determined based on the knife-edge flight. With this trim setting, special care must be taken at the entry and recovery of both loops and rolls. The reason why such a rather difficult setting was made is that the model tends to deviate to the direction of up-elevator when the rudder is in knife-edge flight. This tendency could not be overcome by adjusting the engine thrust and the angle of attachment of the wing, so the elevator trim setting was used. When flying the model, I always pull the stick a little regardless of the changes of the CG point caused by the decrease in fuel.

BLUE ANGEL MODIFIED



The fuselage combines the wings, tail surfaces and engine into a proper aerodynamic relationship. Any warps or distortions in the fuse will result in poor flight performance. This is especially important because of the swept-back wing. Another valuable consideration is to ensure sufficient strength to the fuselage to eliminate problems of vibration. Pay particular attention to framing the fuselage perfectly straight on all axles.

The engine used is an Enya 60 to which a YS carburetor has been attached. This combination is effective enough to pull a 7¼ lb. model straight up. I am completely satisfied with the characteristics of the combination—easy to handle, yet good power, and long life. The YS carb is an original Japanese innovation. It can be attached to almost any type or make of engine. At Groizia, the Enya had a hot run and melted the plug, mainly because the engine had been adjusted to the humid climate of Japan.

The 1975 World Pattern Internats are tentatively scheduled for Switzerland, Sept. 8-13.