The Boeing Hawks 1st Annual Electric Race (1982) saw quite a few *Ohm-Y-Gosh* models flown by: (top, left to right) Don Shepard, Bill Smith, Bill Warner, Dave Katagiri, and (bottom, left to right) Mitch Poling, Ben Almojuela, and Bernard Cawley.

OHM-Y-GOSH

By DAVE KATAGIRI . . . Here is a popular 05 electric racer and fun plane that has really "taken off" in the Pacific Northwest. It has a 300 sq. in. wing area and a very fast 15 oz. wing loading. Why not start a one-design race in your area?

• *Ohm-Y-Gosh* is an electric powered, two-channel sport racer and intermediate aileron-elevator aerobatic flyer. The clever name for the model was a contribution from Avis Cawley, wife of Bernard Cawley, of the Boeing "Hawks" R/C club. The model began as a simple test vehicle on which to experiment with the second generation "05" electric flight systems. The design also satisfied two other objectives: one was to develop a new club event (not that we don't have enough already), and the other was to have an aerobatic sport flyer that could be used in several local fields where engine noise would otherwise prevent their use.

Ohm-Y-Gosh is sized for the 05 flight systems that employ six or seven 1.2 amp-hour cells. Leisure Electronics offers the 601 (Pattern) and 602 (Competition) flight systems. Astro Flight has its 05XL system as well as the new Challenger (cobalt) 05 system. None of these systems includes a safety fuse which is highly recommended. Four fuses were blown by the author while logging 70 flights which certainly saved a motor or prevented a fire in each case. A 20 amp fuse was used satisfactorily for all systems except the 05 cobalt on seven cells which required a 25 amp fuse. The Cox 6-4 grey plastic prop performed the best with these systems.

Several prototypes were made by local flyers which were powered with the Leisure Competition system using six cells. Flight duration with this system is about five minutes of high performance flight. As an audible loss in rpm begins, the motor should be shut off. The Pattern wind motor will run a couple of minutes longer, but with less performance.

A switch-off with down elevator proved simple and adequate. A roller coaster maneuver consisting of a pitch-up followed by a quick full down will shut the motor off.

The *Ohm-Y-Gosh* design is based on a wing of 300 square inches to set the wing loading at 15 ounces per square foot. At this loading, the gliding performance is similar to that of a 200 square inch 1/2A model. Where it differs from the latter is in power loading. Its performance is short of its glow engine counterpart; however, *Ohm-Y-Gosh* will cruise at 58 mph when powered with the Leisure Competition flight system (six-cell). This is a very respectable speed considering that it is an average two-way level entry speed trap measurement. Obviously, a diving entry technique would make a more impressive figure, but it would not calibrate the aircraft.

Locally adopted race rules favored a six-cell pack as it was a stock configuration. The race course layout was the AMA (provisional) 1/2A, 300-foot triangle with a 60-foot base between pylons two and three. Winning times were just above two minutes for a 10-lap race. Further refinement should see times under two minutes. A constant chord wing of 295 square inches was set as a minimum wing area in the spirit of "sport" racing, just as "Q-500" and its constraints have set standards for that class. Stability of rules for any race class seems to be a must for longevity of that class.

WING CONSTRUCTION

The wing features a fully sheeting upper surface to maintain its shape, and is made full span using 36 inch long stock. Full span ailerons may be simpler, but for lighter weight, the plans show inset, conventional ailerons.

The suggested sequence of assembly is to glue the ribs to the leading edge, bottom spar, and bottom sheet at the trailing edge over the plan. Glue the top spar and shear webs.

At this point, the structure can be removed, and the bottom sheet forward of the spar and rib cap strips may be glued in place. Reattach the wing to the plan using shims to align the trailing edge to prevent warping. Install short filler spar sections between ribs to form the aileron spars, and add scrap filler reinforcement at the hold-down bolts.

Notch the ribs on top where the aileron torque tubes pass through, and relieve the aileron spars for the hinges. Note the off-center location of the input arms of the torque rod. Keep the inboard end of the torque rods snug to prevent aileron lash and possible flutter.

Attach the leading edge sheet from the leading edge to the top spar. The wing will now be stiff enough to be removed from the board to finish aileron torque rod installation. Don't glue the torque rod at the aileron end yet. Mark the bottom sheet with a pin by poking holes through the sheet from the top side. Mark the aileron outline on the bottom surface using a straight edge to

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ABOVE: Bill Smith poses with his *Ohm-Y-Gosh* which features a neat air scoop.

Dave Katagiri with original model. Large stab yields excellent pitch stability.

connect the pin holes. Don't cut out the aileron yet. Position the torque rods and finish gluing the back half of the top sheeting and the trailing edge strip.

Next, poke a pin through the top sheet using the bottom holes as guides. Mark the aileron outline on top. Add the tips and sand the entire wing to prep it for covering.

Now cut the ailerons loose, and trim and sand them to fit neatly. Attach the ailerons after covering the wing and ailerons separately. Avoid getting glue on the hinge pins and use care to keep the torque rod and hinge axes in line.

FUSELAGE CONSTRUCTION

The fuselage is designed fairly stoutly. Remember, the battery pack weighs 12 ounces and the motor weighs six. The equipment layout shown should balance on a 30 ounce model. Select matched sheet wood for the fuselage sides and longerons. Pre-assemble left and right hand sides with verticals and longerons. Mark locations of all body formers on the inside.

Check to see how the sides bend around former C. Check the bend up side down over the top view. Mark center lines on body frames to aid in alignment. Assemble the two sides starting with frames C and D, then B. Align the sides over the top view before cementing the tail post and motor mount.

Assemble the top, bottom, and detail parts per plan. The ply skid plate on the fuselage bottom can be omitted if landings are always on mowed grass.

EMPENNAGE CONSTRUCTION

The tail assembly should be made of medium grade wood. The prototype was covered with Super Monokote which was stiff enough to take sustained dives. Some cover materials tend to be more elastic resulting in a flexible horizontal tail prone to flutter. The horizontal tail is intentionally large to ensure stable handling in pitch. Prefit the tail assembly to the body to check its alignment relative to the wing/body.

FINAL ASSEMBLY AND COVERING

Position and align the wing and hatch on the fuselage. Tape the leading and trailing edge to the body. Mark locations of the two wing hold down bolts, and match drill the holes with a 1/8-inch drill at right angles to the top surface of the trailing edge and forward hatch. Thread the hold down plates in the fuselage with an 8-32 tap. Now ream the corresponding holes through the wing just large enough to pass 8-32 nylon bolts. Place a drop of Hot Stuff (or Zap, etc.) into each wing hole. This will harden the wood to resist compression loads and wear. Treat the threaded holes too and retap the threads after curing.

Fully sand all surfaces and remove all dust to receive the selected covering film using the manufacturer's instructions. Attach the tail parts and rig the elevator controls. The pull for off switch installation is depicted on the drawing. Some trimming of the dacron v-control string length may be required to desensitize the shut-off point and still function reliably at full down. When satisfied with the adjustment, apply a small amount of Hot Stuff on the dacron string knots.

PREFLIGHT

Check all control surfaces not only for deflection, but also for proper direction.

Place a soft, half-inch thick balsa block in front of the motor battery. It will function as an energy absorber in the event of a crash. It may save both motor and battery in one those sudden stops. Restrain the aft end of the motor battery if you use a two by three cell stick configuration to prevent it from interfering with the aileron horn and links.

FLYING

Ohm-Y-Gosh is an intermediate design requiring prior flying skill, but it is not a difficult model to fly.

On the first flight, have the elevator trailing edge trimmed up about 1/16 of an inch above neutral. Hand launch firmly and with a slight nose up attitude. The airfoil used on this model has high drag at low speed, so don't let it climb too steeply after launch. Level it out as soon as it is at a safe altitude, and let it gain speed.

The model rolls 360 degrees in about two seconds which should be easy to handle in the excitement of a race.

For aerobatics, consider mounting the motor battery flat against the bottom of the wing. The aileron servo must be submerged flat into the wing's depth in this case; this will allow the model to achieve a more uniform roll rate. Bill Warner made a version which used this feature with a fixed wing and battery hatch on the fuselage bottom.

Electric powered flight is a very enjoyable alternative to the usual form of flying, and best of all, it allows the use of many flying sites which would otherwise be unusable. •