



*Jim's four year old son Todd showing off dad's latest design. Ektachrome transparency by Scott Blészczad.*

# YELLOW JACKET

*Get into electric power with one of the Jackets. They are slow and majestic in the air, yet will loop, roll and spin.*

## YELLOW JACKET

Designed By : Jim Zarembski

### TYPE AIRCRAFT

Electric Sport

### WINGSPAN

48 Inches

### WING CHORD

9 Inches

### TOTAL WING AREA

430 Square Inches

### WING LOCATION

High Wing

### AIRFOIL

Flat Bottom

### WING PLANFORM

Constant Chord

### DIHEDRAL, EACH TIP

1 7/8 Inches

### OVERALL FUSELAGE LENGTH

31 1/8 Inches

### RADIO COMPARTMENT AREA

(L)4 1/2" x (W)2 1/4" x (H)3 3/4"

### STABILIZER SPAN

20 Inches

### STABILIZER CHORD (Incl. elev.)

4 3/4 Inches (Avg.)

### STABILIZER AREA

95 Square Inches

### STAB AIRFOIL SECTION

Flat

### STABILIZER LOCATION

Top Of Fuselage

### VERTICAL FIN HEIGHT

5 1/4 Inches

### VERTICAL FIN WIDTH (Incl. rud.)

4 3/8 (Avg.)

### REC. MOTOR SIZE

Astro 10/15

### FUEL TANK SIZE

NA

### LANDING GEAR

Conventional

### REC. NO. OF CHANNELS

3

### CONTROL FUNCTIONS

Motor On/Off, Rud., Elev.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa and Ply

Wing ..... Balsa and Ply, Spruce

Empennage ..... Balsa

Wt. Ready-To-Fly ..... 44-48 Oz.

Wing Loading ..... 14.7-16 Oz./Sq. Ft.

The Yellow Jacket was originally designed for the Astro 10 Flight System. The first version of this design flew during the 1978 flying season. It was a tremendous success and inspired several members of my club, the Toledo Weak Signals, to try electric flight.

Equipped with the Astro 10 the Yellow Jacket is a sport trainer. It's slow and majestic in the air and is very easy to control. It has no bad flying tendencies. Even the stalls are minor with no violent loss of altitude. The Jacket will fly off a paved flying surface. Because I fly from a grassy field I generally hand launch. The Yellow Jacket will climb lazily to an altitude of several hundred feet. If you are a sport flier, the Yellow Jacket will respond. A little bit of down trim to allow some speed to build up and the Yellow Jacket will loop, roll and spin. It's a fun airplane to fly!

In late 1978, the Astro 10 System was replaced by a more powerful Astro 15 Flight System. For those of you who haven't seen the Astro 10 or 15, both these motors use the same case. The difference between them lies in the internal winding of the motor. In addition, the Astro 10 uses a smaller battery pack than the Astro 15.

The first flight with the Astro 15 was astounding. The Yellow Jacket climbed like a homesick angel. This same model has been flown dozens of times. It will do consecutive loops from level flight. Full right rudder and full up puts it into a snappy snap roll. If this command is held, the model goes into a beautiful spin. Wind penetration is excellent. And yet when you turn off the juice and ease in up elevator, the glide is flat and slow . . . almost that of a glider.

The Yellow Jacket with either the Astro 10 or Astro 15 is a fun to fly sport model. Best of all it can be flown at a local park or schoolyard since it makes no noise.

With the fuel shortages and the scarcity of flying sites in metropolitan areas, electric powered models offer the RC'er the ability to keep flying closer to home and yet keep the neighbors off your back.

### Mini Jacket:

For the 1979 flying season it was decided to reduce the Yellow Jacket in size so that the highly popular Astro 05 system could be utilized. The original Yellow Jacket was photo reduced to 88% of the original dimensions. The Mini Jacket is the result. This model is the most pleasant surprise of all. From the very first flight I knew that the

## MINI JACKET

Designed By : Jim Zarembski

### TYPE AIRCRAFT

Electric Sport

### WINGSPAN

43 Inches

### WING CHORD

7 7/8" Average

### TOTAL WING AREA

330 Square Inches

### WING LOCATION

High Wing

### AIRFOIL

Flat Bottom

### WING PLANFORM

Constant Chord

### DIHEDRAL, EACH TIP

1 3/4 Inch

### OVERALL FUSELAGE LENGTH

27 1/2 Inches

### RADIO COMPARTMENT AREA

(L)5 1/2" x (W)2" x (H)3 1/4"

### STABILIZER SPAN

17 1/2 Inches

### STABILIZER CHORD

4 1/2" Average

### STABILIZER AREA

74 Square Inches

### STAB AIRFOIL SECTION

Flat

### STABILIZER LOCATION

Top Of Fuselage

### VERTICAL FIN HEIGHT

4 3/8 Inches

### VERTICAL FIN WIDTH

4" Average

### REC. MOTOR SIZE

Astro 05

### FUEL TANK SIZE

NA

### LANDING GEAR

Conventional

### REC. NO. OF CHANNELS

3

### CONTROL FUNCTIONS

Motor On/Off, Rud., Elev.

### BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa and Ply

Wing ..... Balsa, Ply, Spruce

Empennage ..... Balsa

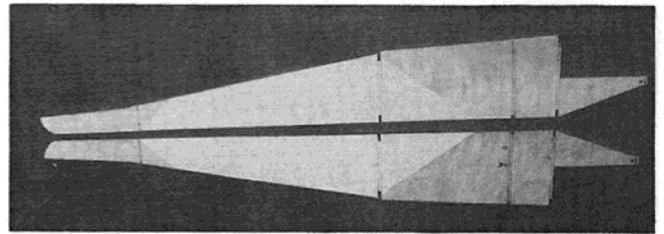
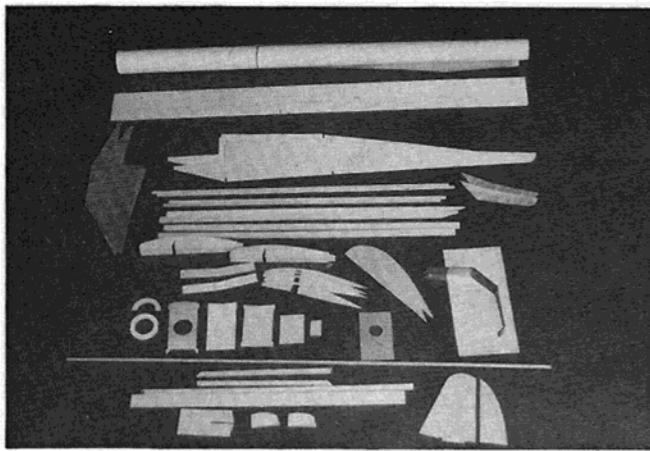
Wt. Ready-To-Fly ..... 30 Oz.

Wing Loading ..... 13.1 Oz./Sq. Ft.

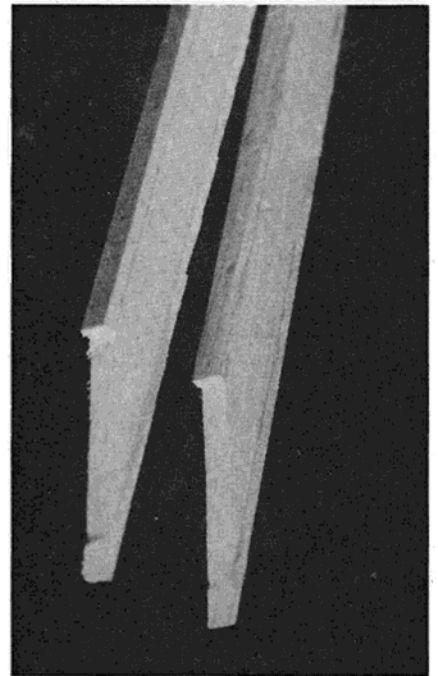
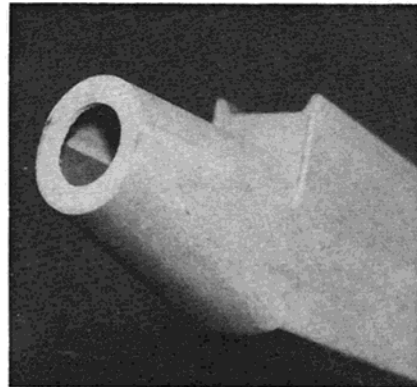
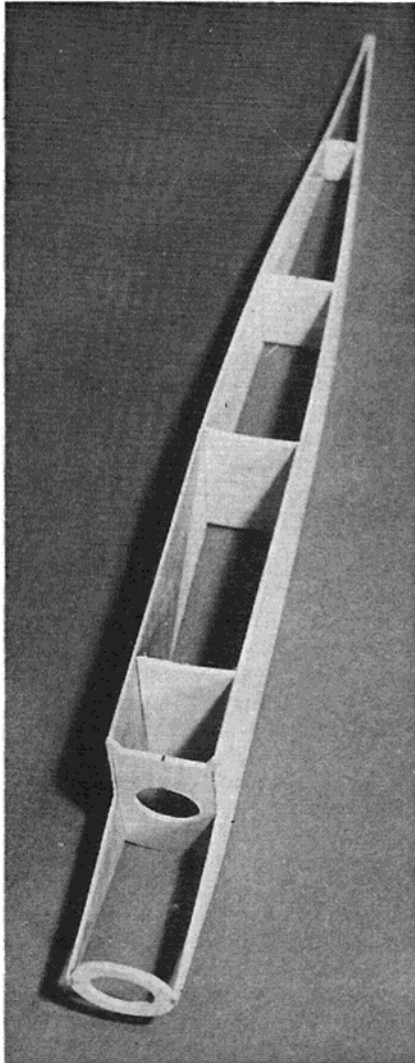
By Jim Zarembski

Photos By Ron Beltz

# MINI JACKET



**LEFT:** Excellent way to start — cut a parts kit. **ABOVE:** Fuselage sides with 1/64" ply doublers. **BELOW LEFT:** Assembled fuselage sides with all bulkheads epoxied in place. **BELOW CENTER:** Nose section sheeted top and bottom with 1/16" balsa. **BELOW RIGHT:** Wing spars laminated top and bottom with spruce.



radio plug. It is connected to the motor control servo connection and does not have a second lead to plug into the power connector. All the power goes into the 3rd servo connector. I don't even have a receiver on/off switch on my model. I use an Astro Flight harness with a built-in charging jack and a heavy duty SPDT switch. When the motor system is turned on the radio is also energized.

The aircraft can be launched by turning on the motor using the throttle control. The model will fly for several minutes until the circuitry in the Electronic Motor Control senses low voltage. At this time the unit shuts down the electric motor and continues to provide power for 6 to 12 additional minutes of flight . . . more than enough time for a leisurely glide down and landing.

One note of caution on the Electronic Motor Control: Because of the design of the circuitry, there is one unusual trait. When you turn on the system the Electronic Motor Control will pulse a small amount of power to the motor which will briefly turn the prop. Once you get used to this it's no problem. However, be aware of this operation and stay clear of the prop.

The Electronic Motor Control unit saves about 3 oz. of weight: the Rx battery, the motor servo, and the radio switch harness. The all-up weight of the Mini Jacket is 30 oz. With 330 sq. inches of wing area the wing loading is a mere 13.1 oz. per square foot. Using a Cox gray 7" diameter 3 1/2" pitch propeller, the Mini Jacket has a phenomenal climb rate. It flies steadily and is a joy to handle. Like its big brother, the Mini Jacket is an excellent trainer. One of

the best advantages of an electric trainer is that the novice doesn't have to learn the care and feeding of the glow engine. For training, a Cox Gray 6" diameter 3" pitch prop will slow down the model and make it easier to control.

The flight duration of the Mini Jacket is 5 to 6 minutes. Keep in mind that a new motor battery pack will give a rather short flight the first few times. The duration will increase as the battery is broken in and will reach a maximum at about 15 flights.

#### **Design Evolution:**

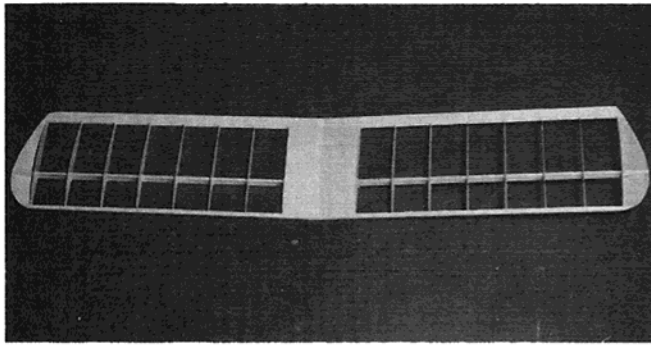
The roots of the Mini Jacket and Yellow Jacket go back to 1970 when I flew an old DeBolt Rebel with an OS Max 10. In 1974, the basic airfoil was taken from the Rebel to create the Buzzer which was the first successful electric that I flew (the first one crashed and burned). This model was flown in three versions since 1974. The Yellow Jacket and Mini Jacket represent the optimization of this basic design.

Both of these models are designed for ease of construction, strength, and durability. The airframe weight is remarkably lightweight due to the blending of spruce, plywood, and balsa in just the right combination to give strength without

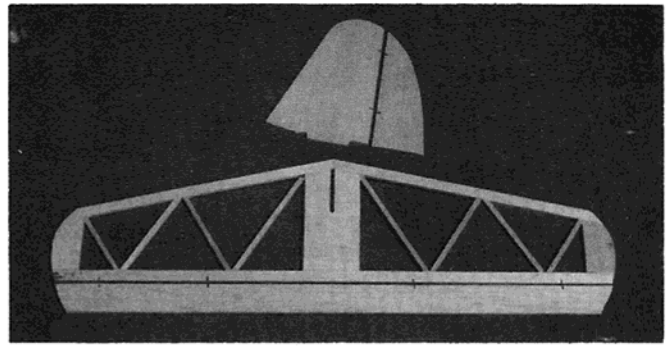
Mini was one of those lucky combinations that results in superb flying performance.

My original Mini Jacket has a Futaba FP-3S radio installed with two of the new S 20 servos powering the rudder and elevator.

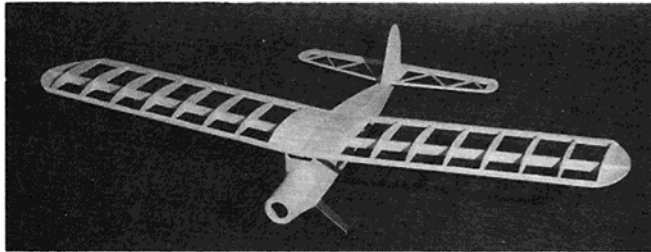
An Astro Flight #4023R Electronic Motor Control was plugged into the 3rd channel of the Futaba to provide motor control (on/off) and to provide power for the radio system from the motor battery. The unit is sold with Kraft and Futaba connectors. Again, let me emphasize that the Electronic Motor Control only has one



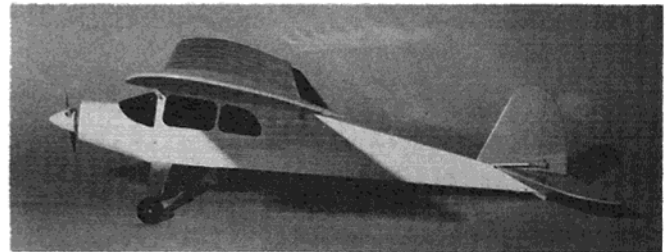
Completed wing structure. Simple but strong.



Completed tail assembly ready to be covered.



Completed airframe. Note air inlet at center section of wing.



Completed model of the Yellow Jacket.

excessive weight.

The nicest feature of these planes is that they can be assembled from scratch in a week of evenings. I built the original Mini Jacket in 8 hours spread over 5 days. One of the keys as to the ability to swiftly build one of these Jackets is that the model uses a notched fuselage and former tab system. You just can't build the fuselage crooked unless you really work at it.

I have found over the years that 1/64" ply works just as well as 1/16" or 1/32" ply for fuselage doublers. The job of the doubler is to keep the balsa fuselage sides from splitting. The 1/64" plywood does this well and can be cut to shape with a pair of scissors. It is also extremely lightweight.

#### CONSTRUCTION

The first step I use is to cut out all of the parts and prepare a kit. I suggest that you purchase two sets of plans — one for construction and one to be cut up for parts templates. It may seem like a lot of money for cut out templates, but it will save a great deal of time in fabricating the parts. I cut all the part outlines 1/4" to 1/2" oversize and rubber cement these portions of the blueprint print to the required plywood or balsa sheet. I let this dry an hour or so and then use a Dremel saw to cut out the part to the exact outline of the plan. In the case of fuselage sides, wing and stab tips, and wing ribs I stack the number of sheets required over on another and pin them together for cutting. Use about 15 pins for the fuselage sides and make sure the blade of the saw is perpendicular to the table bed. You always get identical fuselage sides with this method. You could also cut an extra set of parts for a spare kit while you're at it. I'm sure that one of your modeling friends will want it after seeing your model perform.

#### Wing:

Sub assemble the spruce top and bottom

spar caps on the balsa core. Use a 36" steel rule to pin these against, while drying, to make sure they're straight. I use aliphatic resin for virtually all of the wing construction.

When the spar halves are dry, cut out the tip angle as shown on the plan and cut the dihedral joint angle. Use 5-minute epoxy to join the plywood dihedral braces to the two spar halves. I generally use about three small C-clamps to make sure a good strong bond is made.

Pin the LE and bottom TE in place over the plan. Make sure you use plastic food wrap or wax paper over the plan to prevent the glue from sticking. Assemble the wing ribs and wing tip in place. The bottom center sheet must be added before the center wing ribs are added. When complete, remove from plan and build the opposite wing panel. To complete the basic wing structure, sand the rear of the TE to the bevel shown on the plans and add the TE top strip. Be sure to use a small file to notch the wing tip for a close fit with the top TE.

Add the top wing center sheeting, carve the LE to shape, and sand the entire structure to prepare for your favorite film covering.

#### Stabilizer:

The stab is constructed from 3/16" balsa strips and sheet. Be sure to cut the notch for the vertical fin in the stab center section. When complete, use a drop of Hot Stuff to temporarily join the elevator to the stab at each tip. Sand to a streamline shape and carefully cut the elevator away.

#### Fuselage:

Sub assemble the 1/64" ply front and rear doublers to the two fuselage sides, making sure of a left and a right side. For the Mini Jacket, roll the motor tube out of 1/64" plywood. Use tape to hold the tube around the motor until the aliphatic resin dries. The

Yellow Jacket features an Astro Flight Motor Tube. This is available direct from Astro Flight for \$.50 plus \$1.00 for postage.

Place the motor tube on formers A and C. Use 5-minute epoxy to assemble formers A, B, C, D and the joint between the two fuselage sides at the rear of the fuselage. When this sets up, add the landing gear plywood mounting plates and the fuselage bottom.

Cut a sheet of balsa for the top and bottom cowling. Place this in hot water under the faucet to assist in bending. Fit it to size with an X-Acto blade and use Hot Stuff to complete the cowling assembly.

Add the pushrod tubes first and then glue on the fuselage top. Sand to shape and cover with film. When this is complete, add the wing hold-down dowels and landing gear.

#### Fin:

Cut to shape and sand to streamline section. I use MonoKote hinges on the Mini Jacket and Du-Bro mini hinges on the Yellow Jacket.

#### Finishing:

On the prototype, I used Super MonoKote for the basic color and then a contrasting color of Super MonoKote applied under low heat right over the first color for trim. For markings, trace the required numbers on a sheet of paper and place this over as many as four layers of MonoKote with the backing removed. Add a bottom sheet of paper to form a sandwich. Staple all around the number and use a razor blade and scissors to cut out as many as four identical numbers.

Stripes, stars, and sunburst patterns can all be added in this fashion. Since there is no greasy glow fuel you don't have to worry about sealing these edges.

The side windows of the fuselage are cut out the same way. Be sure to reverse the MonoKote sheets so that you cut out right

and left hand windows with the adhesive side in.

**Motor Installation:**

The motor is friction fit in the motor tube. If loose, add a band of masking tape around the motor for a tight fit. The motor, switch harness and battery are plugged to one another per Astro Flight instructions. If an Electronic Motor Control is used, it is plugged in line between the switch harness and the motor. In this case only the motor system SPDT switch is mounted on the fuselage side.

If you use a conventional servo for motor on-off, mount the motor system switch on former D and link it to a servo with a bent piece of rod and heat shrink tubing.

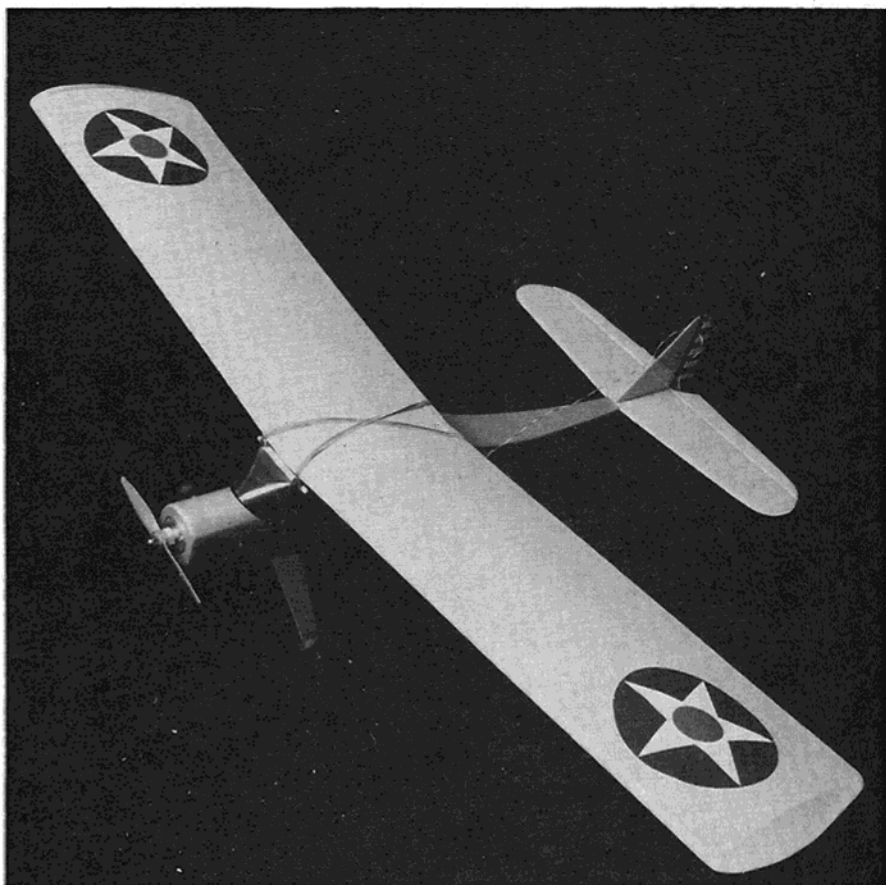
**Charging:**

The Astro 05 can be charged using a Rapid Charger from the cigarette lighter of your car or from a 12 volt source. The Astro 15 is charged from a 24 volt source. Follow the Astro Flight Instructions. Charge time is 15 minutes.

**FLIGHT**

Turn on the system and check for servo chatter and range. Start up the motor and hand launch into the wind. Keep the nose down until you get to altitude. From that point it's just like any other sport model . . . it's fun to fly. □

*Right: Buzzer — 1974 — ancestor of the Yellow Jacket and Mini Jacket.*



**By H.E  
RCModeler  
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