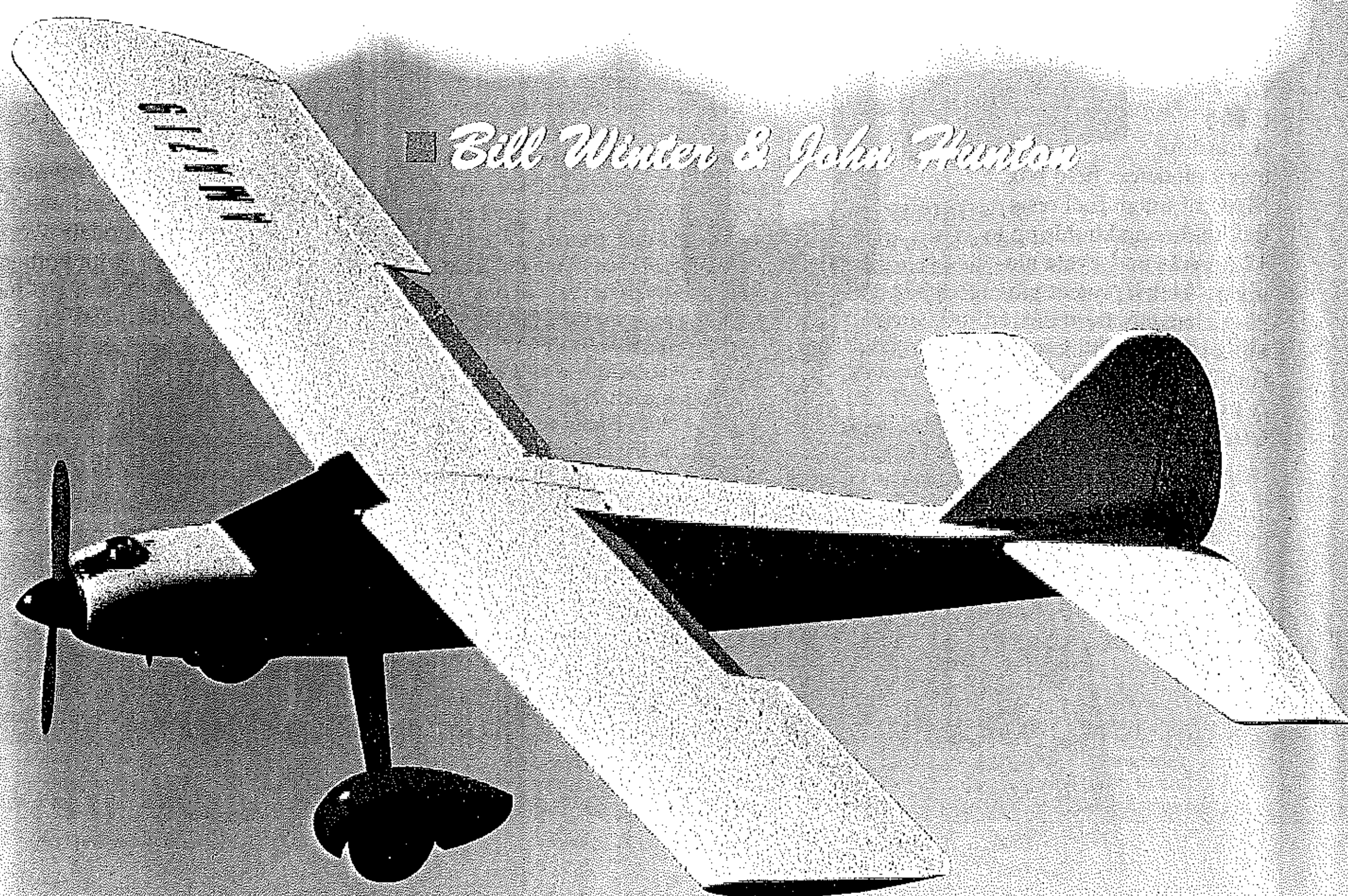
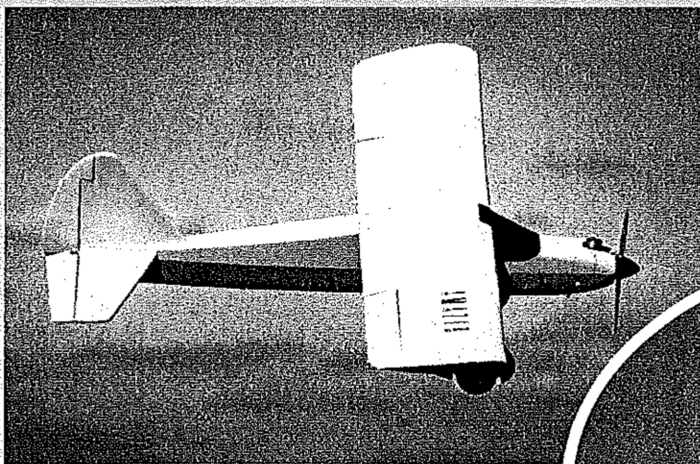
#813

Soft Touch

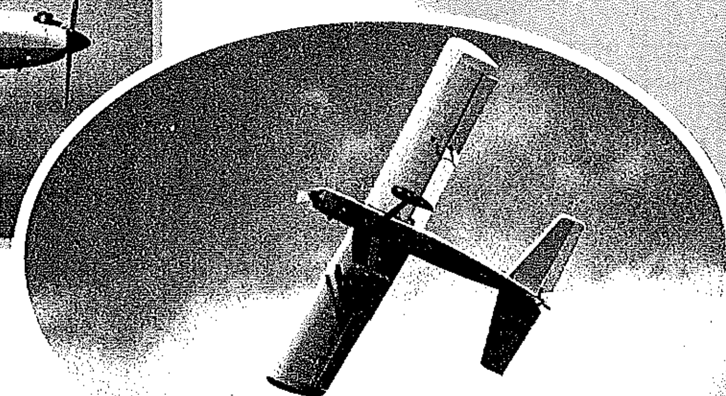


Bill Winter & John Hunton

Have you wished for a big airplane, but put it off because of the perceived negatives? Big airplanes fly far better than smaller ones, but do they intimidate you? Have you been spending your time *building* that special Scale model, and not *flying*? And need to brush-up? Or do you have a big "hangar queen" that you fly sparingly for fear of damage? Do you want something simple, big, easier and safer to fly than Sunday trainers? If so, consider this prospectus for the Soft Touch:



Soft Touch has good short-field characteristics with the large flaps and plenty of wing area.



Landing touchdowns with flaps into a modest wind can be made very softly—hence the name.

Photos by Bernie Stuecker Graphic Design by Carla Kunz

Bill Winter (L) and John Hunton.

Wing Loading: Intended at 27 oz./sq. ft. No, this is not heavy. My Aristocrat drew attention for its Scale-like flying with a wing loading in the mid-30s. It weighs 26 pounds and climbs well on a Tartan single 1.32. The Vagabond weighed 18 lb. and was powered by the old O.S. .90 two-stroke. This model climbed at 45° and, believe it or not, big-engine fliers said "This thing would fly realistically on a .60." "Scale effects" makes these figures comparable to 20 ounces wing loading or so on a five-footer. Many full-scale giants have hundreds of lb./sq. ft. loading.

An 18 lb. gross includes a three-pound allowance for heavier engines, coverings, and paint combinations. The Soft Touch purposely has Sig's Koverall covering with 10 coats of dope for a worst-case weight-distribution scenario (a three-pound camcorder mounted externally had little apparent effect on any flight aspect; some flaps were used for takeoff). Measured level speed is in the 70-mph-plus range. It has a healthy rate of climb. Inverted and upright feel almost identical.

These givens, with a 6:1 aspect ratio, yield a span of 95-plus inches and a chord of 16 inches.

Given field/flight requirements, a "low" cabin type profile was chosen; the wing position thereby minimizing pitch compensation and trim changes with wide power variations. Only slight down elevator is required to fly inverted at speed.

Airfoil is the NACA 23016 (16% thickness). As soon as you use a semisymmetrical airfoil section on a model you eliminate the awkwardness and limitations of the flat-bottom airfoiled trainers. This is a truly great advantage.

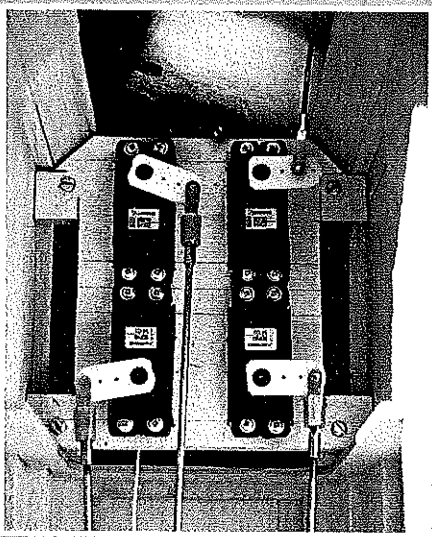
One full-tank test flight was made inverted except for takeoff and landing. The airfoil used is extremely stable, with a little washout at the tip. Adding flaps increases aerodynamic twist in the wing and adds additional stall stability.

The decalage shown at 1½ ° provides ample angular difference between the wing and stab for good pitch stability. The high point on the top of this airfoil section is forward as compared to the low point of the bottom. This configuration imparts a bit of desirable reflex and thereby eliminates any airfoil pitching moment over the entire range of angles of attack.

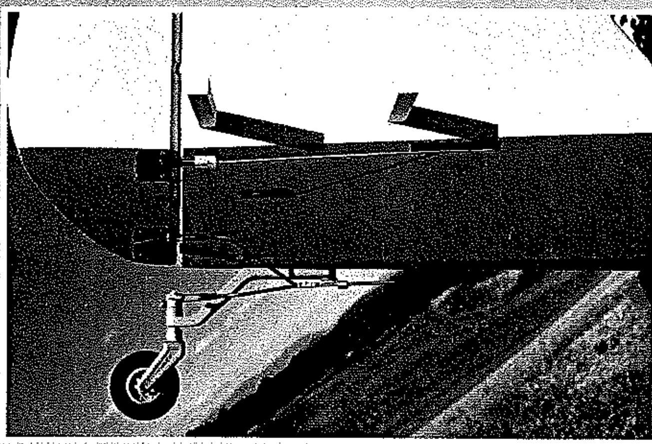
The Center of Gravity (CG) is shown at 30% of chord. This is for your initial familiarization flights. You may want to shift the CG rearward incrementally later to increase control sensitivity and elevator effectiveness, which will lower landing speeds even more.

Because the prototype Soft Touch has the high power-to-weight

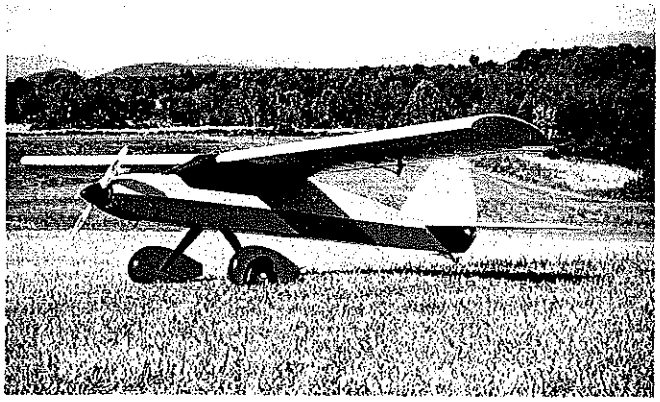
Soft Touch



RC installation is very simple and there is plenty of space. Separate servos for each flap, aileron, and elevator.



Tailwheel setup utilizes a shuttle wire in a guide; works fine. Note large control horns and removable stabilizer.



The wheel spats keep dew and mud away from the underside of the wing; they also add a touch of class.

To paraphrase the old saying about books, you cannot judge an airplane by its picture. The 95-inch Soft Touch looks like just a big trainer, but in reality it has the design and flight personality of a special-purpose aircraft, and it is good at its job.

The conception of Soft Touch dates to the appearance of the K&B 100 engine: a big two-stroke, simple and relatively inexpensive in its category, with a unique muffler/engine mount system. John and I wished for a big, lifelike flier that was capable of routine sport aerobatics, but was not too costly or difficult to build from scratch, as are so many of the Giants.

We have our own field for testing, with wide-open airspace but a short, up-and-down, hilly-and-rough airstrip with predominant crosswinds. This combination called for high-wide-and-handsome flying characteristics with short field capability, comparable to smaller .40-sized so-called trainers.

I had the benefit of years of having two Giant Scalers: a ten-foot General Aristocrat and a somewhat-smaller Piper Vagabond.

Part of the pull of this larger model for both of us is that I once flew and evaluated lightplanes, and John is currently a lightplane pilot. So our model must fly realistically and "on the wing"—not just by brute power. It must respond to control inputs with feedback as well as, say, a Cessna 150, and it must have a dreamy sense of "sitting in it." Finally, a to-be-published design must meet the needs of some sizeable segment of the customer spectrum.

The initial test flights, including aerobatics, came off very well at a gathering of "Ancient Eagles" in an autumn fun-fest; I do not shy away from Benny Howard's DGA designations for this model.

Bill Winter

Soft Touch

Type: RC Sport

Wingspan: 95 inches

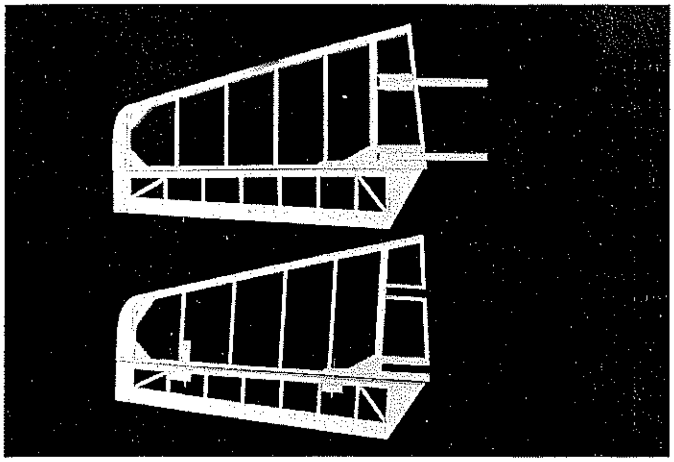
Engine: K&B 100

Functions: Throttle, elevator, rudder, flaps, ailerons

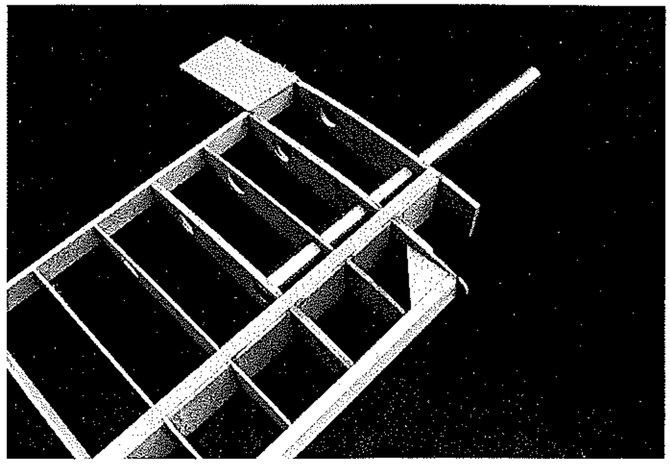
Flying weight: 15-18 pounds

Construction: Built-up

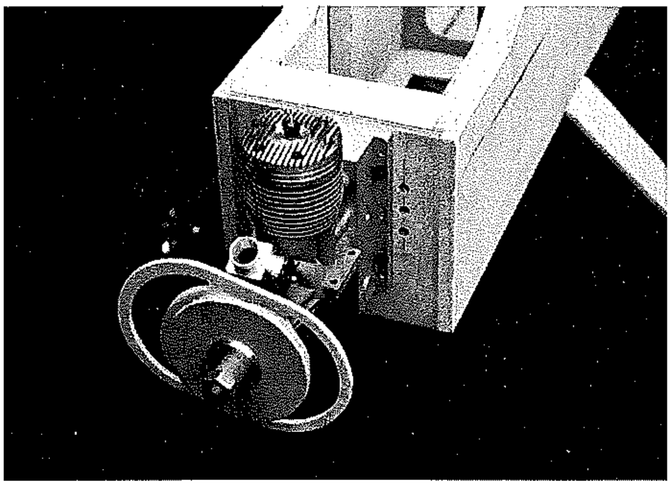
Covering/finish: Koverall and dope



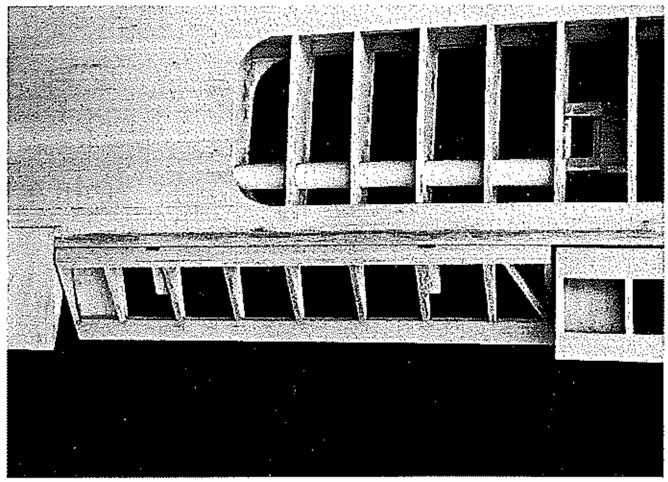
Horizontal stabilizer halves shown before covering with sheet. Keep wood light. Halves can be removable if desired.



The spar supporting ribs are made from aircraft plywood to transfer and distribute loads. Aluminum main spar.



Nose ring (not quite centered yet) temporarily attached to the engine for the beginning of cowl construction.



Note 30° operating range of large flap. If you have never flown with flaps, this adds another dimension to flight.

ratio K&B for power, and the polyester covering with much dope, lead ballast was added under the engine to keep the nose a realistic length. It is essential to balance the model as shown, even if some ballast must be used. Our test worst-case takes 1¼ pounds of lead to balance at 30% chord. One cannot detect any effect on flight; after all there is about 10.5 sq. ft. of wing area.

For inherently coordinated turns, 2½° of dihedral was used with the selected profile (side view). The model was required to pass the following test: bank steeply enough without using aileron correction to cause a mild spiral, and after one hands-off 360 it begins to widen and level the turn and returns back to level within 720°.

Two-Piece or One-Piece Wing: If you have transport for a big airplane, build the wing and stab in one piece. This is always stronger and simpler. Our prototype wing separates at the centerline with one dowel and one hold-down nylon screw through each half for quick assembly and separation. The aluminum tube connector should be a common hardware store item.

Note that the load-bearing rib stations on each panel are aircraft (five-ply) plywood and that the ribs are drilled for 2½° of dihedral. The patterns for these particular ribs show hole centers for the aluminum spar that very slightly in elevation.

Likewise the big stab can be built as one piece and permanently mounted, or as in our prototype, can be made in two slide-on/off halves for convenience in transport. Optional wing and stab struts are suggested for models with more powerful engines, for violent maneuvering, and for greater gross weight. On the K&B 100 Soft Touch does insides, outsides, rolls, etc. without such bracing.

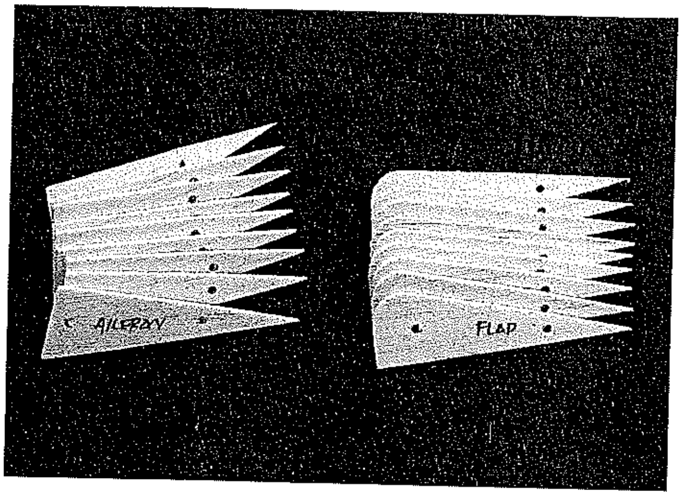
Large wing flaps greatly shorten takeoffs and landings (short ground rollout with light power). They have an optimized maximum deflection of 30° which means that they don't have the drastic slow-down effects of 60° movements, but increase lift while somewhat adding drag. Slow, parachute-like approaches can be done on the wrong side of the power curve.

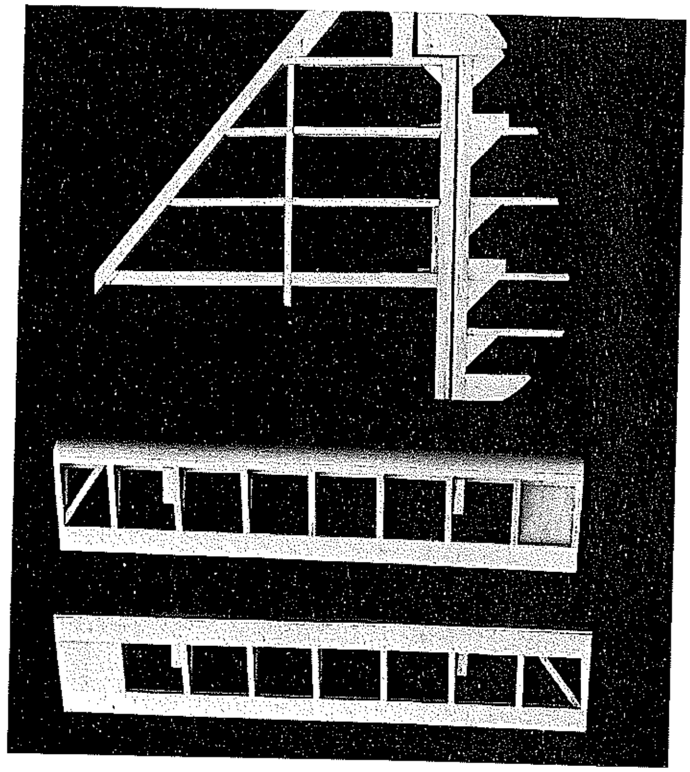
Elevators are individually servo-driven. Including two for each flap and aileron, eight servos in all are required. The tank has an optional uniflow fuel feed arrangement shown. The landing gear is sturdy aluminum, which has handled our worst bounces. An onboard alkaline battery low-speed glow plug booster is a viable option for reliable idle, but we have not found it unnecessary.

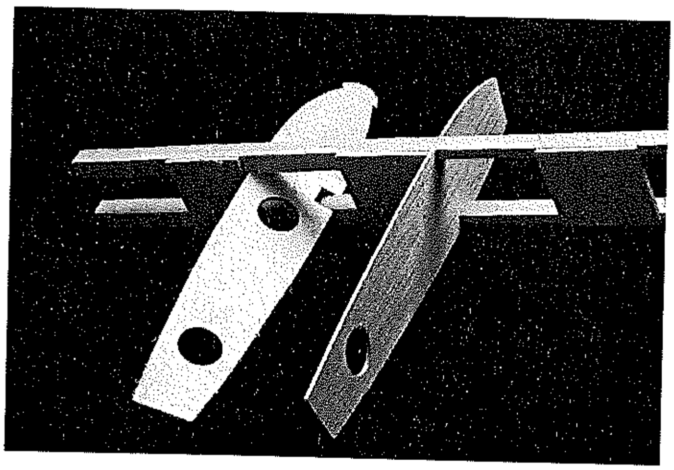
CONSTRUCTION

When purchasing wood, order 48-inch long stock for the wing spars, leading edge sheet, trailing edge parts (¼ and 3/32 sheet), and fuselage sides. It is recommended to use Titebond (an aliphatic resin) for relatively slow-drying applications and cyanoacrylate (CyA) for quick adhesion. Using Titebond for joining large areas will save money and frustration.

Fuselage: Trace the profile of a side. Lay waxed paper over the tracing and butt-join 3/32 sheet to cover the side profile. Check for straight mating edges and true with a straightedge if necessary. Pull the joints together tightly and glue with CyA. Trim to outline. Sand both sides of the side panels with fine sandpaper on a block. Build-up side doublers 1 and 2 similarly. Lay out the side framing, being sure to identify a left and right side. Install doublers. Balsa tends to curl away from water-based glue, so it takes considerable weight to







Above: Fin, rudder, aileron, and flap structures. Note aerodynamic balance on rudder to reduce servo loads.

Above left: Aileron and flap ribs were stack-sawn on a band saw. Holes are for ⅛ dowel used to hold blanks together.

Left: Preassembled spars with doublers and alternate web members. Ribs can be inserted and rotated against the webs.

hold the laminates together. Use stacks of books, etc. Install ¼ square longerons and nose hatch supports. Install all verticals and diagonals.

Cut out the plywood formers. Inside cutout corners are designed to be cut with a one-inch Forstner bit, which produces nicely finished holes. Slip-fit formers C, D, and E and trim as necessary, then glue in place onto one side using a small triangle to hold the formers vertical. Place the partly assembled sides over the top view. Slip the tailpost into place and check vertical alignment. Glue the tails of the sides together.

Cut out the remaining plywood parts. Install blind nuts in firewall and landing gear mount using 6-32s. Crosspieces can be installed, first with the top parts, then after removing the assembly from over the plan, the remaining bottom crosspieces are installed. I do not recommend CyA for gluing crossmembers; use Titebond or model cement. Install all other fuselage formers and members. Fit the landing gear block intimately to the fuselage, then glue it in with 30-minute epoxy.

Sand across the top and bottom with a sanding block before installing the top and bottom sheets. You will probably want to wait until after completing the control installation before adding the top and bottom sheets and finish-sanding the completed fuselage.

To build the engine cowling, cut out all plywood parts. Cut out the nose ring and a temporary spacer former and bolt the tack glued assembly to the engine. Tack-glue the rear plywood cowl former to the firewall, then install the engine. Build up the cowling by fitting balsa parts between the positioned formers. Remove the engine, then reinstall the cowl. Carve and sand the cowling to shape. Remove the cowl, clean up and shape the interior.

Wing: The wing-joining system is based on use of a one-inch (nominal diameter) aluminum spar. This stock should be available in any hardware store. Get a tube with .090 minimum wall thickness, hard-drawn if possible. For any lighter-gauge aluminum, fill the tube with a hardwood dowel (also available at most hardware stores).

Stack balsa and plywood rib material to comfortable height and drill for two ⅛ wood dowels to hold the stacks together. Cut all rib outlines on a band saw and notch for spars. Use a Forstner bit if you can for all holes. Drill holes for servo wire access in ribs.

Cut the plywood center section parts. Drill the holes for the aluminum spar to accurate centers. If you have a table saw it will ease assembly to use a fence and tilt-table to precut the leading edge parts and rear spars to approximate shape.

Begin wing assembly by selecting the best and straightest wood (hardwood) for the wing spars. Glue the spar doublers into place with Titebond. Lay the preassembled spars flat over the plans and add indicated web members (every other member beginning from the tip). Having these alternate web members in place facilitates accurate rib alignment.

Pin the spar subassembly over the plan and just slip the ribs between the spars, rotate them against the web member, and glue into place. Add the sub-leading edge, rear spar, and remaining web members. With vulnerable rib ends at the tip and root it is recommended to add the trailing edge parts at this time.

It is critical for ease of construction to install the wing spar tube at this point—particularly before adding any sheet covering. The wing panels may be taken up for good accessibility. Cut your one-inch-diameter aluminum stock to the indicated length.

Using a sanding disk (or equivalent) taper the last ½ inch of both ends of the tube to facilitate assembly. Also taper the end of a leftover piece of tubing, which you can use for most of the fitting.

Using the scrap tube, work it into the proper rib socket. If your tubing is .020 oversize (as mine was), there will be quite a bit of fitting to do. If you rotate the spar tube it will leave a black mark where there is interference. Remove the black area with a rat-tail file. Repeat this procedure as many times as required at each rib, for each of the four plywood ribs, to get a slip fit.

The proper fit of the tube in the plywood ribs is important. You do not want slop, but you do want the assembly to join properly on a damp day. After working the fit with the scrap spar, try the real spar. If it works without binding, use copper wool (not steel wool), very fine wet-or-dry sandpaper, or ScotchBrite to polish the spar tube, then wax it.

It may be at this point that you will want to fit the wing assembly to the fuselage to see how this model is shaping up. You may notice that the wing slot may not be exactly the proper width for the fuselage forward cabin. This can be corrected by adding balsa buffers to the plywood ribs or the leading edge notch ribs to make a good fit. Leave ample room for covering material when making this fit-up.

While the wing panels are up off the board, install the bottom leading edge and trailing edge sheets. Alignment of the wing panel is not critical at this point. Pin the wing panel down again at the spar and block the trailing edge up accurately, then install the top leading edge sheet. We used aliphatic resin along the ribs and CyA on the spar and leading edge.

The wing becomes "locked-in" torsionally at this point and must be accurately aligned during this final sheeting process. Complete all wing sheeting and install the capstrips. Install the servo mounting plates and servo lead tubes. Complete the wingtip and leading edge.

Sand the wing panel assemblies with medium paper on a large block of wood. Do not oversand and lose the airfoil profile. Shape the leading edge accurately with a small plane then sand (suggestion: make a plywood leading edge template to get a good profile).

Flaps and ailerons can be assembled quickly over the plans by pinning down the leading edge over the plan, installing the ribs, releasing the leading edge (there is curvature in the bottom of these surfaces), then pinning and gluing the ribs to the trailing edge.

The only tricky part of this assembly is the curved sheet used on the flaps to get a good airfoil. I used a dowel of the proper radius, soaked the sheet in hot water, then taped the sheets around the dowel and let it dry. If this seems like too much trouble, you can square off the curve and use a block of balsa and shape it to get the proper curvature.

Hinges must be preinstalled at this point and checked. Geometry of hinge installations is critical for smooth operation. See specific details for hinge geometry. Cut for proper clearances to provide desired control surface and flap deflections.

Empennage: It is amazing how fast the ancillary parts can go together in the CyA age. If you have a bandsaw this assembly can be done very quickly and accurately by marking the parts over the plan, then sawing them to length; otherwise, just cut and fit as required.

If you cut the interior ribs slightly long, during assembly you can install the end ribs, then fit each intermediate rib to suit by sanding square with a block over a table edge. Sand all surfaces flat with a large sanding block.

Preassemble the sheet covering by CyAing the edge joints together, then presand the sheet flat. Cover the framed parts with sheet by using Titebond (aliphatic resin). Use CyA around the edges through the Titebond for good adhesion. Weight the assemblies with books to ensure good, even adhesion.

Pre-Final Assembly: Install the fin first.

With the fuselage flat on the work surface, slip the fin into place and trim it to install vertical with respect to the work surface. Slip the horizontal stabilizer spars in place and slide the stabs on. Check and trim (if necessary) so that the stabs are horizontal with respect to the work surface.

Fit the wing panels together and try them on the fuselage. Lay the wing on the fuselage and check for level with respect to the bench. Do not install the wing bolts or dowels until covering and finishing are complete.

Covering: On the prototype we used Sig Koverall. Prepare all surfaces by sanding with a block to true them up, then touch up the curves with a sanding pad. Use a one-inch camel's hair brush to apply two heavy coats of 50% thinned clear nitrate dope. Sand lightly with #150 production paper after each coat of dope.

After years of working with film only, covering with Koverall was quite fun. The idea, as with most film coverings, is to get a well-adhered border, then shrink the center portion, even over sheeted surfaces.

To cover an elevator, for example, cut a sheet of Koverall large enough to wrap both sides of the surface, with some two inches left over for handling. Apply clear nitrate dope around all edges of the elevator and lay the prepared surface onto the Koverall, always with the grain of the Koverall running spanwise.

Turn this section over and pull the edges, spanwise first, until there are few (if any) wrinkles in them; don't worry about the middle of the covering—just the edges. Dope the edges down and wrap them around to the opposite surface to form an overlap of the covering material when finished.

To speed hardening of the nitrate dope on the overlaps, I used a film iron in the wet dope to set it (be sure to set the temperature so the dope does not turn brown or char on the iron; the excess dope can be scraped from the iron). With this method wrinkles and creases can be removed from the adhered border of the surface through the dope. Adhere the opposite side similarly.

After the border dope has set, or after you have set it with the iron, pass the iron over the entire surface to remove all wrinkles. Now a couple of coats of clear nitrate can be applied to seal the surface.

The above method can be used on more-complex surfaces because of the great "shrinkability" of the polyester material. The entire fuselage on the prototype was covered with one piece of material. The covering was adhered down the center of the bottom, then worked around each side and to the top. Even the complex curved cowling was covered in one piece, beginning from the top and working around the sides.

Finishing: Final finishing on the prototype was four coats of nitrate clear, followed by one coat of clear with talcum. After final fine-sanding, four coats of butyrate color were applied. Two coats of clear butyrate were used for a gloss topcoat. Dope the interior around the tank and RC equipment for some insurance against fuel leaks. 20th Century sprays were used to finish the wheel pants and to apply trim colors.

Final Assembly: Follow the same alignment steps as in pre-final assembly, but this time glue the stabilizer spars in place. Run masking tape along the bottom of the wing where it will meet the fuselage and coat the tape with lipstick. Seat the wing, remove it and trim away the material that is marked with lipstick. Repeat until the wing is seated and level.

Drill the forward cabin former ⅛ diameter and approximately ½ deep to prepare for the hold-down dowels. Sharpen ⅛ dowels approximately ½ long to a steep point and slip these dowels into the hold-down holes (do not glue them). Let the dowels protrude approximately ⅛.

Put a dab of lipstick on the points, then slide the wing into place. There will be a little tick-mark of lipstick where the final dowels should go. Use a ⅛ guide drill to start the dowel hole, then enlarge the holes in steps to ⅜. Install the final hold-down dowels. Drill and install the rear wing hold-down screws. Tap for ¼-20.

Struts, as detailed for the wing and stabilizer, should be installed for models using engines larger than the K&B 100.

Install the fuel tank and radio system as indicated. Be sure that the antenna is installed at full length.

It is critical to make the model balance where indicated. Use ballast if necessary (as shown on the plans). Check side-to-side balance and correct with tip weight as necessary. Check for free control movements of the indicated amounts.

Flying: Soft Touch has had partial

structural analysis, incremental load testing, and rigorous flight testing in normal and mild aerobatic operation (loops, rolls, spins, inverted) which could be compared to utility-type operation for full-scale aircraft.

As with full-scale aircraft, it is possible to exceed the design loads of this model under certain conditions, such as a power dive with rapid pullout, or any maneuver involving rapid control input, or with the installation of a larger engine (which would result in higher velocities).

Designs for strut-reinforcing of the wing and empennage have been shown as an alternate, which would increase the aerodynamic load-carrying capacity of the airframe somewhat. You must, however, use good, common sense for the safe operation of this large model.

Major differences noted while flying are basically that the model requires more room for takeoffs, turns, and landings. Take a good look at your model on the runway before you take off and get the sense of the scale, because if you are used to flying a smaller model you will tend to land farther away from yourself.

You may think (as I did, before flying Soft Touch) that it doesn't matter how big a model is after it leaves the ground. But size makes for big differences in handling characteristics, and I hope to pass these along to so you will not be surprised.

It also seems to be the bane of some large-Scale modelers to build the model of their dreams and to be unprepared to fly it. The Soft Touch provides a stepping-stone to the larger models so your dreams can come true.

Two basic things to be aware of with the large model are mass effects and scale effects. I seem to run into things more often with this large model, and create more than normal hangar rash.

Please use only wood propellers on the Soft Touch; it is a sport model, not a racer. Wood breaks, plastic takes. Performance is outstanding with standard wood props and 10% nitromethane fuel.

With any large model, safety becomes especially important. If a large model hits something or someone, it will cause much more damage to the object and itself than a smaller model. Your preparation and safety procedures must be increased in direct proportion to the size of the model. Use a checklist. Do your range checks. This large model will be flying much farther from you than with a smaller model with the same type RC system.

The Soft Touch minimizes the differences in larger models with its solid flight characteristics, and it makes a great transition model. ✈

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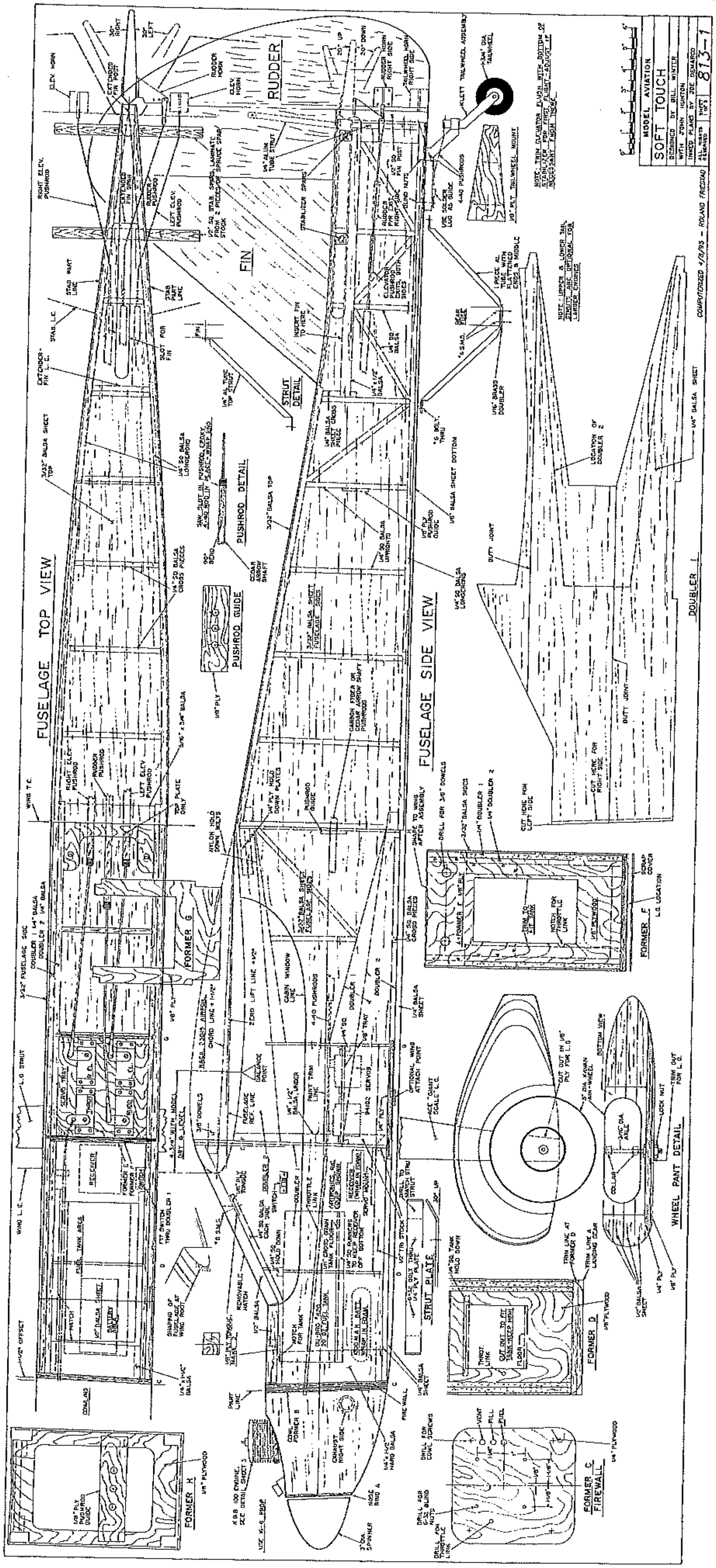
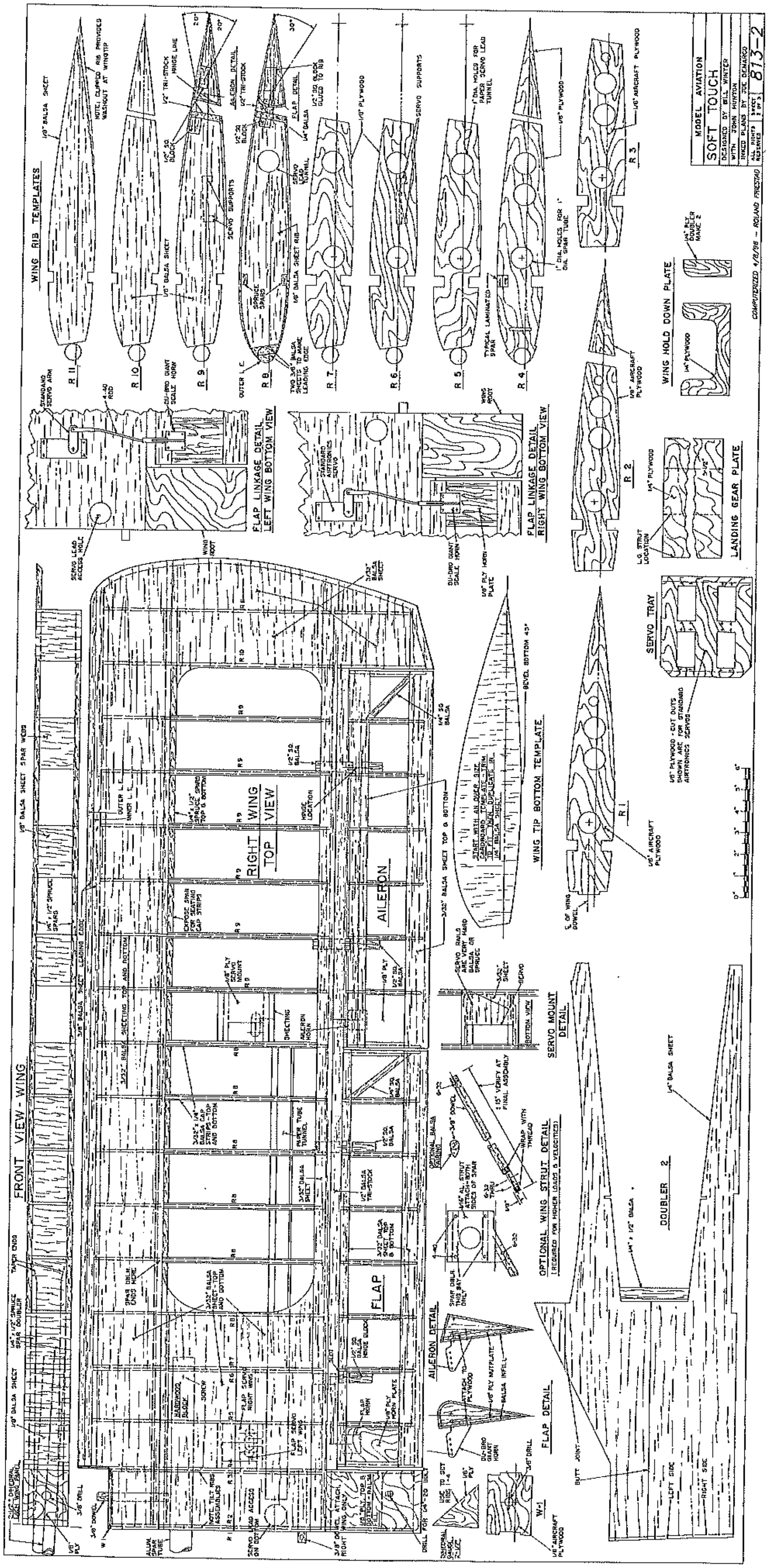
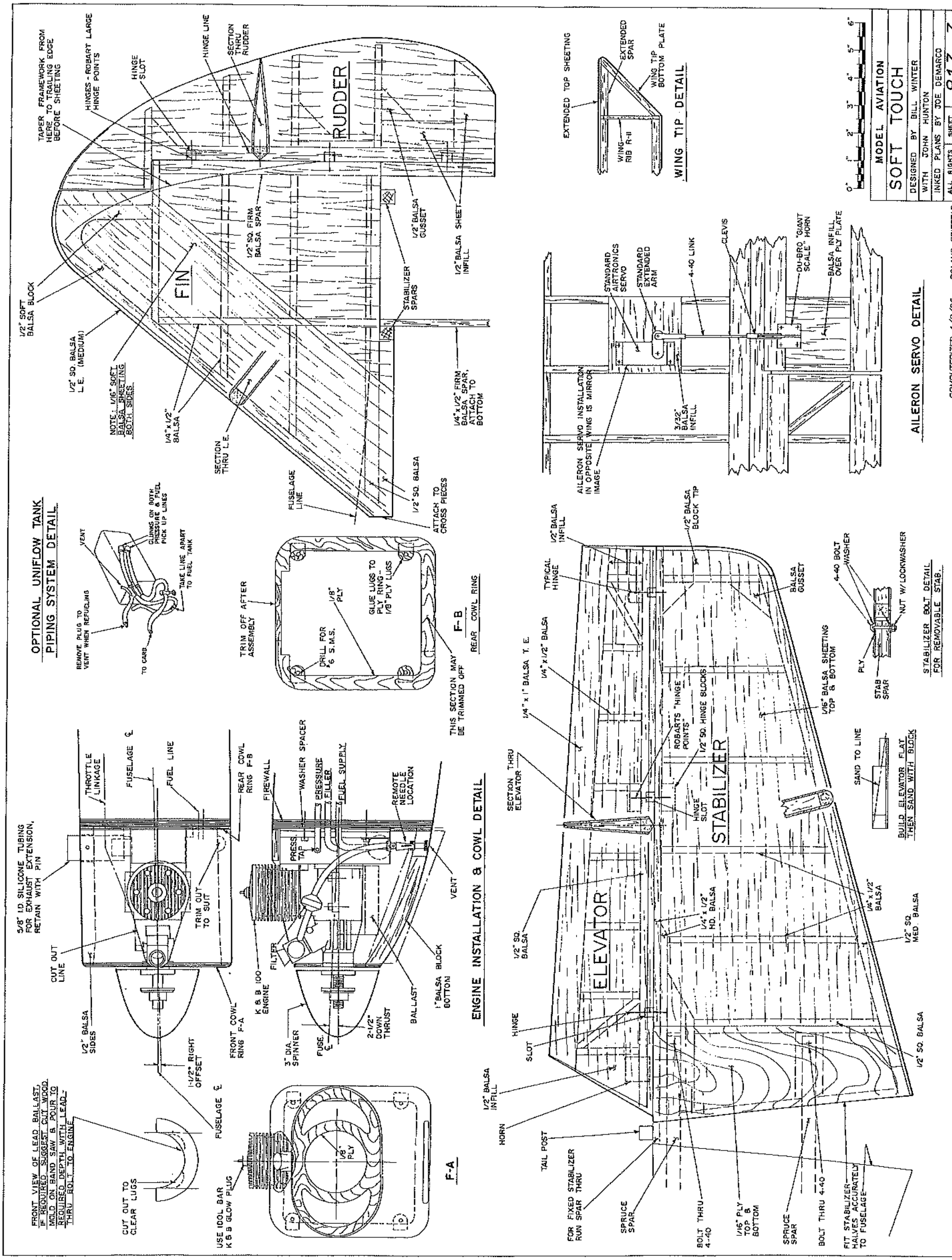
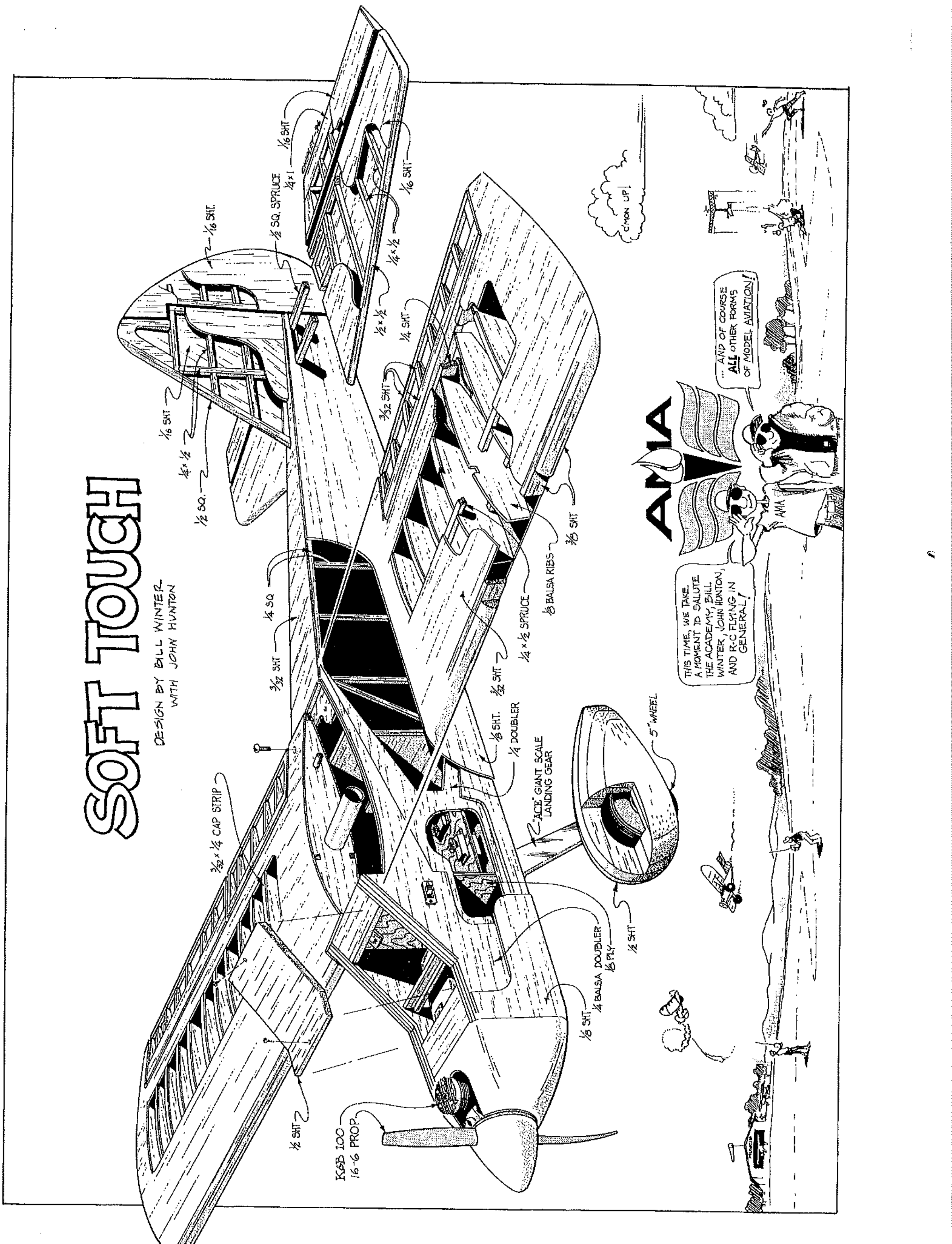
Full-Size Plans Available—see page 189




WING RIB TEMPLATES
FRONT VIEW - WING
RIGHT TOP WING VIEW
AILERON
FLAP
FLAP LINKAGE DETAIL LEFT WING BOTTOM VIEW
FLAP LINKAGE DETAIL RIGHT WING BOTTOM VIEW
WING TIP BOTTOM TEMPLATE
SERVO MOUNT DETAIL
OPTIONAL WING STRUT DETAIL
AILERON DETAIL
FLAP DETAIL
DOUBLER 2
SERVO TRAY
LANDING GEAR PLATE
WING HOLD DOWN PLATE
MODEL AVIATION
SOFT TOUCH
813-2



MODEL AVIATION
SOFT TOUCH
DESIGNED BY BILL WINTER
WITH JOHN HUNTON
INKED PLANS BY JOE DEMARCO
ALL RIGHTS RESERVED
SHEET 3 OF 3
813-3
COMPUTERIZED 4/8/96 - ROLAND FRIESTAD
RUDDER
FIN
TAPER FRAMEWORK FROM HERE TO TRAILING EDGE BEFORE SHEETING
HINGES - ROBART LARGE HINGE POINTS
HINGE SLOT
HINGE LINE
SECTION THRU RUDDER
1/2" SQ. FIRM BALSA SPAR
1/2" BALSA GUSSET
1/2" BALSA SHEET
1/2" BALSA INFILL
STABILIZER SPARS
1/2" SOFT BALSA BLOCK
1/2" SQ. BALSA L.E. (MEDIUM)
NOTE: 1/16" SOFT BALSA SHEETING BOTH SIDES
1/4" x 1/2" BALSA
SECTION THRU L.E.
FUSELAGE LINE
1/2" SQ. BALSA
ATTACH TO CROSS PIECES
1/4" x 1/2" FIRM BALSA SPAR, ATTACH TO BOTTOM
EXTENDED TOP SHEETING
EXTENDED SPAR
WING TIP BOTTOM PLATE
WING RIB R-11
WING TIP DETAIL
STANDARD AIRTRONICS SERVO
STANDARD EXTENDED ARM
4-40 LINK
CLEVIS
DU-BRO "GIANT SCALE" HORN
BALSA INFILL OVER PLY PLATE
3/32" BALSA INFILL
AILERON SERVO INSTALLATION IN OPPOSITE WING IS MIRROR IMAGE
AILERON SERVO DETAIL
OPTIONAL UNIFLOW TANK PIPING SYSTEM DETAIL
VENT
CLUNKS ON BOTH PRESSURE & FUEL PICK UP LINES
TAKE LINE APART TO FUEL TANK
REMOVE PLUG TO VENT WHEN REFUELING
TO CARB
TRIM OFF AFTER ASSEMBLY
1/8" PLY
GLUE LUGS TO PLY RING - 1/8" PLY LUGS
DRILL FOR #6 S.M.S.
THIS SECTION MAY BE TRIMMED OFF
F-B
REAR COWL RING
1/2" BALSA INFILL
1/2" BALSA BLOCK TIP
TYPICAL HINGE
BALSA GUSSET
1/4" x 1" BALSA T.E.
1/4" x 1/2" BALSA
ROBARTS "HINGE POINTS"
1/2" SQ. HINGE BLOCKS
1/16" BALSA SHEETING TOP & BOTTOM
4-40 BOLT
WASHER
NUT W/ LOCKWASHER
PLY
STAB SPAR
STABILIZER BOLT DETAIL FOR REMOVABLE STAB.
SAND TO LINE
BUILD ELEVATOR FLAT THEN SAND WITH BLOCK
SECTION THRU ELEVATOR
HINGE SLOT
STABILIZER
ELEVATOR
1/2" SQ. BALSA
1/4" x 1/2" HD. BALSA
1/4" x 1/2" BALSA
1/2" SQ. MED. BALSA
HINGE
SLOT
1/2" BALSA INFILL
HORN
TAIL POST
FOR FIXED STABILIZER RUN SPAR THRU
SPRUCE SPAR
BOLT THRU 4-40
1/16" PLY TOP & BOTTOM
FIT STABILIZER HALVES ACCURATELY TO FUSELAGE
1/2" SQ. BALSA
THROTTLE LINKAGE
FUSELAGE ℄
FUEL LINE
REAR COWL RING F-B
5/8" I.D. SILICONE TUBING FOR EXHAUST EXTENSION, RETAIN WITH PIN
TRIM OUT TO SUIT
CUT OUT LINE
1/2" BALSA SIDES
FRONT COWL RING F-A
1-1/2" RIGHT OFFSET
FUSELAGE ℄
FIREWALL
WASHER SPACER
PRESS. TAP
PRESSURE FILLER
FUEL SUPPLY
REMOTE NEEDLE LOCATION
VENT
K & B 100 ENGINE
FILTER
3" DIA. SPINNER
FUSE ℄
2-1/2" DOWN THRUST
BALLAST
1" BALSA BLOCK BOTTOM
ENGINE INSTALLATION & COWL DETAIL
FRONT VIEW OF LEAD BALLAST, IF REQUIRED SUGGEST CUT WOOD MOLD ON BAND SAW & POUR TO REQUIRED DEPTH WITH LEAD - THRU BOLT TO ENGINE
CUT OUT TO CLEAR LUGS
USE 100L BAR K & B GLOW PLUG
1/8" PLY
F-A



SOFT TOUCH
DESIGN BY BILL WINTER
WITH JOHN HUNTON
3/32 × 1/4 CAP STRIP
1/2 SHT
KGB 100
16-6 PROP
1/8 SHT
1/4 BALSA DOUBLER
1/4 BALSA DOUBLER
1/8 PLY
1/2 SHT
"ACE" GIANT SCALE LANDING GEAR
1/4 DOUBLER
1/8 SHT.
3/32 SHT
5" WHEEL
3/32 SHT
1/4 SQ
1/4 × 1/2 SPRUCE
1/8 BALSA RIBS
3/8 SHT
1/2 SQ.
1/4 × 1/2
1/16 SHT
1/2 SQ. SPRUCE
1/16 SHT.
1/16 SHT
1/4 × 1
1/16 SHT
1/4 × 1/2
1/2 × 1/2
1/4 SHT
3/32 SHT
AMA
C'MON UP!
... AND OF COURSE ALL OTHER FORMS OF MODEL AVIATION!
THIS TIME, WE TAKE A MOMENT TO SALUTE THE ACADEMY, BILL WINTER, JOHN HUNTON, AND R-C FLYING IN GENERAL!