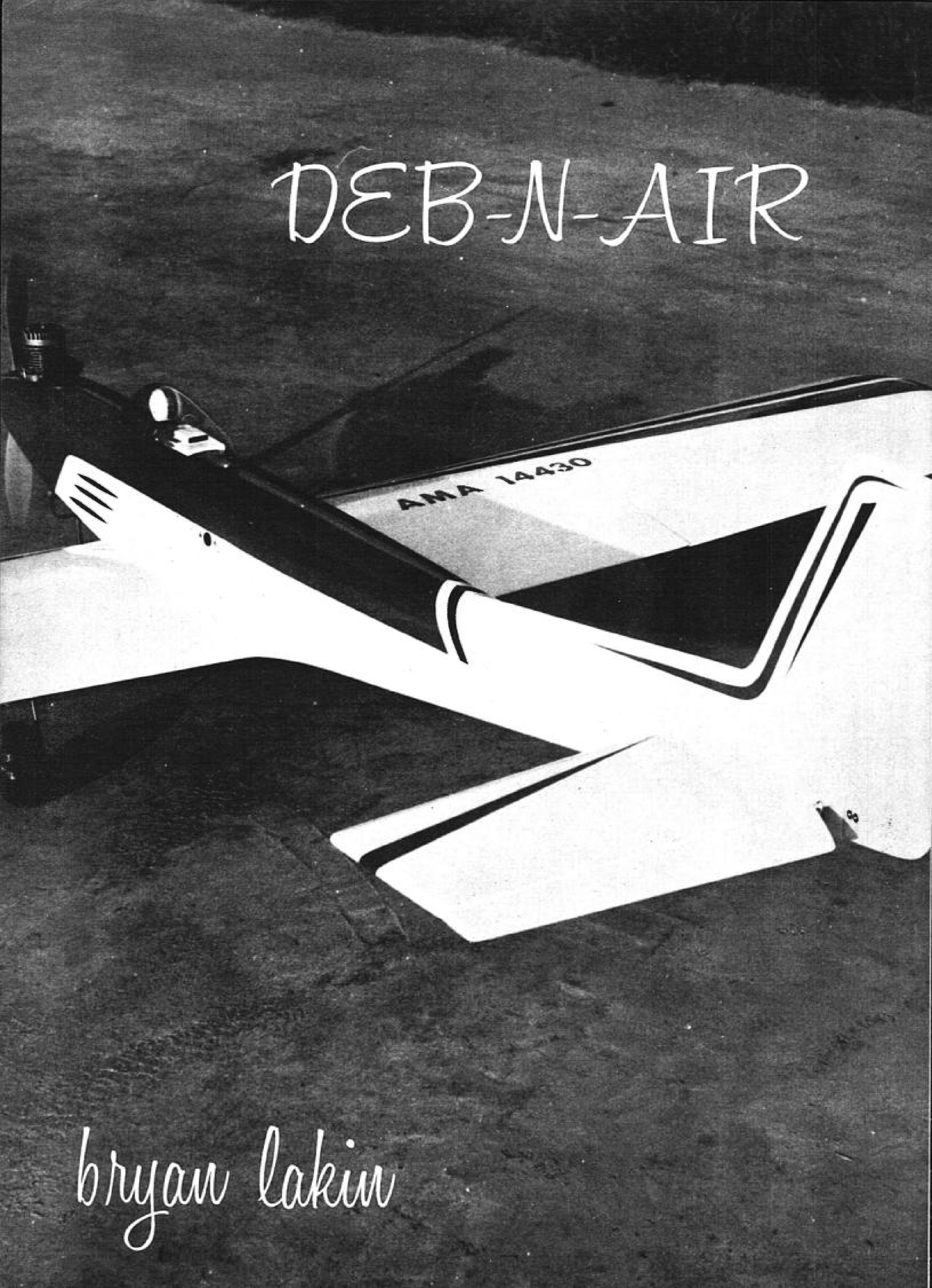
DEB-N-AIR



bryan lakin

DEB-N-AIR, – Beautiful, graceful, smooth – ."

That's what Daniel Webster says in the dictionary, and of course he's the undisputed LAST WORD! What's that you say?—he spells it D E B O N A I R ? Oh, well, technicalities; someone's always pulling the book on me!

Deb-N-Air is everything her name implies. She is easy to build, sweet and responsive to fly, and really is a consistent contest winner. In the air now less than a year, she has never placed lower than second place in any contest entered. At home she's the local "Belle" drawing "Oohs" and "Ahaas" each time she performs. How did the Deb-N-Air come into existence? Here's the story.—

After flying Stormers, Orions, Taurus's and various other high, shoulder, and low wing craft throughout the past few years, it seemed to me that there was still something missing in high performance multi competition aircraft. Since I had just come out on the short end of a head-on, mid-air collision last fall, I decided to look for something new and different. It seemed the first thing to do in choosing my next airplane was to write down a list of desirable traits we would like to see in a good competition machine, and then see if we couldn't find something to fit those specifications.

Our ideal airplane, first of all, had to have good ground handling characteristics. It should track out straight and true on the take-off run as well as through all inside and outside manuevers, once in the air. We also wanted a ship that exhibited good, true axial rolls; both flat out and in the looping rolling manuevers. The ability to drag-in for a landing at a smooth, safe approach speed without ballooning was a must in our set of specs.

Sound like a big order? As I began my quest for the perfect airplane, I began to think so, too. One popular type seemed to perform well in the pattern but was obviously squirming through the rolls. And talk about ballooning on the landings – just try to get a smooth approach in any wind at all with this one! (Incidentally, this airplane actually grooved better upside down than it did right side up.) Several of the other currently popular designs had pretty good roll characteristics and were good windy weather airplanes, but were not too smooth in the looping maneuvers and landed at far too fast a rate of speed. Still others flew well in a general fashion but had undesirable characteristics such as fish-tailing at high speed, zooming tendencies, and self recovering tendencies in a dive. Well, I'm sure you get the message by now. I simply wasn't satisfied with anything on the market, and so set out to design what came to be known as the DEB-N-AIR.

I have studied aerodynamics for several years now, especially as related to R/C, and have formed some pretty firm personal opinions as to what R/C designs should and should not do. I might add, that as a private pilot for about 15 years now, I have had some firsthand flight experiences to help guide my studies and opinions. However, I'll be the first to admit that there is virtually no connection between your ability as a pilot and your ability as an R/C pilot. (Beginners take heart!) Your knowledge of aerodynamics will help, and knowledge of control movements required will speed you along at a more rapid rate, but learning to fly the complete pattern proficiently, will take considerable time and practice. Maybe this is why we love the hobby so well; we never quite master it completely. There's always a new challenge ahead.

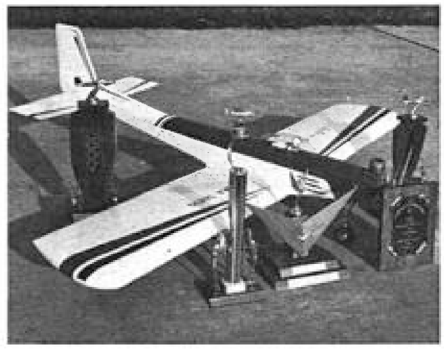
In designing a modern R/C high performance airplane we want many features similar to full scale aircraft and some that are completely different. Of course, the way you design anything is to first write up a set of ideal specs you would like the plane to meet, based on its intended usage, and then design around these specifications. Sooo – here we go – !

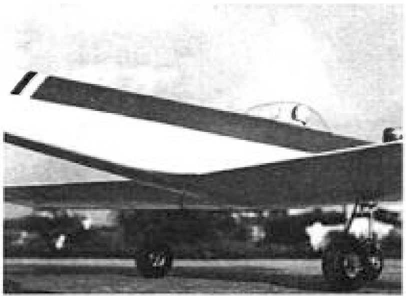
–SPECIFICATIONS–

"R/C Multi stunt design, neutrally stable, contest performance.

1. Power requirements ....45 to 60.
2. Good ground handling with sturdy gear. Plenty of clearance.
3. Straight take-off run with clean break from ground.
4. Straight and level climb-out with no tendency to increase climb rate as speed builds up.
5. Good grooving characteristics both right side up and inverted.
6. No tendency to fish tail as speed increases in a dive.
7. Good grooving characteristics with no tendency to zoom out in a straight vertical dive. Again we want no fish tailing as speed increases and would like for the speed to stabilize as a good speed-drag ratio speed is reached.
8. Rolls should be perfectly axial regardless of whether full ailerons or minimum ailerons are applied.
9. The aircraft should be able to maintain a constant continuous bank of 25 to 45 degrees with hands off by simply applying the necessary amount of elevator trim with no tendency to hook in or roll out.
10. Tail spins should be entered cleanly and rate of spin should be as slow as possible. There should be no tendency to hang in the spin or reverse spin, when controls are applied to stop the spin.
11. In yaw manuevers such as the wing over the airplane should yaw tightly with no tendency to spin out

The Deb-N-Air is a competition and sport machine par excellence. Aerodynamically far ahead of most of the multi ships flying today, this is the one to watch in months to come!





Extremely smooth in all maneuvers, continuous hands-off turns, proto landings, characterize the Deb-N-Air.

over the top or roll during the yaw portion of the maneuver.

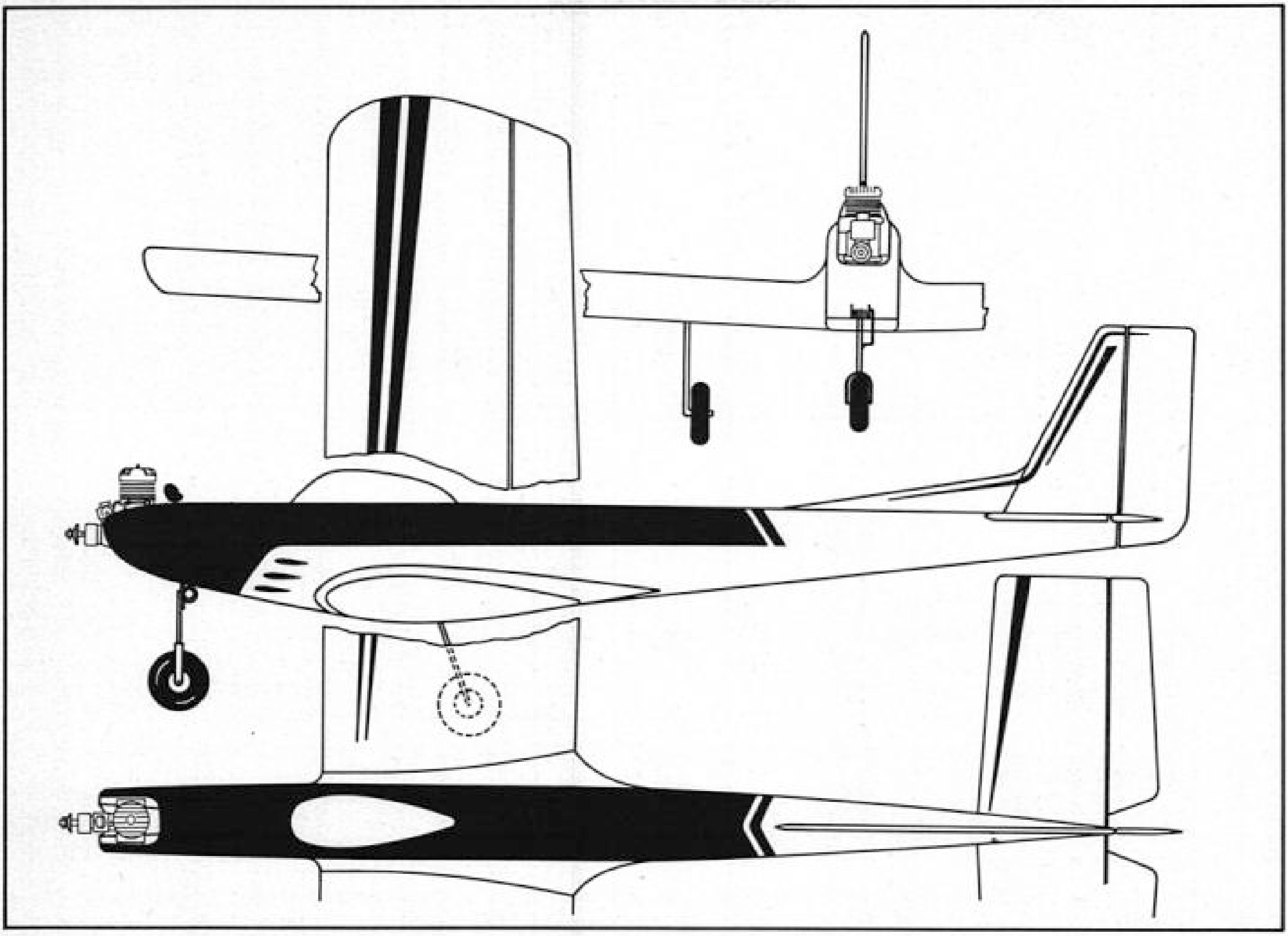
12. In looping maneuvers the airplanes should exhibit no tendency to roll out or yaw off to the side while cimbing or diving.
13. Slow flight should be smooth and controllable with no tendency to spin out. It should not zoom up when throttle is applied abruptly, nor should there be any nose dropping when the throttle is cut.
14. Most important – on the final approach, there must be no tendency to balloon with the gusts. It must be capable of very slow approaches without danger of stall in order to make those smooth clean landings where the main gear touches first and then rotates forward onto the nose gear as the speed slows.
15. In general, our "ideal" R/C airplane should be extremely smooth in all maneuvers, fly straight as an arrow maintaining perfect wings level attitude, and holding altitude clean and stable. It should do continuous hands-off turns and slow dragged-in approaches with nice prototype landings.

After writing up these rather ideal specs we set out to track each desirable trait aerodynamically and to see what was necessary to provide the desired results. This led us to the library where there, and at home, several weeks were spent analyzing and researching every book available. Definite design trends started to develop and the Deb-N-Air began to take form.

First it seems we needed a symmetrical airfoil of fairly thick section to give the desired grooving characteristics both upright and inverted. This also takes the pressure off those landing approaches by eliminating the ballooning tendencies, and recovery tendencies in diving maneuvers. It is worthy of note that a symmetrical wing positioned at 0° to the line of flight produces no lift until it is rotated to a positive degree. This accounts for its superior grooving tendencies and its insensitiveness to gusty air on landing approaches. Its major disadvantage is its inefficiency for full scale aircraft, but of course, we're not interested in how many miles we get to a gallon of fuel in R/C so it has a definite application here.

While on the subject of stability, let's take a look at the fairings on the Deb-N-Air. Turbulence affects flight more than we'd like to believe, and turbulence occurs two ways. First, some turbulence just exists in the air from normal air currents. The other way is for the airplane to create it itself. If we could see some of our R/C models in a smoke filled wind tunnel, the aerodynamics and lack of cleanliness would make

DEB-N-AIR DATA SHEET



ENGINE

Use a .56 to .61 R/C engine.

DIMENSIONS

Wingspan: 68½" Chord: 12"
Total Wing Area: 800 square inches
Fuselage Length: 52"
Max. Fuselage Width: 3½"
Engine Offset: 3 degrees right
0 degrees down
Incidence: 0 degrees wing
0 degrees stab

FLIGHT CHARACTERISTICS

Competition Class III or FAI.

RC EQUIPMENT

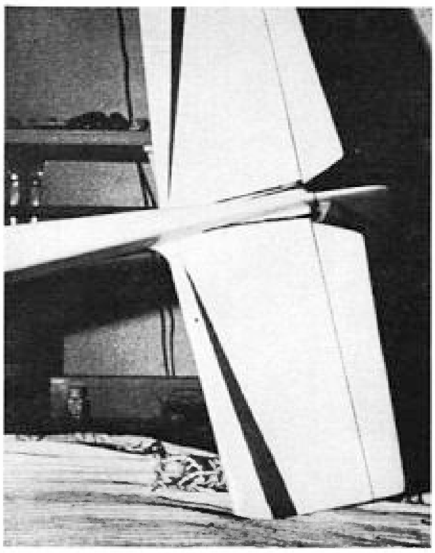
Author's prototype used Kraft proportional equipment. For "full house" proportional or reeds.

MATERIAL LIST

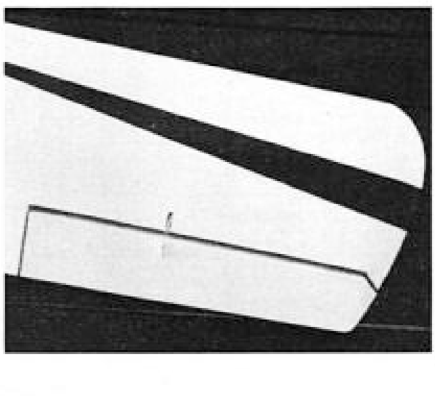
Wings:
- (10) ¼" x ¼" x 36"
- (2) 2¼" x 2¼" x 12" tip blocks
- (2) ¾" x ⅜" x 6½" maple gear blocks
- (2) ¾" x ⅜" x 2¼" maple torque blocks
- (1) 1" x 4" x ⅛" plywood
- (1) 6" x 12" x 3/32" plywood
- (16) 3/32" x 4" x 36"
- (1) ¼" x 2" x 12"
- (1) 3/32" x 2" x 36"
- (2) ¼" x 36" triangular stock

Tail Group:
- (2) ¼" x ¼" x 36"
- (2) ¾" x ¼" x 36"
- (1) ¼" x 6" x 36"
- (1) 5/16" x 3" x 36"
- (2) 1/16" x 6" x 36"

Fuselage:
- (5) 6" x 12" x ⅛" plywood
- (3) ½" x 36" triangular stock
- (2) 1" x 1" x 48"
- (2) 3/32" x 4" x 48"
- (1) ½" x 4" x 48"
- (1) 3/32" x 4" x 36"
- (1) ¼" x 4" x 36"
- (1) 3/32" x 1" x 36"
- (2) 1" x 1¾" x ⅜" maple blocks
- (2) 1" x ⅜" x 12" hardwood motor mounts
- (1) 5/32" x 36" piano wire
- (1) Lakin Nose Gear or equivalent
- (1) pair 3" DuBro wheels
- (1) 2¾" DuBro wheel



A symmetrical wing, clean lines, full fairings and fillets, as well as a unique control surface attachment add up to an aerodynamically clean design . . .



us sick.

The first kind of turbulence we can do very little about. The second kind, that created by our airplane, is turbulence we can, to a degree, control. Turbulence is first kicked up by the fairings and cowlings around the prop and engine. The next place for old man turbulence is around the front of the wing near the fuselage. Turbulence here and around the canopy can start vertical air stirring which can ultimately affect the tail empennage. Carrying on to the rear surfaces of the wing near the fuselage, enough air drag can be created here to spoil the lift in the innermost ⅓ section of the entire wing under certain conditions, unless generous and proper wing fillets are provided. Ah Ha,— you always thought those beautiful fillets on real airplanes were just for looks didn't you? Well I kid you not, all the old successful designers of full scale aircraft continually pound on two primary requisites. If all else fails to provide stability, keep the rudder & fin large and keep all turbulence to a minimum by generous use of fillets and fairings. Air stirred up around the wing can keep the tail surfaces in constant turbulence causing no end to sloppy control response fish-tailing and many other problems in various attitudes of flight.

The Deb-N-Air is extremely stable in fairly rough air. She owes this quality to her symmetrical wing and to her clean lines, include full fairings and fillets. One other thing should be mentioned while on the subject of turbulence. Take a look at Deb-N-Airs' control surface attachment and fairing. No — take a **close** look . . . To our knowledge no other R/C design today, utilizes the principle used in the Deb-N-Air. You'll notice that the trailing edges of the stab and vertical fin (near the hinge-line) are finished nearly full thickness and are square. In other words, there is no taper or round edge as is customary on all R/C designs. The leading edges of the movable controls (rudder and elevator) are also full thickness and have sharp corners. The leading edges are shaped to a flat "V", being tapered from about 1/16" back of the hinge-line into the point of the "V." Metal or nylon hinges are then mounted right in this pointed area of the control surface. The other half of the hinge is centered in the square trailing edge of the stabilizers. You will see that this causes the control surface to blend in perfectly aerodynamically with the stab and fin. This effectively avoids the usual turbulence caused by rounding the rear edges of the stabilizers and the front edges of the movable control surfaces. Careful fitting also causes the crack to shut up tight when the elevator or rudder is thrown to full position, and eliminates spoilage or leakage at the hingeline. This system of fairing and hinging comes as close to a completely sealed hingeline as possible on a model. This is considered so important for full-scale aircraft that they have actually provided them with a pocket and rubber seal arangement along the control hingeline. Again, let me stress this tight fit and seal is not only for appearance but is important for the elimination of turbulence and sloppy control response at the control surface.

The Ailerons are fitted in much the same manner. Keep them smooth and keep the opening on the bottom as small as possible. Only enough for clearance. On the Deb-N-Air, when one aileron goes full down, it shuts up tight. No air leakage and no turbulence. Fairing the bottom of the wing into the fuse is important, too. This is the final touch, eliminating the turbulence rolling up from the bottom of the frontal cowl and wing pocket.

Finally, the moments were figured to provide as much stability as possible in the rolling and looping maneuvers. The best arrangement we could provide was 22% nose movement and 48% tail movement. These percentages are based on wing span. Both are unusually long but are considered ideal for our application.

As for the questionable trend in some areas to swept wings, it's an established fact, aerodynamically speaking, that there is no measurable advantage in swept back wing below supersonic speeds. Every degree of sweepback spoils precious lift and encourages tip stalling at a tremendous rate. No reasonable amount of sweepback in the wing can provide the stability found in a little larger vertical stabilizer. There is a very small drag advantage in swept wings for speed aircraft even below sonic speeds. However, this is not applicable to R/C since we definitely want some drag to control diving speed and the wing is where we want the drag to develop. The Deb-N-Air sports a conventional straight wing which is the most efficient wing available from an aerodynamic standpoint.

One other point worthy of mention before we delve into construction details is the landing gear. The main gear is mounted almost on the C/G but has a good deal of back sweep to provide an extra softness. The nose gear is of special design using ⅛" wire torsion springs and an adjustable shock absorber. The symmetrical design helps maintain perfect alignment and eliminates continuous re-adjustment. The steering arm is so positioned as to provide no load on the servo even when the gear is flexed back at a severe angle, and since the flex is always in line with the fuse the servo gets very little pull on hard

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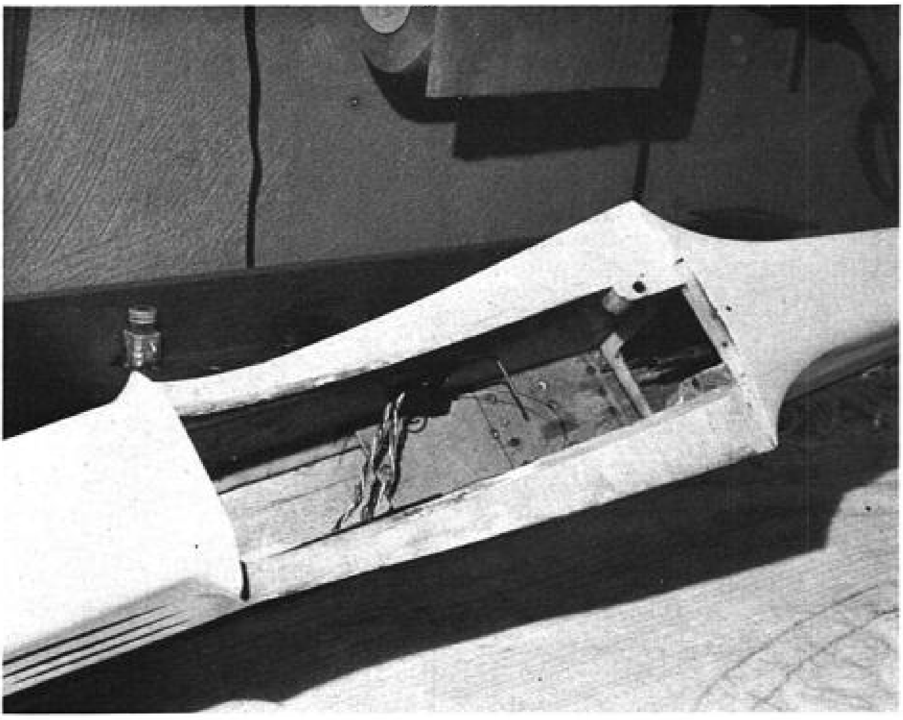

Wing mounting blind nuts are epoxied into the mounting blocks, which in turn, are notched into the rear cabin bulkhead for safety.

Deb-N-Air and co-pilot. The little guy in the cockpit really does the flying . . . Bryan never could get the hang of this new-fangled propo stuff.

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landings even with the gear turned to the side.

Construction of the Deb-N-Air

FUSELAGE:

Start with a thorough familiarization of the plans. Study them carefully until you feel you have a good understanding of all construction details. Make up a list of the materials required so that once construction is begun, you won't have to stop an evening's work for lack of materials you've overlooked.

First assemble the fuse sides. Be sure the top edge of the 3/32 sheet has been cut with a straight edge so that it is perfectly straight. Cut the diagonal fuselage doublers and cement them in place. Lay the assembled side sheets over the plan anrd mark the position of the formers and vertical bracing.

Mark the position of the motor mounts and cement in place. Cement the formers into one side and when dry assemble the other side over this. Pull the tail cone together, being careful to keep the main fuselage straight. Take a little time here to make sure that the triangular shaped longerons are perfectly flat on top so that when the top block is cemented into position there will be a nice tight fit. Mark the top block and rough cut to shape. Hollow out as much as possible and cement in place on top of the fuse. Fit it carefully; we don't want any big crack along this cemented line.

Next install the blocks around the front of the motor compartment, all bracing inside, and finally cement the bottom cover front and rear in place. Sand the entire fuselage throughly.

Fiberglass cloth reinforcement should be laid in around the motor mounts and firewall. Also at this time a couple of thin coats of fiberglass resin should be painted inside the fuel and battery compartment.

STABILIZER:

Construction of the stab is begun by laying out the framework. The next step is to insert the geodetically positioned ribs. Use a 1/16" by 6" sheet to completely cover the stab framework. After drying, the stab can be removed from the plan and the opposite side covered in the same manner. Trim the leading edges and the ends as shown on the plans so as to provide a nice, stream-

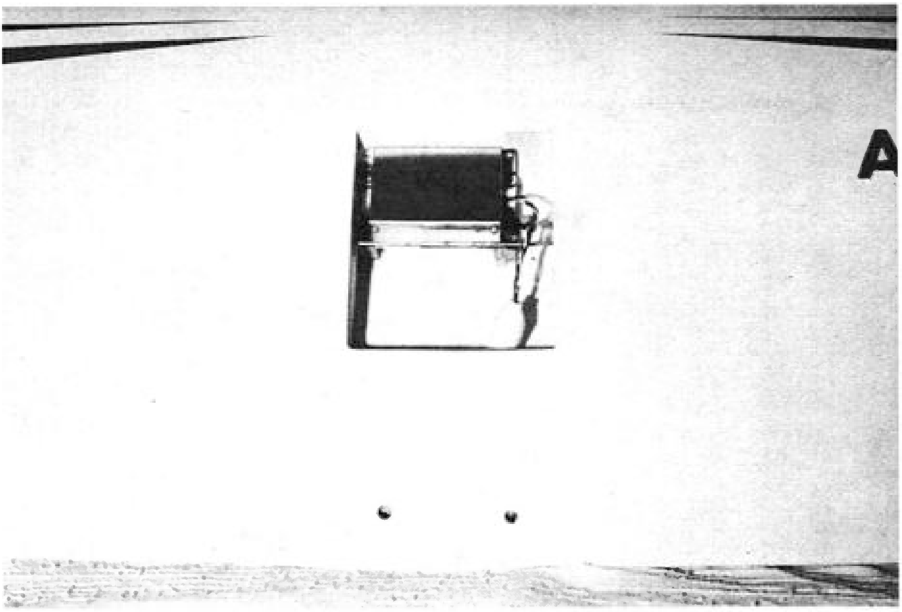

Photo shows the wing screw holes and the dowels at the front. Bryan says Phil Kraft is going to be mad at him because you can't hardly read the word Kraft printed on the Kraft servo, which means PHIL KRAFTwon't get the free plug Bryan meant to give him, because the lousy photo didn't turn out so you could read the name KRAFT. Sorry, Phil!

lined, symmetrical leading edge. NOTE: DO NOT SMOOTH OR ROUND ANY PORTION OF THE TRAILING EDGE OF THE STABILIZER OR VERTICAL FIN AT THIS TIME. Do not sand or blend this area until the elevator surface has been finished and is ready for fitting. Keep these rear corners very sharp and square.

RUDDER AND FIN:

Assemble the rudder and fin from ¼" sheet stock. The same rule applies here. Taper and sharpen the leading edge of the vertical fin to a nice, streamlined edge, but keep the rear hinge line area absolutely square and the corners sharp. (These sharp corners are rounded **very, very** slightly with 400 sandpaper just before covering.)

In constructing the control surfaces of the rudder and elevator, they may be cut out and tapered at the **trailing** edge in the usual manner to a nice streamlined edge. The leading edges of the surfaces can be planed to a shallow "V" as noted on the plans. This taper should be just enough so that when full control is applied, the hingeline shuts right up. This is the condition we want as we don't want any loss of air spilling through the crack, nor do we want any turbulence created around the hingeline. Now the surfaces can be sanded to a nice blending contour by laying them in position against their mating stabilizer and sanding. Leave the leading edges of the control surfaces sharp at the corners as shown on the plans. Do not attach hinges. These will be attached after finishing.

Fit the stab to the fuselage keeping the center line parallel to the thrust line (o). This should be relatively simple since the thrust line is the top edge of the fuselage and since the horizontal stab is perfectly flat except for the frontal taper.

Next the vertical fin is fitted and installed. Make sure this is located straight and square by using the pin and line method over the top fuselage block. (Pin is located at front of top block in center and line of thread is stretched around the fin. Make sure line is even on both sides of the fin.) Fillets for the empennage should be cut from sheet stock, sanding very closely to the proper shape before installing. They should be hollowed out, somewhat, on the inside edge and the corners feathered to fit between fuselage and stabilizer. Don't depend too much on fillers or glues for smoothing out these fillets. They should be fitted as tight as possible and sanded to shape almost entirely without the use of any filler. Filler adds weight like crazy so keep it off if at all possible. Very little should be required.

WING CONSTRUCTION:

The best way to construct a good straight wing is to use a wing jig, not the expensive store bought kind, but a homemade one. This can be built in one evening for about $2.00 worth of materials and is really worth the effort. A good wing can be built very simply by using two pieces of ¾" plywood 1 ft. wide by 3 ft. long, backed up with a 1"

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by 2" frame, squared and glued, and topped with regular bulletin board material. The two sections are joined in the middle with regular door hinges. The pins can be pulled for storage and the hinges allow you to set up various dihedral angles. This wing will assure a straight wing even if your bench is not as flat as it should be (very few are, believe me).

Cut out all ribs and false ribs according to plan. This is best done all at once on a jigsaw. The tapered area ribs are made by progressively cutting down the regular ribs one at a time according to the plan. Actual assembly of the wing is very straight forward and requires no special explanation. The wing is full sheeted with 3/32" **soft** balsa, and sanded down to about 1/16" using fairly coarse sandpaper cemented to a straight pine block. (Linoleum paste works fine for this. Use garnet sandpaper.) Follow up with fine sandpaper. Take your time and make it real smooth. This is the secret of a nice finish later on. The ailerons are cut out after assembly and re-installed after finishing. Use a razor saw and work carefully.

When the wing is done drill the holes for the mounting screws and the large countersunk area for the screw heads. (I use a metal cap from an old fountain pen, as a hole cutter for balsa. Sharpen the edges and break off the clip.) Balance the wing by adding weight in the tip block to the lighter pane.

Fitting the wing to the fuse comes next. Work and measure very carefully now. We want a perfect fit the first time. After we finish the wing fillets, it's pretty difficult to do much more fitting, so get it right the first time. Install the wing and hold it in place with rubber bands to check fit and alignment. The wing centerline should be marked on the leading edge to use as a measuring reference point. With the fuselage blocked up to where the stab is perfectly level both in roll axis and in pitch axis the wing should be perfectly level as measured from the reference center line to the floor, and as measured from the centerline to the floor at the trailing edge of the wing. Sand the wing saddle area as necessary to accomplish this. Also make sure there is no tilt of the wing in relation to the stab. Any tilt here will produce a turn in the looping maneuvers, and will cause the airplane to stray off course in straight flight. Don't kid yourself about getting perfect fit and alignment. Remember, it's better to spend the whole evening fitting the wing properly, than to fight an impossible airplane from now on. Use bits of paper to locate tight and hollow spots between the fuselage and wing.

When you are satisfied you have the wing set at exactly 0° decalage, and it is aligned perfectly level with the stab, you are ready to install the wing attachment dowel former and the blind nuts for the nylon screws.

Install the two wing attachment blocks, one on each side of the fuselage at the rear of the wing opening. These should be epoxied in good as we don't want to lose the wing in an outside loop the first flight. Also, cut out former F 2A which will be installed next.

The wing is held in place by dowels at the front and nylon screws at the rear. Obviously, the trick here is to get the dowel locating former (F-2A), and the blind nuts for the attachment screws, properly located.

First place locating former F-2A on the wing dowels. (Use wax paper between former and wing.) Apply glue to the front side of F-2A and carefully install the wing. This will position F-2A against former 2 and will properly locate it vertically. Make sure the wing is positioned exactly where you want it. (The oversized dowel holes in former F-2 will allow F-2A to slip around some for accurate alignment.) The wing should be held firmly in place with rubber bands until dry.

Mark and drill the holes for the attachment screws at the rear by inserting the drill right through the holes in the wing. A brass tube slipped over the drill bit will prevent damage to the wing while drilling. Remove the wing when dry and "safety dowel" former F-2A. Insert the blind nuts in the support blocks at the rear wing opening, and epoxy in place. Re-install the wing using the wing attachment screws to hold it in place this time. This will assure good alignment of the blind nuts until dry. Now we can start on the large wing fillets.

Lay a piece of wax paper on top of the wing to protect it from glue. Carve and fit the solid front fillets from soft sheet. Work carefully and avoid damage to the fuse or wing. Cement the 3/32" sheet fillet foundation in place against the fuselage sides. Note that these are cross grain. Next the large fillets are formed from 3/32" sheet by wetting one side of the sheet and bending it over a cardboard mailing tube. It is a good idea to make a thin cardboard pattern which can be cut and tried until you get the proper fit before cutting the balsa ones. Taper the underside edges of the fillets with a razor blade and sandpaper so you get a good fit against the cross grain foundation pieces and against the fuselage sides. Cement in place. Feather edge to fit when dry.

Cut the fillets for the underside of the wing from solid **soft** sheet. Carve and sand to fit and glue in place. Sand all wing fillets to a nice contour. These fillets are what give Deb-N-Air her clean lines and complete absence of self-make turbulence.

Give the entire airframe one more last going over using fairly fine sandpaper to effect a nice clean appearance. Take your time and remember, now is the time to make any last minute corrections in alignment, decalage, etc.

COVERING AND FINISHING:

Give the whole airframe two coats of clear dope, and sand with 320 sandpaper. Now give it one coat of real thin filler. Hobby-poxy stuff thinned to a **watery** consistency is excellent. Sand this all off leaving filler only in the pores or cracks. If there are any open pores left, give it one more coat of **thinned** filler. Sand all off again leaving filler only in the pores. We must keep weight down. Now give it one more thin coat of clear before covering with Silron. Sand lightly before covering with 400 sandpaper wet. Cover carefully making butt joints wherever necessary to joint.

After covering give the whole airframe 2 thin coats of clear followed by 2 **thin** coats of Hobby-poxy stuff. Sand this filler all off except what remains in the pores of the Silron. Follow it with 2 coats of clear.

Naturally you should sand carefully with 400 wet between these final coats before putting on the color. Take a long last look at the surface now because this is your last chance to make any minor repairs, fill any cracks, etc. Your final finish will be no smoother than it is right now. O.K.?, now we are ready to put on the color. This is the easy part really. The plane should require no more than 2 or 3 coats of dope and the light color should be put on the entire airframe as a base coat. We used white and trimmed in red and blue.

As you put on the color, sand carefully between coats with 400 wet. Be careful not to sand through, especially around the edges and sharp corners. Spraying lays it on more evenly but it is certainly not necessary to achieve a plastic-like finish job. You must sand out the brush marks (if any) between each coat. They aren't going to get any better as you build up subsequent coats over them. Sand carefully before applying masking tape for each trim color.

Take plenty of time between coats, preferably two or three days. After completing the finish job allow two or three weeks for it to cure before final sanding and rubbing out. Install the ailerons, elevators, rudder, landing gear push rods, guide tubes and equipment now while the paint is curing. If metal slip hinges are used and cemented in place with epoxy cement, all controls can be installed without damaging the finish or needing to spot repair around the hinges. Use DuPont rubbing compound to rub it out, and Johnson's Pledge as a final gleaming wax job.

If you've followed plans to the letter, you now have a beautifully finished, perfectly true airplane that should fly right off the board with no further adjustments, except the minor trim corrections required for contest winning flights.

TRIMMING:

Check all controls to assure they are hooked up correctly (I dedicate this remark to my old flying buddy wrong ailerons Corrigan). Make sure they are all free and work easily. This is a must with any contest design. Also make a last check of C/G, (both in pitch and roll). Check to see everything is centered perfectly, crank in a small amount of "up" trim in the elevator and "let 'er go."

There have been countless articles written on "How to trim an R/C airplane," so I'm not going to elaborate at length on the subject. However, I will cover a couple of the more important principles involved. Adjust the control links until you have perfect straight and level flight. Don't even attempt to stunt the ship until she'll fly hands off in straight flight and will do smooth, gentle turns by maintaining just a little elevator trim or back pressure. You may have to alter engine side thrust or down thrust a little and maybe change the aileron neutral setting a little if you have a slight imperfection in the wing or empennage somewhere. But don't compromise this final trimming job. Take your time and get it right. Half the fight is won in a contest if your airplane tracks perfectly through all the maneuvers.

You'll find the Deb-N-Air is every ounce a winner both in style and performance. Not too many R/C enthusiasts realize that good clean lines and smooth "debonair" flying go hand-in-hand.

You will when you build and fly your own Deb-N-Air.