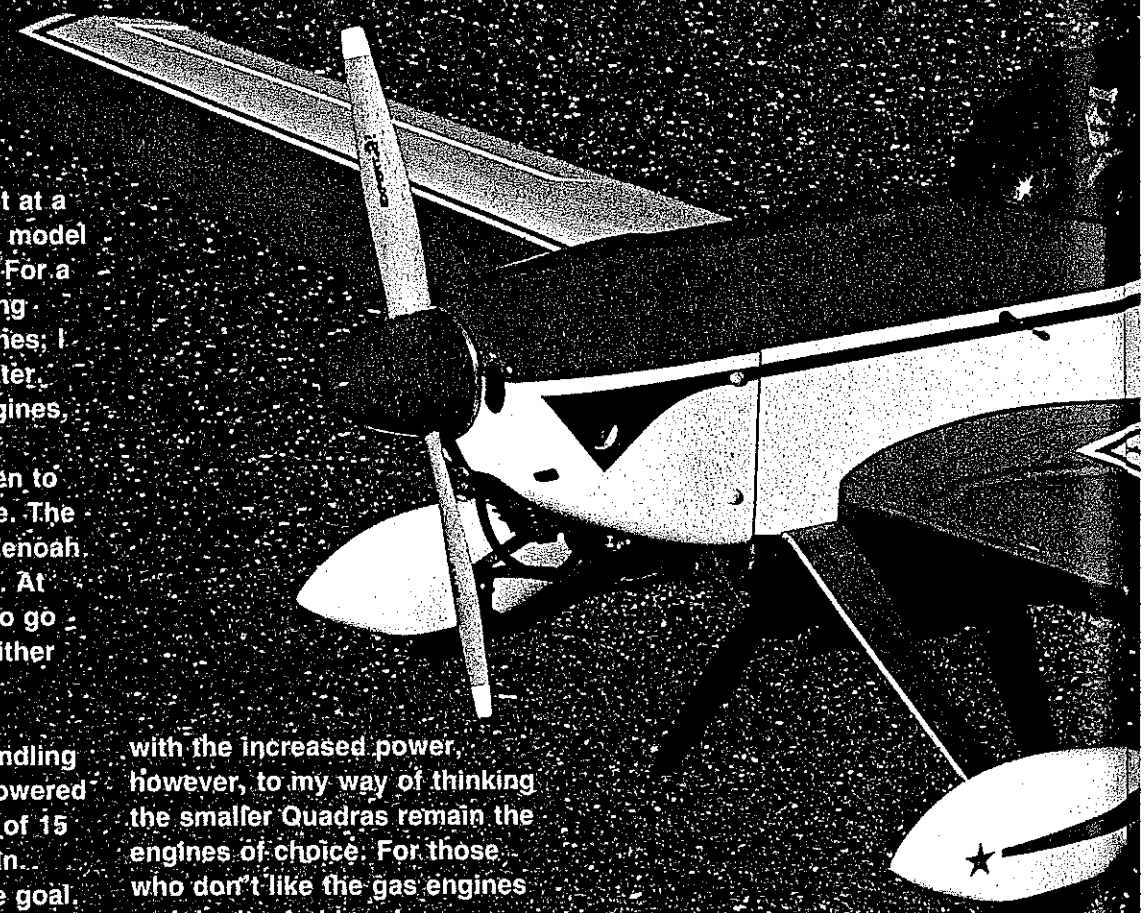
Prime Cut

■ Dick Sarpolus



Somewhat resembling a home-built like the Cap-21, RV-3, or Stephens Akro, this large sport and aerobatic-capable aircraft has a 90-in. wingspan, 1,200-sq.-in. wing area, and weighs about 16 lb. It's quite happy with a Quadra 40 or SuperTigre 3000. It has foam core wings, tail surfaces, and fuselage top blocks. The only built-up structure is the fuselage box assembly.

THIS AIRPLANE is my shot at a large, quick-building sport model that's also a capable flier. For a good deal of my sport flying activity, I prefer big airplanes; I think they really do fly better. Big airplanes need big engines, and the large gas engines available today have proven to be economical and reliable. The Quadra 35 and 40 or the Zenoah G-38 are practical choices. At the moment I don't want to go any larger or heavier, in either engines or aircraft.

To get lively aerobatic performance and good handling with a Quadra 35- or 40-powered aircraft, an overall weight of 15 or 16 lb. with a 1,200-sq.-in. wing area is an achievable goal. The resulting 30-oz.-per-sq.-ft. wing loading is reasonable for a large model. Such a model is built to fly, not to crash. Though not particularly strong, its structure is designed to stand up to virtually anything you can put it through in the air.

You can use a larger engine in the Prime Cut as well. In several of the models, a Quadra 50 produced about the same or slightly higher airspeed but greatly improved their vertical performance. The bigger Quadra really pulls! Because of the weight penalty that tags along with the increased power, however, to my way of thinking the smaller Quadras remain the engines of choice. For those who don't like the gas engines and don't mind burning more glow fuel, a Supertigre 2500 or 3000 can be expected to do a good job.

The 7½-ft. wing and 5-ft. fuselage fit in my minivan, so they aren't too cumbersome to transport. Although I like quarter-scale sized aircraft, I don't insist that they be bona fide Scale replicas. For me, the challenge of designing and scratch-building a model, striving to get the appearance and performance I want, can be just as satisfying.

The Prime Cut is based on my Pik-15, an earlier Scale effort whose overall design, size, and weight had proven successful. This time around I planned to stress even easier construction techniques. The Prime Cut utilizes foam core wings, tail

For the big plane enthusiast who doesn't want to undergo the intricacies of Scale construction, here's a large, snazzy, fast-building sport RC aircraft designed around Quadra 35 or 40 power that just might fill the bill.

surfaces, and fuselage top blocks. Although a well-designed built-up structure would probably be lighter, the foam construction is so much easier and quicker that for me it's worth the tradeoff.

The total wing area is approximately 1,200 sq. in., with a 90-in. span, 16-in. root chord, and 10½-in. tip chord. Wing aspect ratio is 6.8 to 1. A fully symmetrical airfoil with 16.8% thickness at the root and 17.8% at the tip gives full aerobatic capability and good handling. The horizontal stabilizer area of 250 sq. in.—21% of the wing area—is ample for stability.

Although the fully symmetrical airfoil sections on the tail surfaces were used because of the foam core construction, they may also be enhancing performance as a fringe benefit.

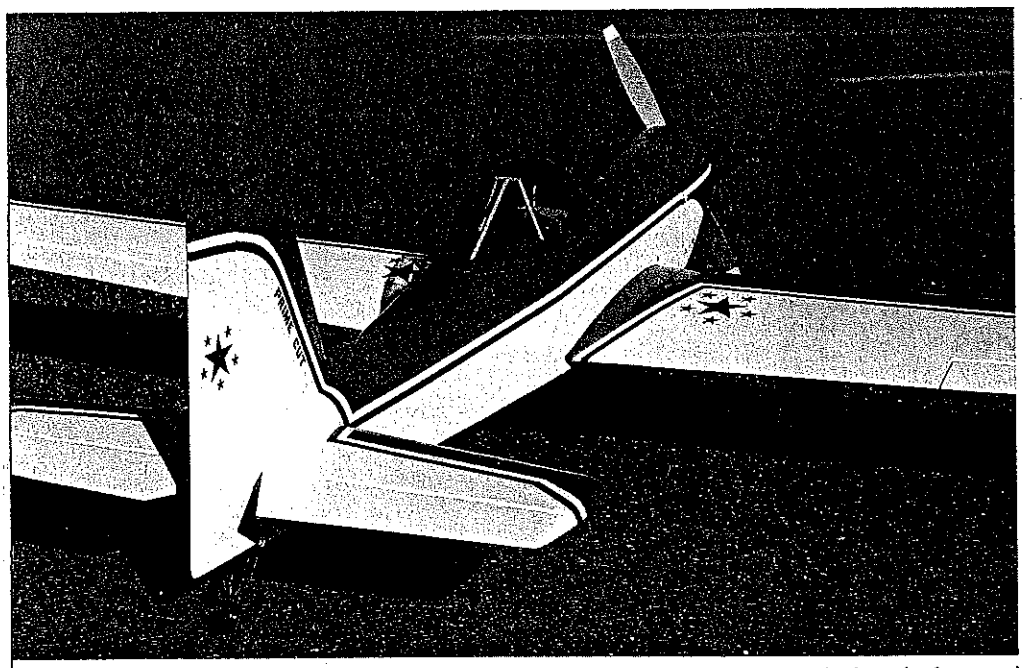
The overall fuselage length of 62 in. provides sufficient tail moment for easy handling and stability, together with a short nose moment to counterbalance the heavy gas engine. Several prototypes built to these plans have balanced with no added weight.

The model uses inset tip ailerons which are driven by separate aileron servos in the wing; strip ailerons on an aircraft this large would probably have too much flex. To retain maximum simplicity of wing construction, the tail-dragger landing gear is mounted in the fuselage just forward of the wing.

Design of the tail surfaces includes a vertical rudder hinge line on the same plane as the elevator hinge line; this permits the rudder to be extended beneath the stab. Separate elevators, each driven by its own servo, provide redundancy and adequate control power. Rudder and elevator linkages are simplified with this arrangement, and a leaf-spring tail wheel is easily coupled to the rudder for ground steering.

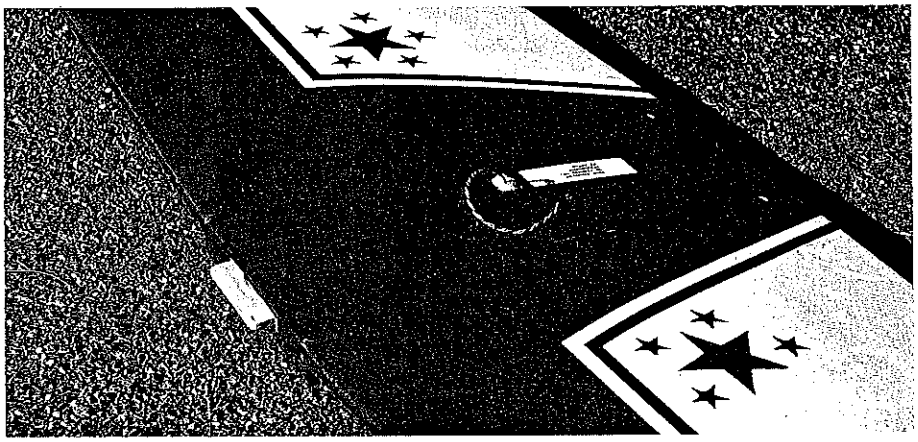
The Quadra engine is mounted inverted, enclosed within a simple fiberglass cowl. The sheet aluminum landing gear is dressed up with fiberglass wheel pants. A simple, rounded top on the fuselage accepts a bubble canopy.

In overall appearance the Prime Cut suggests a generic aerobatic/home-built aircraft. The model is scalelike without

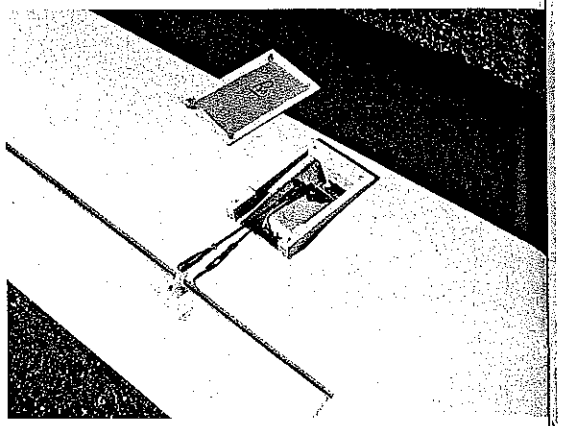


This view shows the sleek lines of this big tail-dragger with its tapered wing planform and fully symmetrical airfoil. The covering is Coverite Black Baron film with Coverite graphics.

Close-up of the canopy showing the Williams Brothers ¼-scale pilot complete with dark glasses and roll bar, adding a nice touch of realism to the model. This canopy is commercially available from T&D Fiberglass Specialties. Tinting is black Tintex.



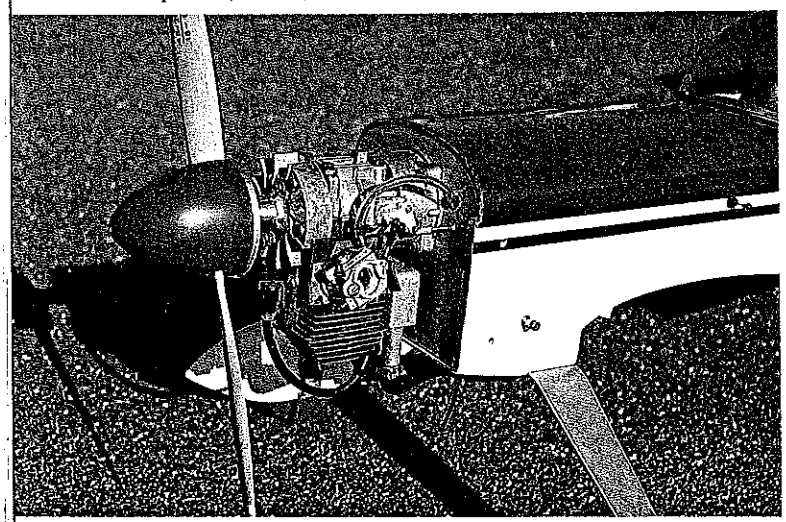
This view of the top center section of the wing shows the ¼-in. plywood wing mounting key, or tongue, used in lieu of the more common dowel arrangement. The author finds this system to be easier to install and easier to adjust for a good fit. The aileron servo lead is seen extending from the wing. Name and address label on wing suits the AMA identification requirement.

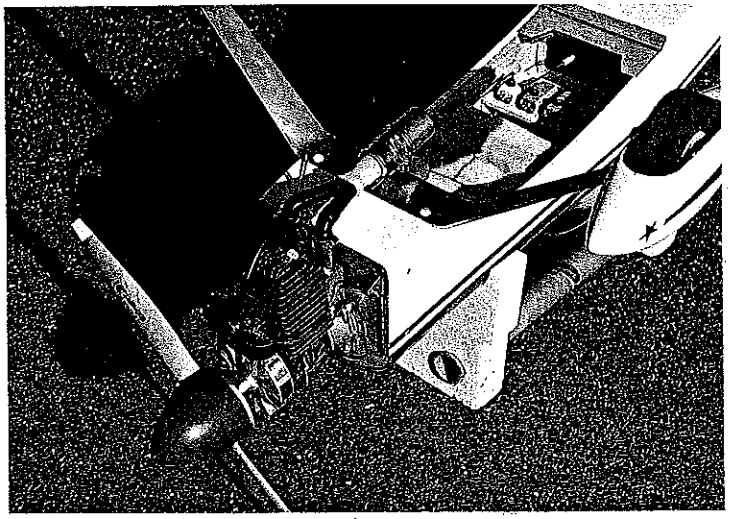


The access hatch (and cover) on the wing bottom surface for the aileron control rod. Each aileron is controlled by its own servo.

replicating any particular design. Originality is not its strong suit. Derived primarily from the Pik-15, with a dash or two of other successful forerunners like the Cap, Laser, Chipmunk, RV-3, and Akro, it's an eminently practical sport aircraft that melds proven aerodynamic parameters with very easy construction techniques.

Though its pace is slower than a Pattern aircraft, the Prime Cut is capable of almost any aerobatic maneuver. It's a steady and reliable airplane; takeoffs are easy, and the model can be slowed down sufficiently to achieve reasonably relaxed landings. However, the Prime Cut is hardly a trainer. With an airplane this big and a wing loading this high, the pilot has to really pay attention. I'd suggest this model as a first step into the quarter-scale arena. It's a nice

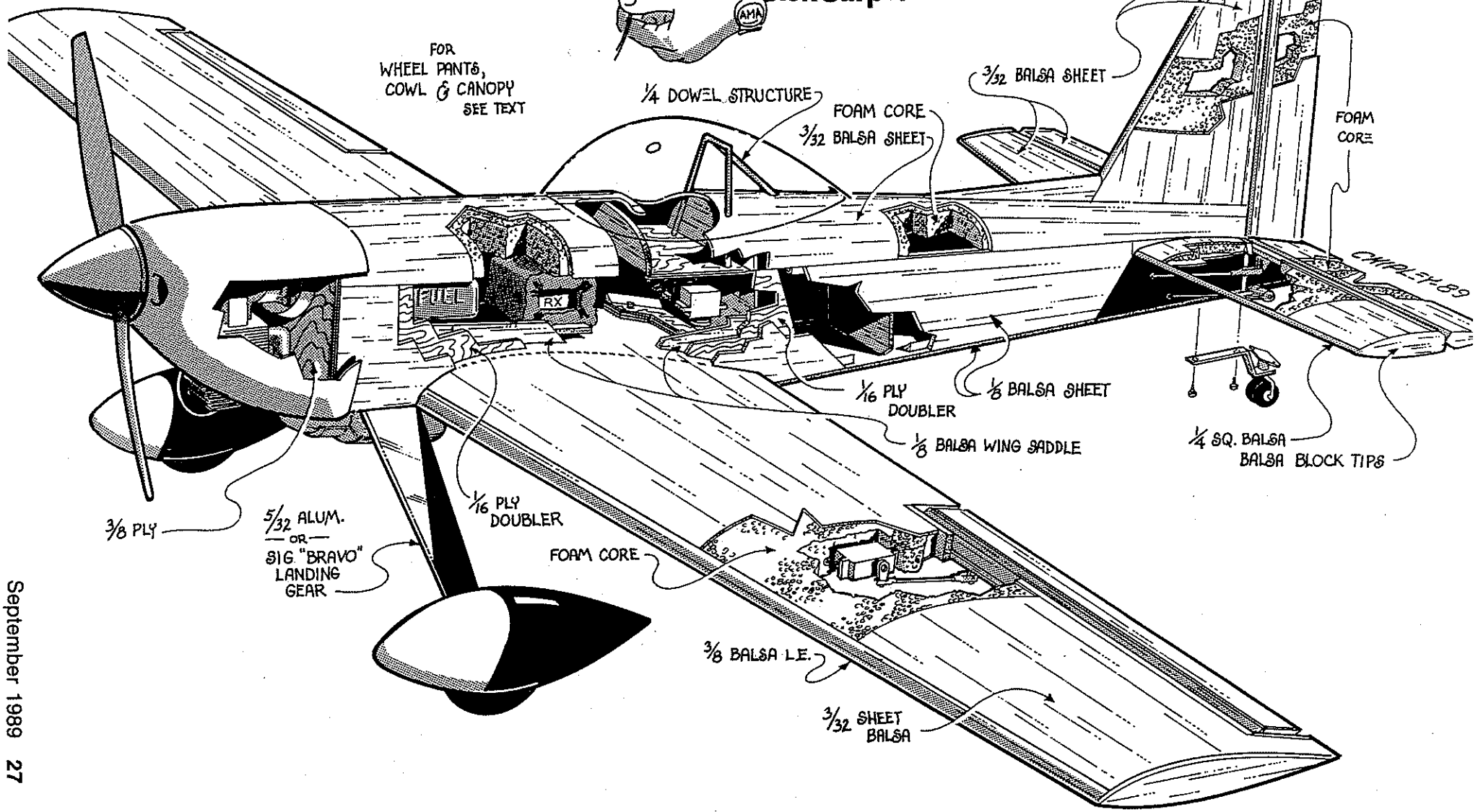


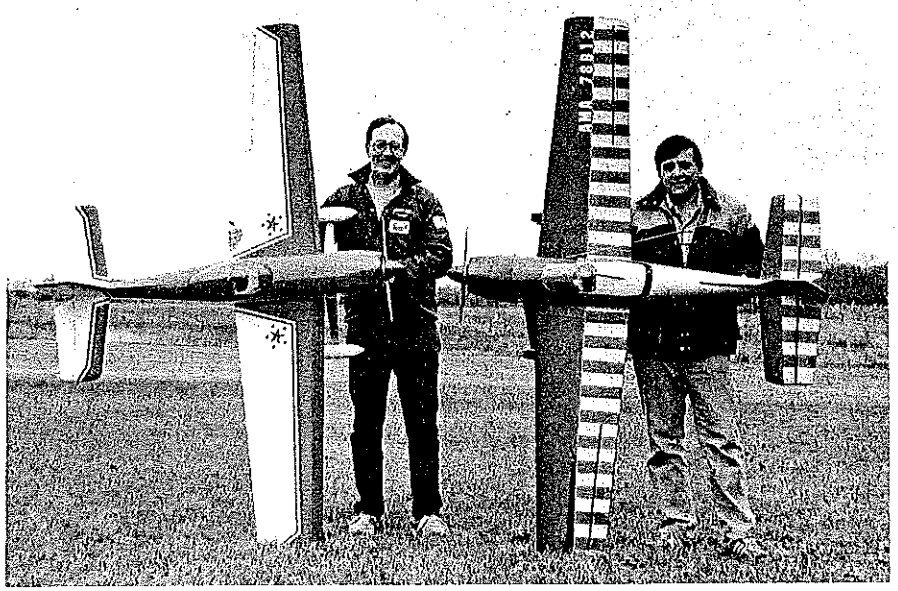


These engine shots show complete access with the fiberglass cowl removed. On the left is a close-up of the upside-down-mounted Quadra 40 engine with an 18-in. prop and 3½-in. C.B. plastic spinner. The ignition on-off switch is mounted on the firewall with the handle protruding slightly through the cowl. The photo on the right shows the simple foam-and-tube structure of the fuselage and the exhaust system, consisting of a B&B muffler coupled to a lawn mower muffler to reduce noise. The adapter consists of two copper plumbing elbows and brass tubing.

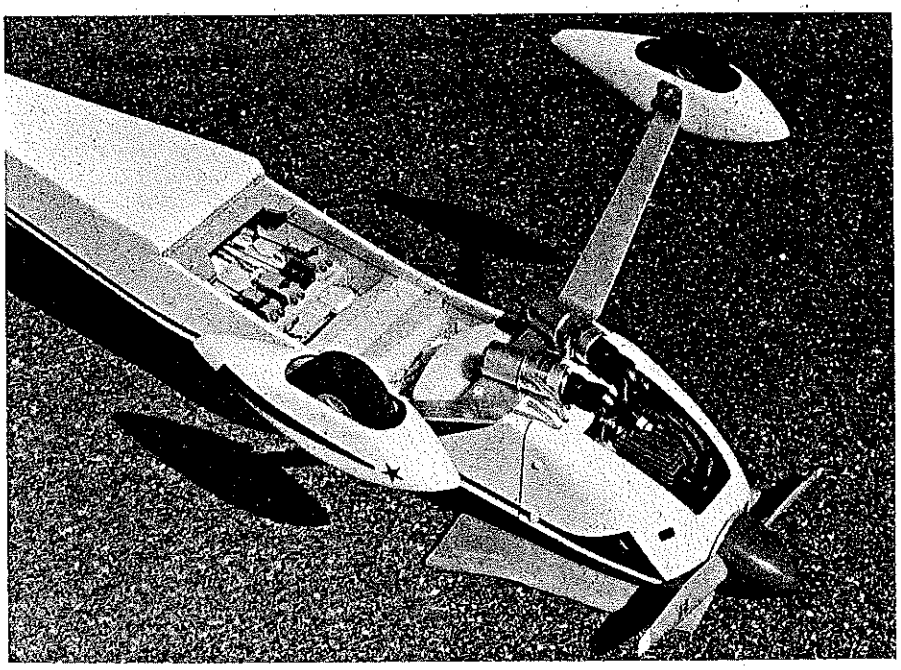
PRIME CUT

Dick Sarpolus





The size of these airplanes is apparent in this photo of the author (left) and his his friend, Lou McGuire (right), showing off their respective models. Lou's plane is also powered with a Quadra 40 but is distinguished by its Chipmunk-like trim scheme and different canopy. Lou's airplane was finished several months before the author's, which benefited from Lou's flying experience. Modifications were incorporated in the landing gear based on what Lou learned.

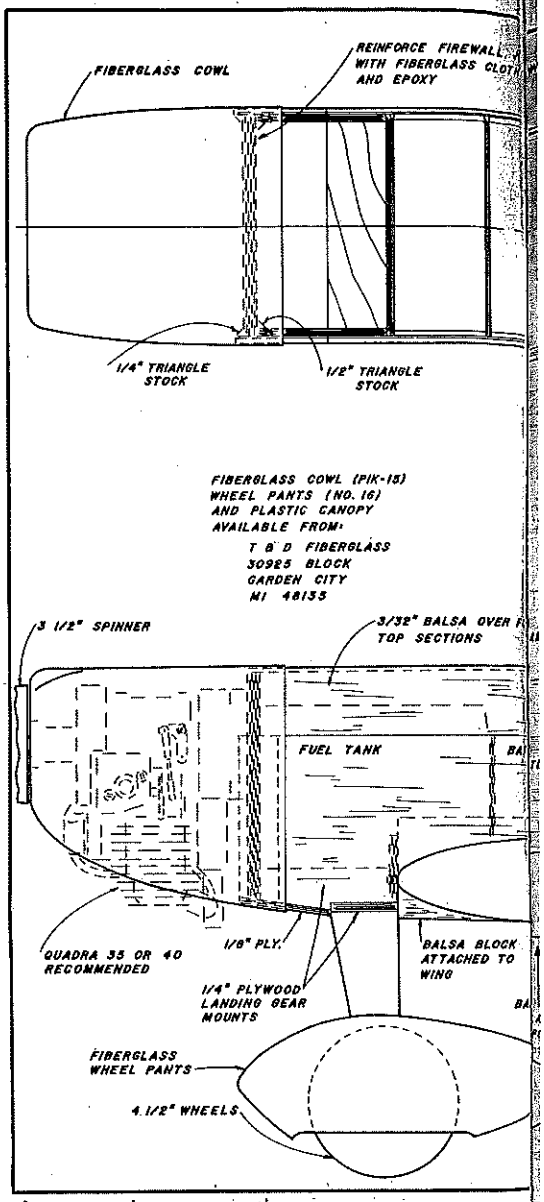


This bottom shot with wing off shows the interior arrangement. Four servos are mounted side-by-side across the fuselage. Two servos are for elevator control, one for each surface, giving redundancy and more control power. The other two are for throttle and rudder control. Note the use of two lawn mower mufflers coupled to the B&B muffler in an attempt to quiet this large engine. The lack of effective mufflers on the market for large engines is a real problem.

change from a .40 or .60 size ship—a bit of a challenge, and that makes it fun.

Construction is sufficiently straightforward that capable modelers will have no problems, and building supplies are readily available. The fiberglass cowling and wheel pants, as well as the plastic canopy, are available from T&D Fiberglass. The aluminum landing gear is the Bravo unit from Sig Manufacturing Co. All other hardware is commercially available. If you don't have a local foam cutter, the foam cores can be purchased from Robin's Wing. Balsa and plywood are available locally, or through mail order suppliers. I surmise that the overall cost is comparable to or less than any commercial kit for an aircraft this size.

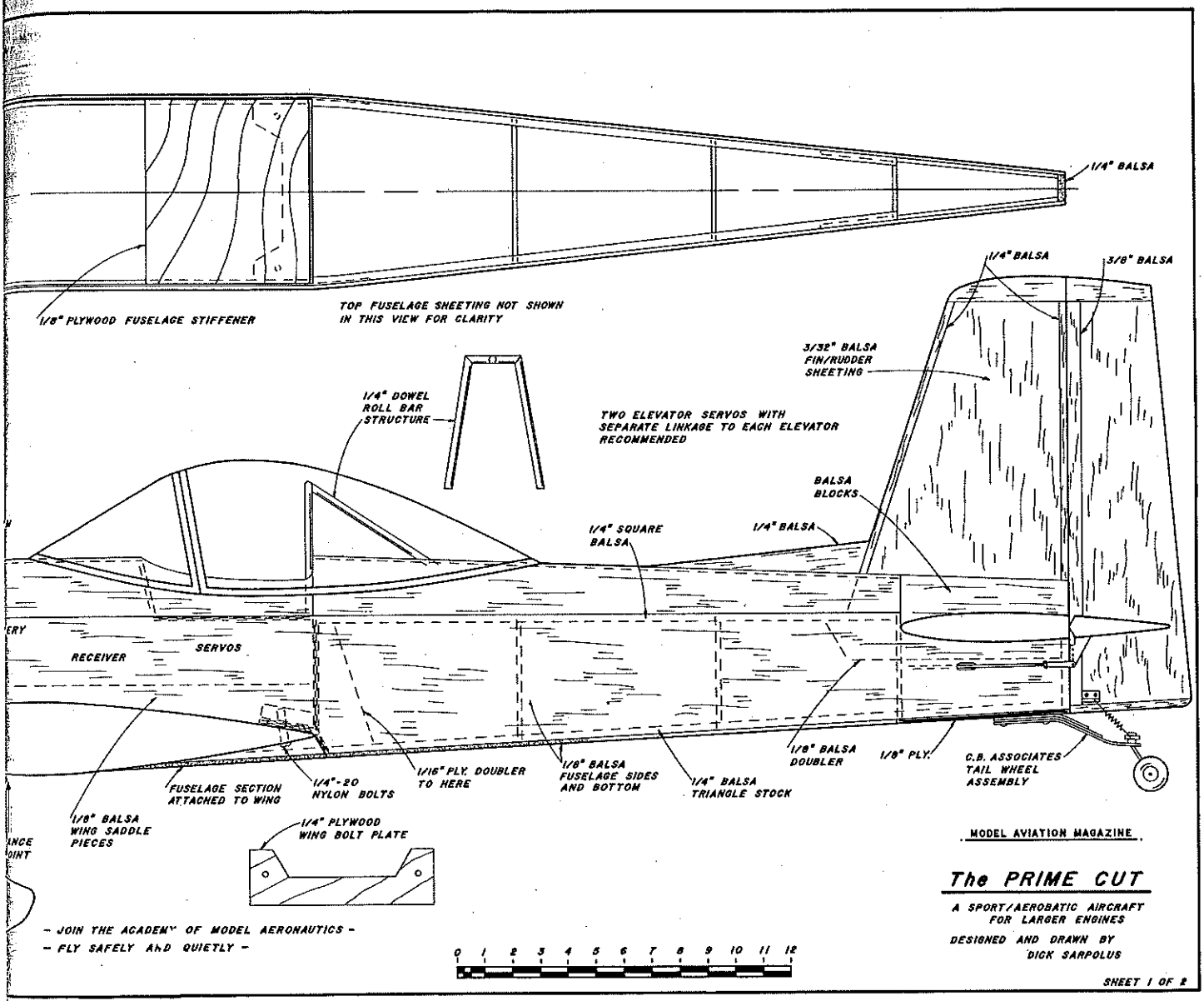
My friend Lou McGuire began work on a Prime Cut at the same time that I did, but Lou had his finished and flying several months before mine. Lou's experience with his aircraft led us to beef up the landing gear mounting for additional strength. As shown on the plans, this has worked out well, and when it came time to test fly my Prime Cut I knew there was little to worry about. Nevertheless, I took my usual bundle of photographs of the model before that first flight. Even though I can't remember ever losing a plane on its debut, I always take the photo record as a precautionary measure.



The first flight was uneventful—until the midair. After takeoff and making a few elevator trim adjustments, Lou and I executed some rolls, loops, and snap rolls, and then began making low passes for the photographer. My concentration must have been total, because I didn't notice the other plane until it was too late. I heard a crash and watched helplessly as pieces of airplane fluttered through the sky. Interestingly, another midair occurred less than 30 minutes later, with one plane surviving.

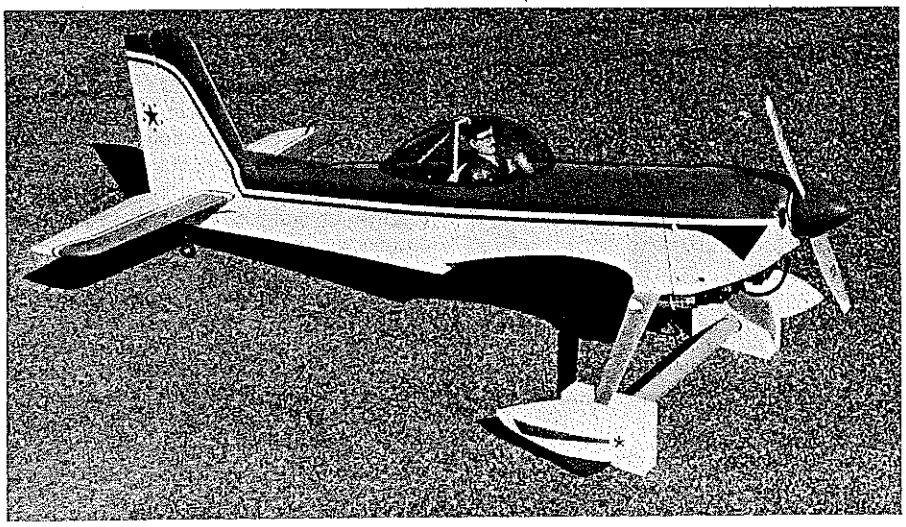
The Prime Cut withstood the impact as well as could be expected. Though the radio and engine survived, and the wing and tail surfaces could be reused, the fuselage was destroyed. I'm in the process of constructing a new fuselage and hope to be airborne again before long. Still, it's just as well that I took all those preflight photos.

Construction. The Prime Cut's structure follows conventional foam core design. If you're ready for a scratch-built project of this size, you've probably already developed your own preferred building techniques. If

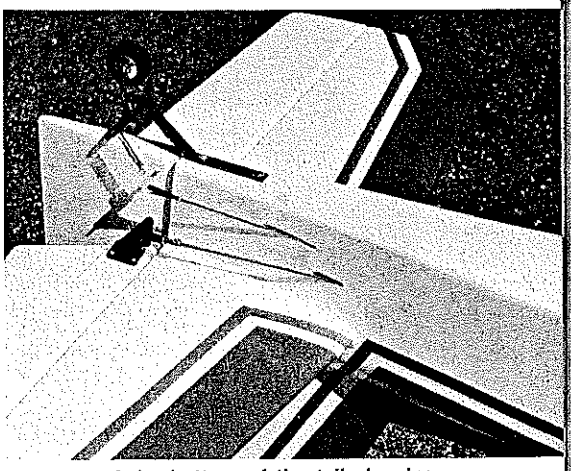


you can't find a local source for foam core cutting, I recommend Aerosmith Model Aviation, RD #1 Box 290, Athens, NY 12015.

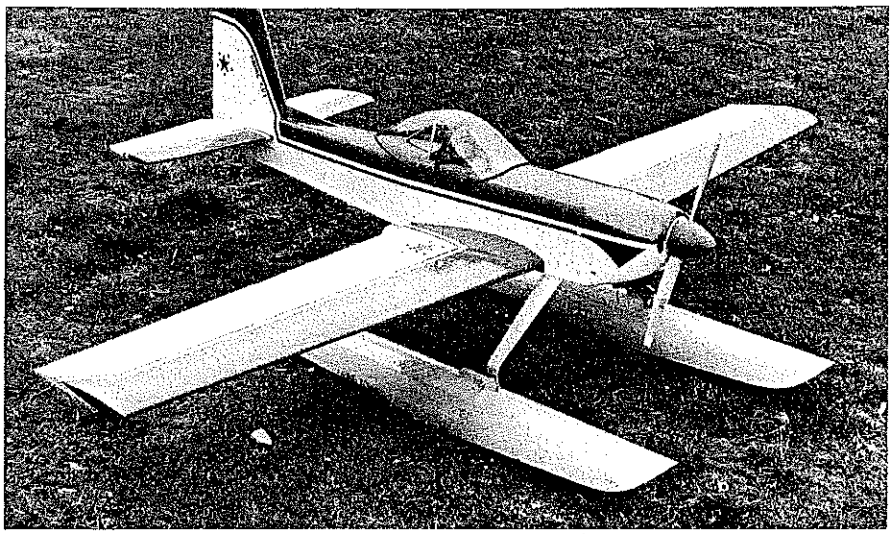
The foam cores are sheeted with 3/32 medium-weight balsa, which is edge glued as necessary for the needed width. I've used Dave Brown's Southern Sorghum contact cement for many years with complete success, but many builders prefer using epoxy glue, thinly applied, or the 3M No. 77 spray contact cement to adhere the skins to the



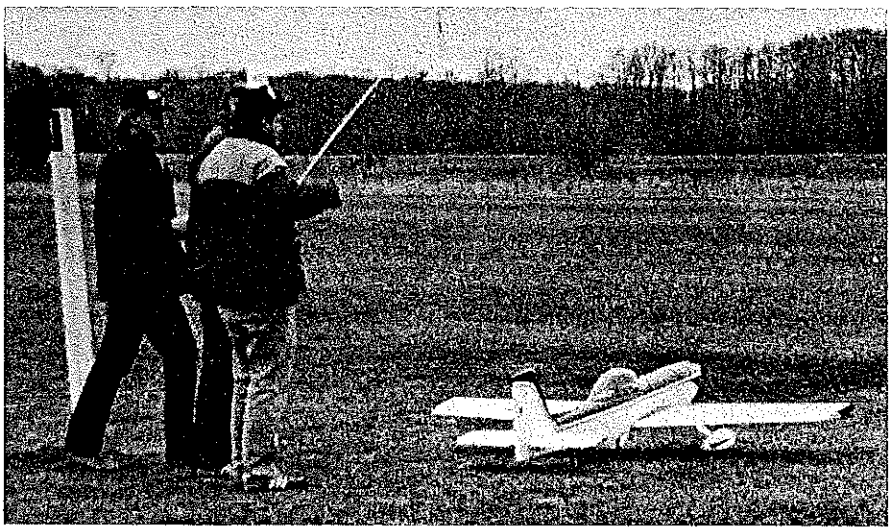
The finished model, without wings, is shown supported by a simple foam block/cardboard tube assembly under the landing gear to keep weight off the wheels while the airplane is left standing. This prevents flat spots on the wheels. The canopy, cowling, and wheel pants are all commercially available from T&D Fiberglass Specialties. The landing gear can be made up from 5/32-in. aluminum stock, or purchase a Morrisey Bravo unit from Sig Manufacturing Co.



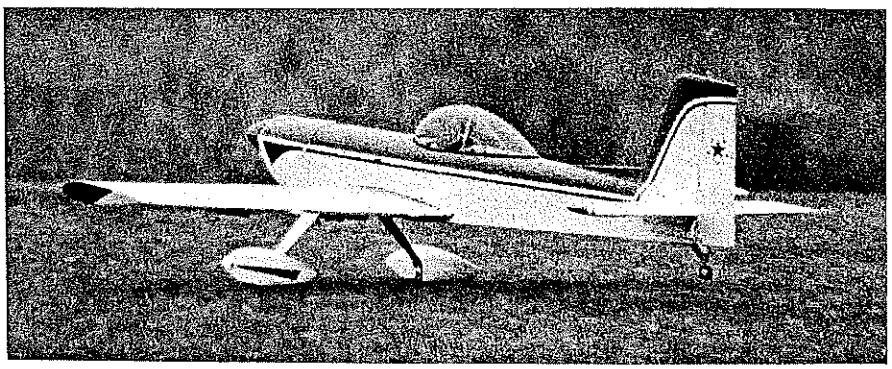
Close-up of the bottom of the tail showing the C.B. Associates heavy-duty leaf spring tail wheel assembly and steering linkage attached to the rudder pushrod and one of the elevator pushrods. There's a separate pushrod for each elevator. The clevises and pushrod ends are heavy-duty 4-40 size, with jam nuts and keepers on the elevator clevises.



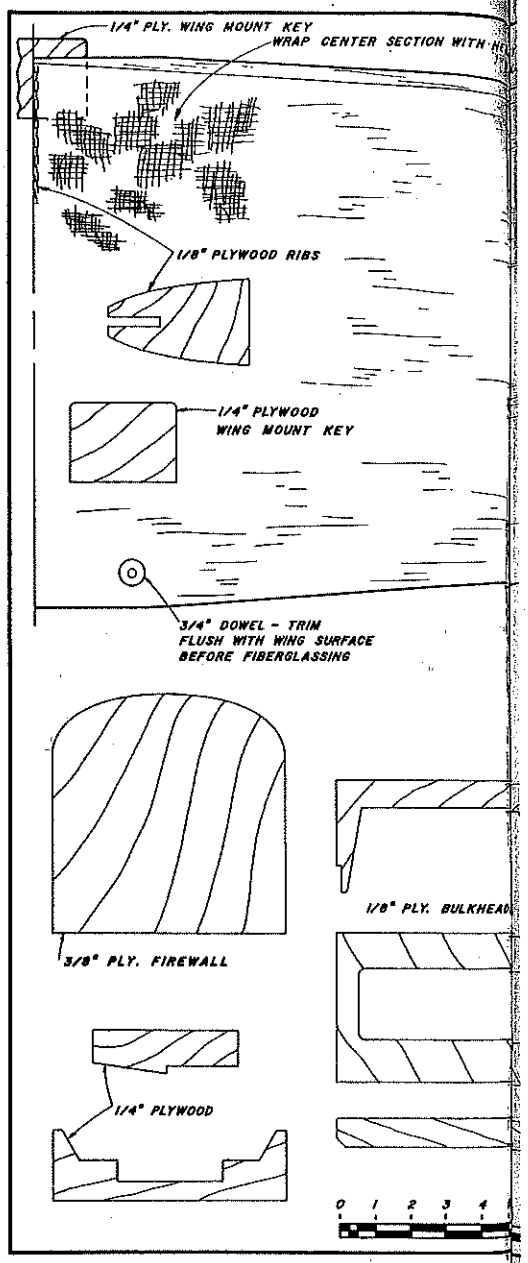
The Prime Cut can be mounted on twin floats for off-water flying fun. These foam core floats are 48 x 6 in., and have an additional sheet aluminum support strut bolted to the fuselage behind the wing. A water rudder on the aft end of one float is coupled to the aircraft rudder.



Preparing for takeoff. The author seems to be listening to last-minute instructions from Lou McGuire and another member of the Jersey Coast Sportfliers Club just prior to takeoff run.



With the tail wheel off the ground, the Prime Cut is just at the point of smoothly lifting off.

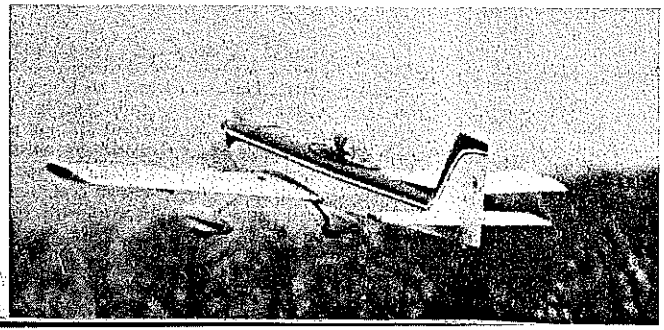


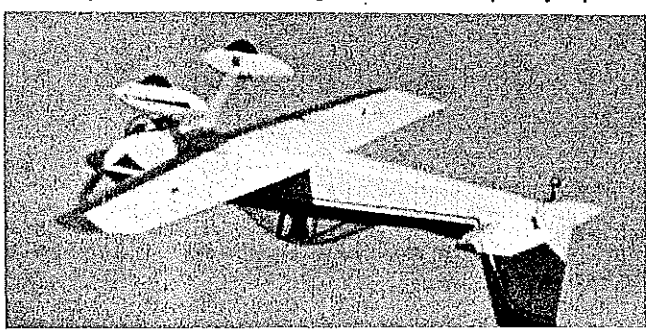
cores.

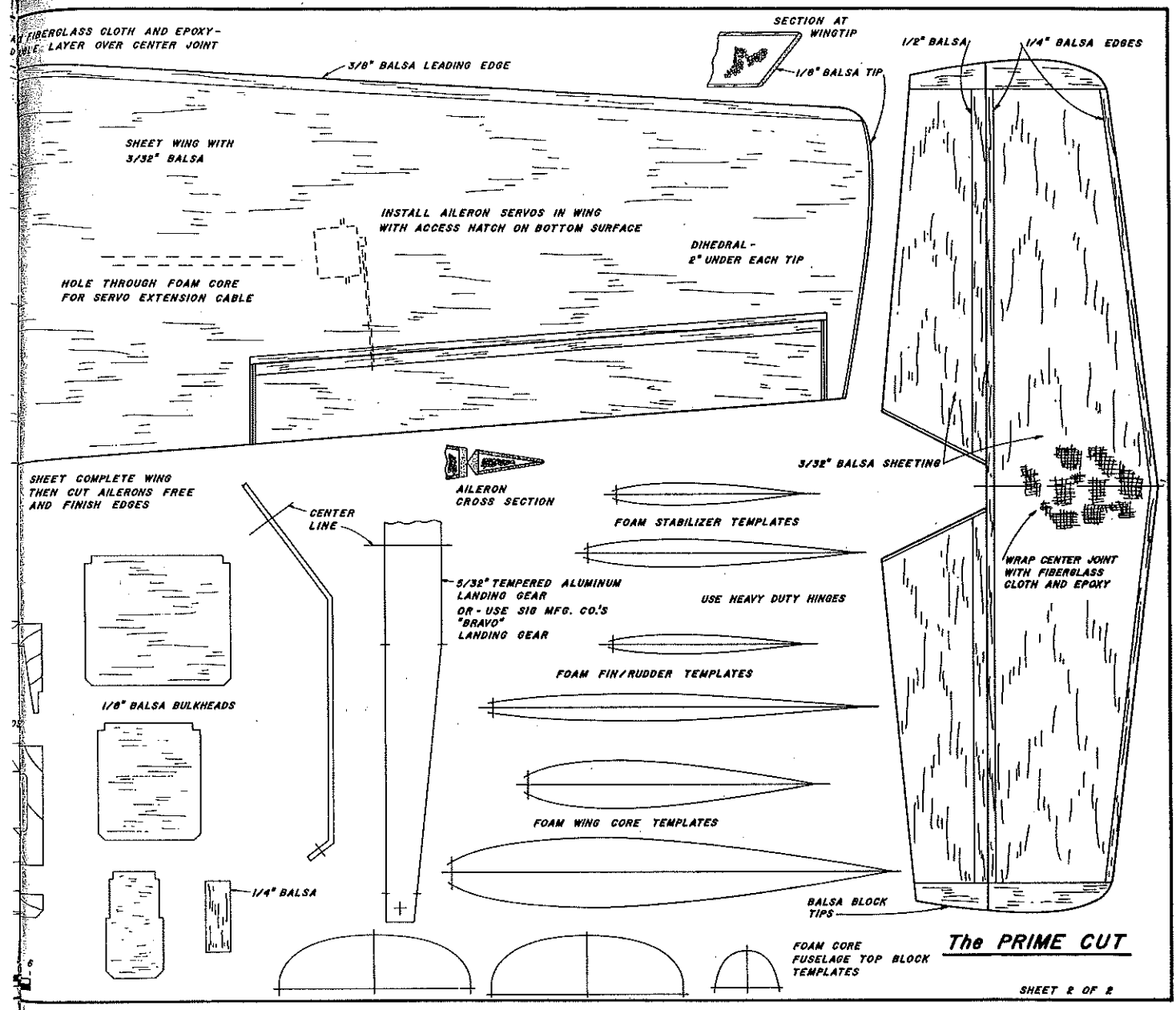
Wing. A plywood wing mounting tongue is substituted for the more commonly used dowels for wing positioning. It is reinforced by installing a plywood rib at the root of the wing cores. I prefer the mounting tongue to dowels since the contact area of the fuselage bulkhead retaining the wing mount can be trimmed or shimmed as necessary to get the correct wing-to-fuselage fit.

When the wing core is sheeted top and bottom, trim off the leading edge and block

Left: This shot catches the aircraft as it climbs out on its first takeoff. Right: Its aerobatic capability is undisputable in this dramatic photo. Unfortunately, just moments later it suffered a midair collision and was extensively damaged. The fuselage had to be completely replaced.







sand it square. Add an oversized leading edge strip, and plane and sand it to shape. The wing tips are sanded to an angle and sheeted with balsa. This is easier than sanding tip blocks to shape and also produces lighter results.

Cut the ailerons from the sheeted wing, trim them down to allow for the balsa edges, and sand them to shape. Hinge the ailerons along the centerline using large, sturdy, freely moving hinges—and plenty of them. Cut recesses in the lower wing surface for the aileron servo mounting.

For installation of the aileron servo extension cables, I heat the end of a piece of ¼-in. steel rod, then push it through the foam core from the root to the aileron servo location. Removable hatches can be installed over the servo areas. Butt glue the two wing halves, then wrap the center joint of the wing with heavy fiberglass cloth and epoxy. Use double layers of cloth in the center.

Fuselage. Select firm-to-hard balsa for the fuselage sides, edge gluing and splicing as necessary to achieve the size required. Glue the 1/16 plywood doublers, ¼-in. plywood landing gear block reinforcements, balsa wing saddle pieces, stab saddle doublers, and balsa corner strips to the two fuselage sides before adding the bulkheads.

Glue the ⅜-in. plywood firewall and the next three bulkheads to one of the sides, being certain to install them at a perpendicular angle. Glue the second side to those three bulkheads, so that the sides are parallel from the firewall to the wing trailing edge position. Note that ¼-in. triangle stock is used on the sides in front of the plywood firewall, with ½-in. triangle stock behind the firewall.

Add the ¼-in. plywood wing bolt plate and the cockpit floor/fuselage reinforcement piece. Pull the tail end together, and install the four rear bulkheads. As you do so, be certain that the fuselage sides taper in a straight line from the bulkhead beside the wing trailing edge to the tail, ensuring that the straight-cut foam top block will fit correctly.

Sheet the foam fuselage top pieces with 3/32 balsa. Trim the sheeting as necessary, and glue it in place atop the basic fuselage structure. Reinforce the firewall installation with heavy fiberglass cloth and epoxy applied over the triangle stock behind the firewall. I also install several ½-in.-long No. 4 screws through the sides into the firewall for extra security against the vibration that a large gas engine can produce. Large 8-32 blind nuts, or tee nuts, are installed in the firewall for the engine mounting bolts.

Add the plywood landing gear mount and forward bottom section to the fuselage. Before adding the fuselage bottom sheeting, cut holes in the rear bulkheads for the elevator and rudder pushrods. I usually wait until the tail surfaces are installed and the wing fitted to the fuselage before adding the fuselage bottom planking.

Engine mount, tail surfaces, elevator, stabilizer, fin, and rudders. The fiber-

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Letters to the Editor

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sick .60, but the .40 did a fine job. Keep it up, Homer! Show those young kids.

Beno Echerd
South Padre Island, TX

Safety/Preston

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associated with gasoline-filled fuel cans. One letter which did catch my eye was dated September 1986 and came from Ernest Razzano, who is a licensed A&E mechanic with 50 years of experience.

Ernie's letter responded to an article in a previous Safety column concerning the hazard of having fuel cans and batteries in close proximity, and he sent me photos of the flight box he was using which did use an automotive fuel pump to dispense gasoline. However, Ernie has the battery powering the fuel pump located in a separate flight box which also houses his electric starter. A phone jack in the battery box is used to make the electrical connection.

I would welcome any letters with opinions, pro or con, on the use of electric pumps for dispensing gasoline to models. In particular, are any of you besides Ernie Razzano using automotive fuel pumps for this purpose? If so, would you care to tell us about your setup?

Before leaving the subject of fuel fires/explosions, Jim Baxter (Spokane, WA) sent me a newspaper clipping with the headline, "Arson Suspected in Hobby Shop Fire." Jim had highlighted a segment of the clipping which stated, "From 30 to 50 gallons of methanol-based model airplane fuel were stored in the building but did not explode."

In his letter Jim commented, "Since the store was totally gutted, I suspect that the fuel enhanced the intensity of the fire." I'm sure it did!

My reason for mentioning this newspaper account is to question whether fuel stored in metal cans is safer than in plastic jugs. My guess is that the fuel in the hobby shop was in plastic jugs which melted and allowed the fuel to burn. Had the cans been metal, it's my guess that they may well have exploded. Any comments on the safety of metal versus plastic fuel storage containers will be welcome.

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Prime Cut/Sarpolus

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glass cowl must be trimmed as necessary to clear the engine cylinder. Mount the cowl using four nylon bolts which fit into holes tapped in the fuselage sides. Tap holes in the ¼-in. plywood for the aluminum landing gear, which is held in place with ¼-in. nylon bolts.

The tail surface foam cores are also sheeted with 3/32 balsa. Cut the sheeting apart along the hinge lines, and trim it back to allow for the added balsa edging. Join the horizontal stabilizer halves, reinforcing them with fiberglass cloth and epoxy. Glue the stabilizer into the fuselage. Each of the elevators is controlled with its own servo and pushrod.

Glue the vertical fin in place; rudder linkage is via pushrod or cables. The tail wheel steering is linked to the rudder by small springs. Balsa blocks must be shaped and installed behind the fuselage top pieces on each side of the fin.

I recess the surfaces to accept ¼-in. plywood pieces where the nylon horns are mounted to the control surfaces, ailerons, elevators, and rudder. The horns are retained with self-tapping sheet metal screws. Epoxy the plywood mounts into the control surfaces.

I recommend using the larger 4-40 threaded rods and clevises for all linkages. Fiberglass tube pushrods are used for the elevator linkages. I use ¼-in. plywood for the servo mounts in the fuselage. Using separate servos for the elevators, each with its own pushrod, allows the pushrods to be perfectly straight. Since the pushrods cross over within the fuselage, one of the elevator servos is mounted ⅜ in. higher than the other to keep the two pushrods from rubbing together.

I made up aileron extension cables into a Y-harness for the two aileron servos mounted in the wing. A 1,200 mAh battery pack was used, wrapped in foam rubber and positioned in a recess cut into the foam fuselage top block. The battery pack can be located behind the wing position, if necessary for balance.

Landing gear, tail wheel assembly, and canopy. The sheet aluminum landing gear can be cut from 3/32 aluminum stock, if available; or use a Morrissey Bravo landing gear from Sig Manufacturing Co. I secured the T&D Fiberglass wheel pants by inserting two screws through the aluminum gear into a plywood block epoxied inside the wheel pants. Alternatively, Sig and B&B Specialties each stock mounts of the wheel collar type.

The leaf-spring tail wheel assembly is the heavy-duty model from C.B. Associates. A 16-oz. fuel tank was used, and space is available for

another 16-oz. tank for a smoke system if desired. In order to keep the ignition cutoff switch in front of the firewall, I mounted it with a sheet metal right angle bracket so that the switch handle protrudes slightly through a slot cut into the fiberglass cowl. The receiver antenna is pushed into a nylon tube glued inside the fuselage, running back toward the tail.

Finding a large enough plastic bubble canopy for an aircraft like this isn't easy; T&D Fiberglass Specialties is about the only source I know of for large canopies. You might also try kit manufacturers that include large aircraft in their lines, since they will usually sell the canopies separately. The shape of the canopy greatly influences the general appearance of this type of design, so it's important to find one that you like.

Several of the canopies sold by T&D Fiberglass are suitable. Note that the version shown on the plans differs from the one used on the prototype in most of the photos. The canopy in the plans is basically a military style, while the version in the photos is more appropriate to a lightplane or home-built aircraft. Contact T&D for details.

My preference is to tint the canopy so that it shows up well. I use black Tintex dye, but with warm water only to prevent distorting the canopy shape. A few hours in the dye bath is necessary to achieve the desired tint. Use a container large enough to fully immerse the canopy for a uniform result. The black plastic molding that I used for the lower edge provides a finished appearance. The canopy is attached with four screws into plywood tabs which are glued into the fuselage top. A roll bar structure of ¼-in. doweling and a quarter-scale-size pilot figure in the cockpit cutout add realism.

Propeller and muffler. I cut a hole through the cowl to permit choking the carburetor, and another hole for access to the carb needle valves. A B&B muffler was fitted to the Quadra. Let's face it, though: The B&B or nearly any other nominal muffler available for the Quadra does little, if any, actual muffling. My solution, coupling a $2.95 lawn mower muffler to the exhaust outlets using a homemade adapter, quieted things down considerably. The mower muffler is neither too big nor excessively heavy, and it's even practical to use two of them for dual exhausts.

The added mufflers are mounted externally to the fuselage bottom, positioned below the landing gear. Of course, we don't *want* to hang these contraptions on our nice, clean aircraft—but they'll do the job until somebody makes a true muffler for the larger engines. With reasonably muffled engines, much of the noise comes from the propeller. As the efforts of other club members have shown, the noise level is definitely affected by the shape of the prop tips. Rounded or pointed tips produce less noise. I've heard from a lot of gas engine fliers that these engines produce a lower-pitch noise, eliminating the need for additional muffling while achieving a more realistic sound. To the general public, noise is noise. Let's keep 'em quiet.

I used a 3½-in. P-51 plastic spinner from C.B. Though this looks quite attractive, I find myself picturing how a Tru-Turn machined aluminum spinner would look instead, now that the company is offering them in larger sizes. A polished aluminum unit would be more costly but would certainly add that "pro" pizzazz that's hard to resist.

Covering and finishing. Plastic film covering is the accepted norm for today's modelers. Not only is film easier and faster to apply, but it contributes a vast weight saving. It's been quite a while since I put a painted finish on a sport aircraft, and I really don't miss the fun of doing a good paint job.

I used Coverite's Black Baron film on the Prime Cut, a material that was new to me. For a quarter-scale plane with a built-up structure, Permagloss or Super Coverite would contribute added strength, but for a totally sheeted, foam-cored model like the Prime Cut I knew that the plastic film would work fine.

The Black Baron film requires a lower heat setting for application than those I'd previously used, and my 20-year-old-plus heat sealing iron couldn't be turned down low enough. I bought a Coverite Black Baron iron and one of their pocket thermometers for exact monitoring of the temperature. The Blackstone coating on this iron makes it nice and slippery. It's a lot easier to use than my old iron that lacked any coating at all.

Using the Coverite thermometer, I found that a setting of around 225°F worked best for allover application of the film. I chose a basic red-and-white covering scheme, and overlapped the film about ½ in. on all the seams. The Black Baron was easy to apply, showing only a little tendency to bubble. A soft cloth was used to rub down any bubbles and assure total adhesion.

I trimmed the white areas with a blue stripe, cut with a metal straightedge and razor blade from the Black Baron film. Positioning it carefully, I ironed the stripe in place with no trouble. With ironing and stretching, the Black Baron material was particularly easy to apply around compound curves such as the tips of the tail surfaces.

Planning to use red and blue stars for trim emphasis, I picked up some Coverite Graphics Trim Sheets for this purpose. The trim sheet material is press-on adhesive backed and is simply pressed into place after being cut to the desired shape.

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Prime Cut/Sarpolus

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However, I found an easier way. Coverite offers a die-cut sheet of stars, a package containing 62 stars in four sizes. I purchased a pack of red and blue stars, lifted them off, and put them on my airplane for a really easy trimming job. I'm sold on Black Baron film.

Coverite also offers Black Baron epoxy paint in colors to match the film; it's even available in spray cans. This would be a good choice for the fiberglass cowl and wheel pants.

Flying. The Prime Cut is a solid, stable flier that's nice and responsive when you want to wring it out. If you're not used to flying larger aircraft, you'll need to literally adjust your sights. If the model appears the same size in the sky as a smaller one would, you're flying it too far out. I made a lot of faraway landings with the bigger models until I learned to gauge their distance more accurately and bring them in closer.

Large aircraft are quite stable on landing approaches; they don't bounce around. Bleed off the speed as you bring the model in, and set the plane down gently. Aerobatics are fun, but with the Prime Cut the maneuvers require a certain amount of thought and piloting skill. You can't horse around with this airplane as you would with an Ugly Stik.

A smoke system definitely adds that special air show appearance. Treat the big ones with plenty of respect, though—an 18-in. prop is a big piece of lumber and can do real damage. *Always* have a helper hanging on behind the aircraft when you start the engine and run it up. Safe flying is the watchword.

Radio Technique/Myers

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Advanced, and Unlimited.

A contestant (except in Basic category) constructs "figures" from FAI-CAT elements for his Free Program. Thus, the figure commonly called an Immelmann consists of a half-loop upward entered from upright level flight (7.2.1, K = 6) and a half-roll to exit in upright level flight (9.1.3.2, K = 4) for a total K = 10. The decimal numbers in parentheses are FAI-CAT numbers which locate particular elements in the catalog and the corresponding K-factors. *Figures* are judged in IAC competition, not *elements*.

There is no limit to the number of elements which can be combined to create a figure, so long as you can keep it within the IAC's Aerobatic Zone which measures 3,300 ft. square to 3,500 ft. above ground level (AGL). The top of the zone is at 3,280 ft. AGL for the Unlimited category (only), and the bottom of the zone is at 1,500 ft. AGL for Basic and Sportsman, 1,200 ft. AGL for Intermediate, 800 ft. AGL for Advanced, and 328 ft. AGL for Unlimited.

An IAC sequence is a list of figures to be performed sequentially during one trip through the Aerobatic Zone. It has a sum of K-factors appropriate to the category being flown.

In order for someone on the ground to be able to judge how well the flier performs his Free Program, the flier must write on paper that which is to be performed. IAC provides forms A, B, and C for the purpose. Some judge must check each competitor's Free Program on Forms A, B, and C before the event. That involves a lot of work with FAI-CAT and an adding machine—for both the judge and the competitor. That's one reason why judges have to be familiar with FAI-CAT.

All IAC categories must fly Known Compulsory sequences, which are made up for each category and published yearly by the IAC. The difficulty in flying the Known Compulsory sequence increases from Basic to Unlimited. The first flight of the event for each competitor is a Known Compulsory, and it is also a qualifying flight. **If a majority of the judges votes that the competitor has not demonstrated the ability to safely control his aircraft, he is disqualified from that category. AMA could do likewise.**

Let me digress into *Model Aviation*'s "Competition Newsletter" section in the June 1989 issue, pages 139-140, for a moment. There you will find a description of the IMAC (International Miniature Aerobatics Club) and its compulsory sequences for 1989. Aresti diagrams are given, with names of figures and K factors. You can see that what I am discussing here has been used in the RC model world since 1974. It's only new if you haven't heard about it before.

Now back to airplanes you can sit in: The IAC has no compulsory advancements in category for competitors. The category a pilot flies in is somewhat dependent on his airplane, because many airplanes are too weak (structurally) and lack sufficient power to perform Advanced and Unlimited category figures.

Intermediate, Advanced, and Unlimited categories must also fly an Unknown Compulsory Program. The Unknown Compulsory is constructed by IAC headquarters and supplied to the contest organizers for a particular contest.

Now we come to a peculiarity. Only pilots in the Unlimited category are allowed to perform a Graded Unlimited Four-Minute Free Program. This program is judged on Originality (K = 60), Versatility (K = 60), Harmony & Rhythm (K = 60), and Execution (K = 0). This was also done