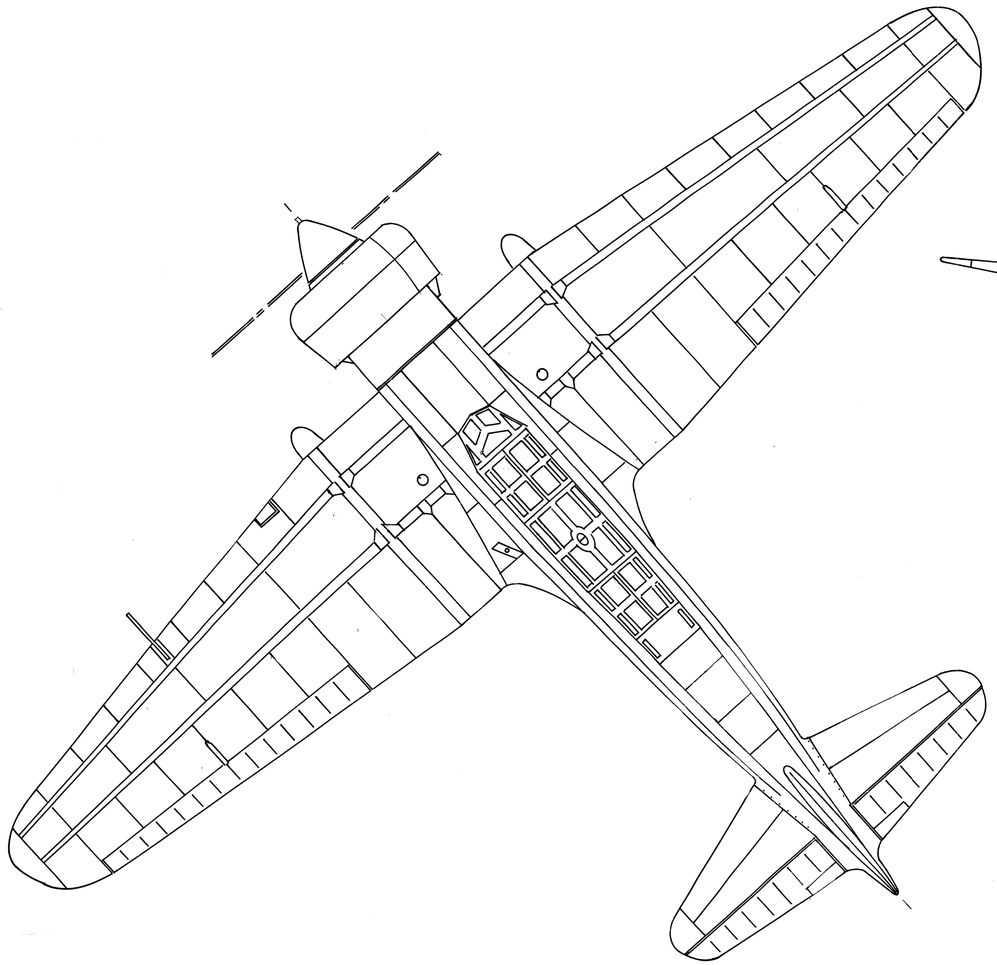
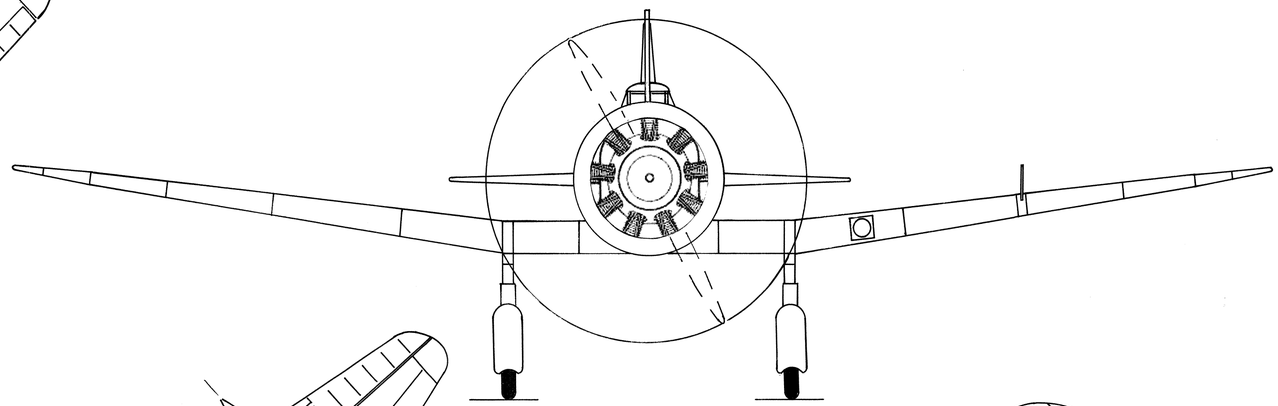
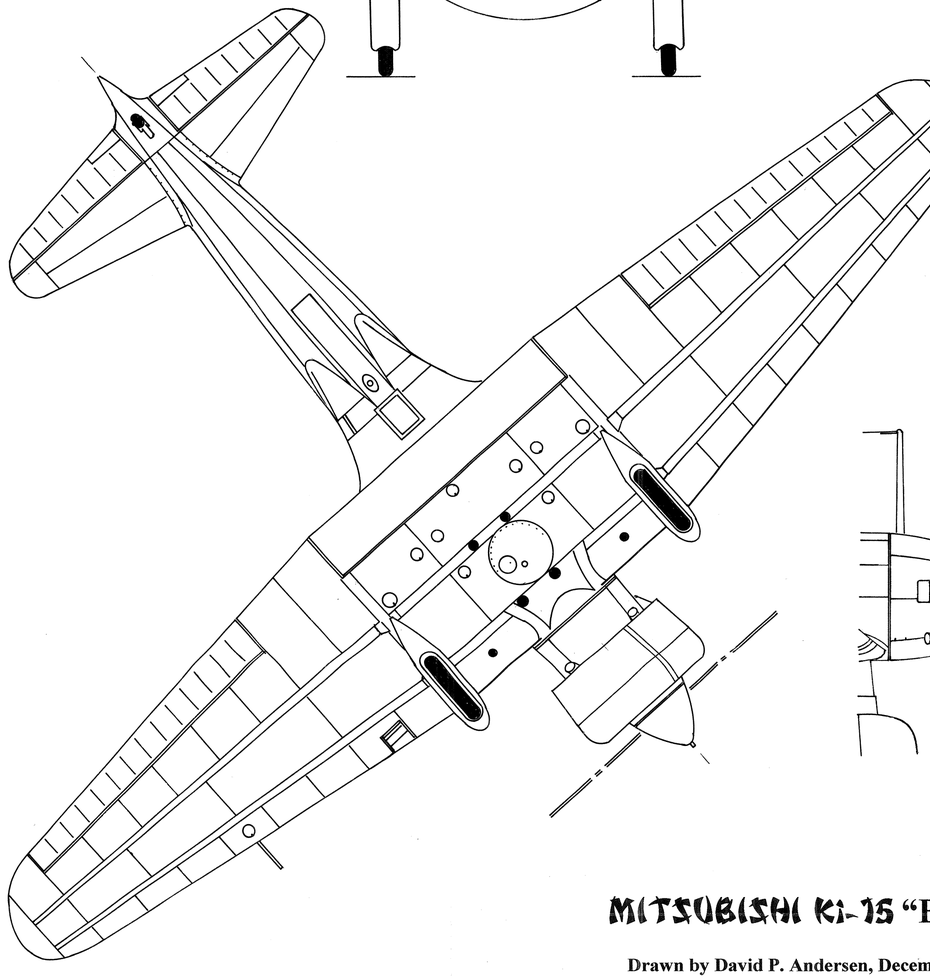
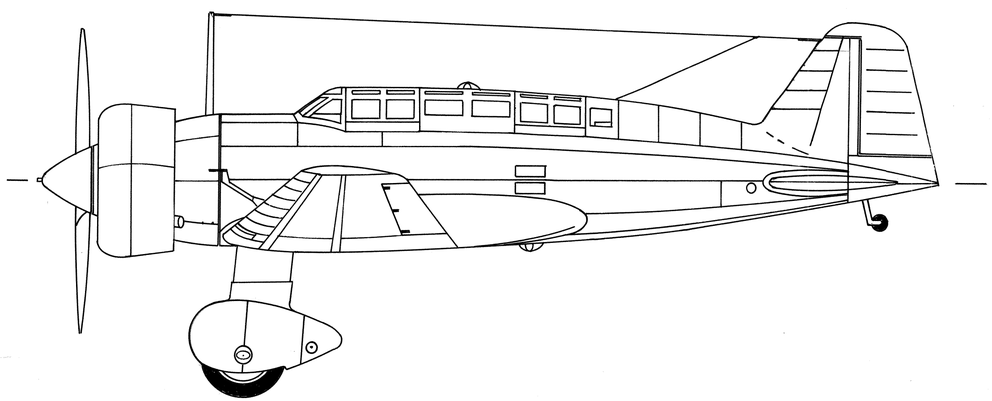
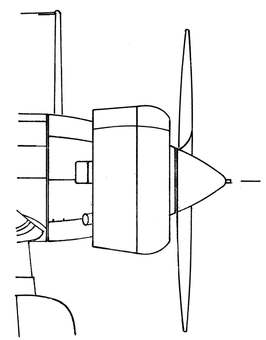










MITSUBISHI Ki-15 "BABS"

Drawn by David P. Andersen, December 2008

Babs Parts List

Plywood:
1--3/8 x 6 x 12 ply: firewall
1--1/4 x 12 x 24 ply: ribs E & F, C2
1--3/16 x 6 x 12 ply: L.G. plates
1--1/8 x 12 x 36 ply: tank box, F1, F20, center section ribs(2), Rib 1(2), center section L.E., ail servo mount.
4--1/8 x 12 x 48 lite ply: 8 center section ribs, F2, F6 thru F14, wheel pants, tank box end, C1, fin platform
1–1/16 x 12 x 48 ply: wheel pants, V3
1--1/32 x 12 x 48 ply: cowl skin
1–1/64 x 12 x 48 ply: flap

Balsa sheets:
2–1 x 2 x 12: wing tips
2–1/2 x 4 x 48: pants, rudder post, fin rib 1
1–3/8 x 3 x 30: rudder top, V1, V2
4–1/4 x 3 x 48: tailcone, stab T.E., elevator tips, el trim tab, F5 upper, pants
4–3/16 x 3 x 36: F3, F4 upper & lower
15–1/8 x 3 x 48: 8 center ribs, wing jigs, outer wing ribs, stab ribs, fin & rudder ribs, F15-F20, stab tips, shear webs.
54--3/32 x 4 x 48 light (soft) density: F14 ½, wing sheeting, fuselage sheeting, stab sheeting, tailcone, rear sheer webs, flap core, lower wing filets
5–1/16 x 4 x 36: aileron skins, rudder base, fin sheeting, upper wing filets
1–1/32 x 3 x 36: aileron dummy L.E, aileron dummy ribs

Balsa Blocks:
2–3 x 4 x 12 blocks: cowl nosebowl
2–3/4 x 3 x 24 block : tailcone, wing saddle supports

Sticks:
1--3/8 dowel: wing rods
1--1/4 dowel: wing alignment pins
3—3/32 x ¼ x 36 hardwood: canopy stringers
1--1/2 x ¾ x 12 hardwood: antenna mast, stab support
1--1/2 sq. x 36 hardwood: L.G. mounts, tank box, wing bolt support

1—3/4” x 30” triangular stock: landing gear support
2--3/16 sq x 36. hardwood: cowl stringers
4--1/4 x ½ x 36 hardwood: center main spars
1--1/16 x 3/16 x 36 hardwood: elevator & rudder T.E.
2–1/2 x 3/8 x 36 hardwood: center forward spar
2–1/2 sq x 36: fin, rudder
3–1/2 x 1 ½ x 48: Wing L.E., stab T.E.
1–1/2 sq x 48: stab L.E.

22—1/4 sq. x 48: rear wing spars, crutch, fuselage stringers
5—1/4 x ¾ x 48: outer wing panel main spars
7 –1/4 x 1/8 x 48: outer wing panel rear spars, fin spar, elev trim tab spar
2–1/4 x ½ x 36: stab spar
1–1/16 x ¼ x 36: elevator cross ribs
1—1/8 x 1 x 12 hardwood: scale antenna mast core

Hardware:
1—1 ½" dia x 30" aluminum wing tube & socket. http://www.ziroliplans.com
1 pair Shindin "Babs" oleo struts, http://www.shindinmachine.com/
1 pair Aeroflex 8" x 1 ¼" wheelchair wheels,
http://www.wheelchairparts.net/CATALOG_i6458114.html?catId=316997
1—Dave Brown Vortech 6" P-51 spinner w/ lightened backplate,
https://www.dbproducts.com
11—Klett or DU-BRO hinges: flap
22—Robart Hingepoints: ailerons(10), rudder(4), stab(8)
1—5/32" music wire: tailwheel strut, elevator control horn
1—5/32" DU-BRO nosegear control horn: for elevator control horn
1--5/32" DU-BRO nosegear block & steering Arm: for tailwheel strut
4—1/4 x 20 nylon bolts: stab(2) and wing(2)
4—8-32 x ½" socket-head cap screws & blind nuts: cowl
4—4-40 x ½" socket-head cap screws & blind nuts: wheel bolts
4—8 x 32 x 1 socket head cap screws: wing bolts
24—4x3/4" FH wood screws: landing gear bearers
8—4x3/4" RH wood screws: landing gear mounts
1/16" sheet sheet aluminum: tailwheel, aileron horns.
1 pkg SIG Koverall: fabric covering for aileron, elevator, rudder
1—1/4 scale Japanese Pilot, http://www.acesofiron.com/page/AOIW2IJN14.htm
1—1/4 scale 9-cylinder dummy radial engine,
http://www.sigmfg.com/IndexText/WBR30850.html
1—3/16" x .014" x 12" brass tube: Spangenberg aileron control
1—7/32" x .014" x 12" brass tube: Spangenberg aileron control
2—2-56 x 3/8" nuts and bolts: Spangenberg aileron control
2--.015" x 17" x 17" SIG clear plastic: canopy and windows
1—1 ½"-2" soft tailwheel
1—3/8" masking tape: canopy frames
1—1/8" 3M Fineline masking tape: canopy frames
3 rolls—ChartPak 1/64" graphic tape, BGCP0201: panel lines
1 pkg—Radio Shack Red 12 VDC Lamp Assembly, ½", P/N 272-0332: signal lamps
Vacuum-formed windscreen & signal light fairings, fiberglass wheel pants & cowl available from Jeff Micko. See www.MNBigBirds .com or email jmikhl@aol.com.

Markings:

C:\Corel\Andersen Kamikazee,cdr: ProMark dry transfer markings.
http://www.pro-mark.com/

Quarter-Scale Mitsubishi Ki-15 "Babs" Construction Summary

For a brief period in 1937, the Mitsubishi Ki-15, code-named ***Babs*** by the Allies, was the fastest production aircraft in the world.

The Ki-15 Karigane (Wild Goose) was a two-seat reconnaissance aircraft with a top speed of 300 mph. Construction to military specifications began in December 1935. The prototypes exceeded all expectations. About the same size as a P-47 Thunderbolt but only one-third as heavy, its range was four times that of a Spitfire and its ceiling was 6000 feet higher. No fighter could catch it at the time.

A detailed construction article containing 250+ color photos is available on CD. To purchase, go to MNBigBirds.com on click Micko Aircraft & Accessories.

The model described in this article is a quarter-scale version of the second prototype, named ***Kamikaze-Go*****.** The right side of the airplane contains its name, ***Kamikaze***, and other Japanese markings while the left side contains their English equivalents. Kamikaze-Go was identical to the military versions except for internal equipment and markings.

The name, Kamikaze, had a different meaning in 1937. Meaning ***Divine Wind***, it was a patriotic slogan referring to a typhoon that saved Japan from a Mongolian invasion in the 13th century. The appendage ***Go*** means ***the one and only*** as when naming a ship, such as ***The*** Queen Mary or ***The*** USS Constitution.

In those days, communication across Asia was slow and difficult—no long-distance telephones, no portable radios, no email. So the large Tokyo newspaper ***Asahi Shimbun*** purchased the first two Ki-15 prototypes for use as curriers. The idea was to fly to developing news sites, gather information and aerial photos and return home. Although it carried a radio, communication with the ground and other aircraft was also performed with Morse code. Large red lights were installed on the top and bottom of the fuselage, connected to a telegraph key in the observer's position.

Large and colorful markings on the underside helped reporters on the ground identify the airplane when it appeared overhead.

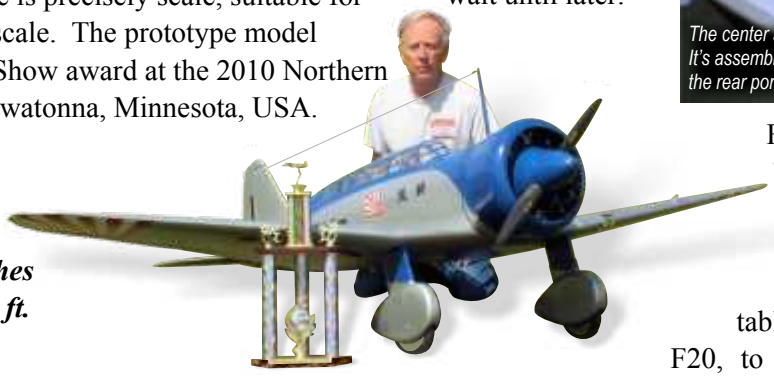
To achieve long range, the Ki-15 was very light but held large fuel tanks. It could penetrate deep into China and return without refueling. This made it a candidate for a prize offered by a Paris newspaper for the first flight from Japan to Paris in less than 100 hours. And so, the Asahi Shimbun sent the second prototype, Kamikaze-Go, piloted by Masaaki Linuma and navigator Kenji Tsukagoshi. It flew 9,542 miles across French Indochina, India, Iraq and the Middle East to Europe in less than 95 hours to capture the prize and lots of publicity for Asahi Shimbun and Japanese aviation. Nearly all surviving photos of Kamikaze-Go are from this trip.

While in Europe, Kamikaze-Go flew to London to photograph the coronation parade of HM King George VI. Although meant as a tribute to the King, it was an embarrassment to British aviation because the fastest British aircraft in production at the time was an open-cockpit biplane. Most of the West was unaware that Japan even had an aviation industry. After giving rides to some dignitaries in England, Kamikaze-Go quietly flew home.

During the second Sino-Japanese conflict, hundreds of Ki-15s covered China from their bases in Manchuria. They were faster than all Chinese interceptors with the possible exception of the Russian Polikarpov I-16. During the first year of WW2, facing faster Allied aircraft, they were withdrawn from combat service.

The last were expended, ironically, as ***Kamikaze*** bombers in the closing months of the war.

The model presented here is precisely scale, suitable for competition, in exactly 1/4th scale. The prototype model shown here won the Best of Show award at the 2010 Northern Alliance Military Fly-In in Owatonna, Minnesota, USA.



Wingspan: 120 inches
Length: 83 inches
Weight: 30 lbs
Wing area: 1900 sq. inches
Wing loading: 36 oz./sq. ft.
Engine: 65-100 cc.

*Full-size plans in th*e form of PDF files are available on CD and free download at http:/www.mnbigbirds.com. For paper copy, take these files, as CD or email, to a print shop capable of printing 36" wide and any length. A complete construction article of almost 300 color photos is available on the same CD.

With its three-piece wing and removable horizontal stabilizer, Babs will fit in most compact hatch-back cars. Babs can be built with common materials and common tools. It requires no third-party custom-made parts. If you prefer, fiberglass, metal and plastic parts are available from the venders shown on the plans and in the parts list.

Construction Summary

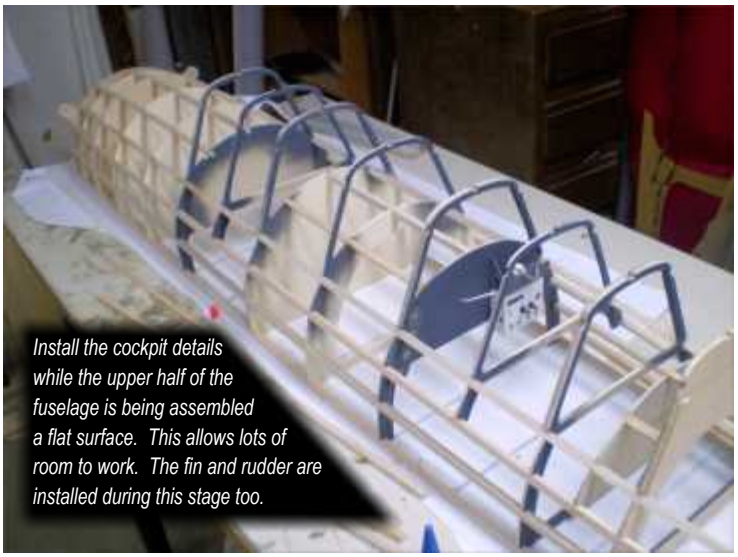
The stab & elevator and fin & rudder are assembled as two clam-shelves over the plans. The rudder is 1/16" sheet balsa with ribs and leading edge spar attached to both sides. Sheet the fin and fit the rudder before assembling the fuselage. Also, sheet the stab and fit the elevator before proceeding with the fuselage; they will be needed during fuselage assembly.

Tail surfaces are constructed as clamshell halves on a flat surface. Robart hinges are installed before the shells are joined.

Assemble the wing center section upright on a flat surface. There is no washout in the center section.. Elevate all ribs with a balsa stick near the rear spar as the main spar rests on the workbench. Clamp hardwood sticks to the end ribs, before gluing, to hold them straight. After sheeting only the upper surface, turn it over and install the flap and flap servos. The center section will be needed during the fuselage assembly. Its completion can wait until later.

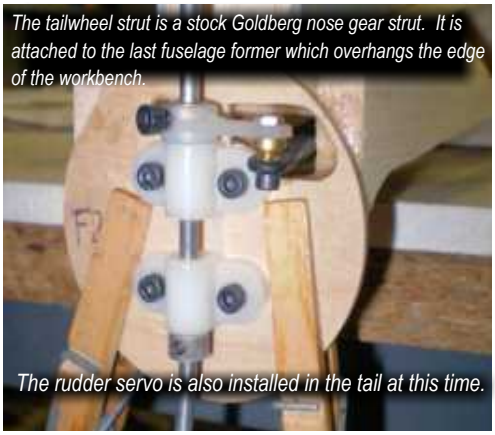
The center section of the wing is constant-chord with no washout. It's assembled upright on a flat surface. A balsa stick elevates the rear portion of the ribs. Ribs are weighted, not pinned.

Fuselage construction begins by laying a ¼" sq. balsa crutch over the plans on a flat surface. Allow the end of the crutch to extend beyond the edge of the building table, giving room for the last former, F20, to extend below the surface. The formers of the upper half are then glued to this crutch. Adjust the crutch slightly during assembly to fit the notches in the formers. This allows all of the cockpit details to be installed early and the rest of the fuselage built around it.



Install the cockpit details while the upper half of the fuselage is being assembled a flat surface. This allows lots of room to work. The fin and rudder are installed during this stage too.

Install the completed and primed fin & rudder on the fuselage. Attach the last former, F20 that contains the tail-wheel strut, at the same time.



The tailwheel strut is a stock Goldberg nose gear strut. It is attached to the last fuselage former which overhangs the edge of the workbench.

The rudder servo is also installed in the tail at this time.

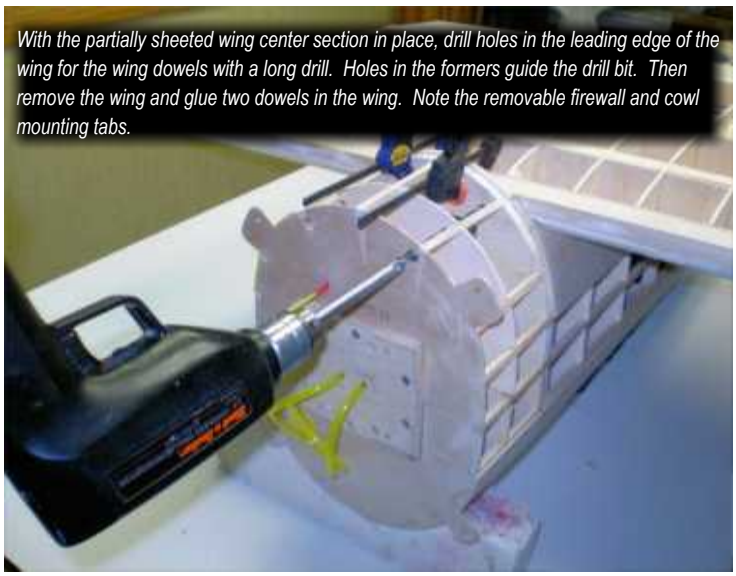
After sheeting, the fuselage is turned over and supported with Styrofoam blocks or other means. Install the elevator and rudder servo cables. Glue them in place along the crutch and away from where the receiver and its antennas will be. The fuselage is now ready to receive the tank box and lower formers.

The ply fuel tank box doubles as an engine mount. The forward end is also the firewall which is attached to the tank box with several screws. This allows access to the fuel tank from the front. The tank box position shown on the plans is for the DA 100 engine but it can be positioned forward or rearward for other engines. Measure carefully and epoxy the tank box in place with balsa gussets.

Partially sheet the lower fuselage so that it will be rigid before fitting the wing and stab. Complete the rudder, elevator and throttle servo installations at this time.

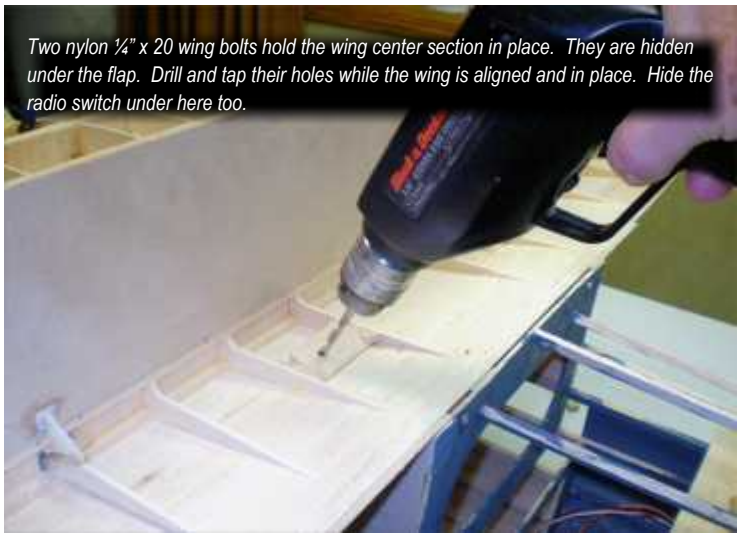
The fuselage is turned over and the tank box, lower formers and servo leads are installed. Beyond, the author's ancient Kraft transmitter rests quietly, thinking of the old days.

Fit the stab to the fuselage, measuring its incidence angle per the plans and leveling parallel to the fuselage crutch. Add internal alignment blocks to the stab. Key blocks on the stab keep it from shifting. Drill two holes thru the stab into the hardwood blocks epoxied to V3. Tap for two ¼" x 20 nylon bolts. Harden the threads with thin CA and retap. A removable stab allows Babs to fit into almost any hatchback compact car. It's easier to work on too!



With the partially sheeted wing center section in place, drill holes in the leading edge of the wing for the wing dowels with a long drill. Holes in the formers guide the drill bit. Then remove the wing and glue two dowels in the wing. Note the removable firewall and cowl mounting tabs.

Fit and install the wing saddle using the partially completed wing center section as a guide. Align and clamp the partially completed wing center section in place. Using the holes in the forward fuselage formers as a guide, drill two holes thru the wing leading edge and into the main spar's shear webs. Remove the wing and install wing dowels in the leading edge. Plug the guide holes in F1 to keep oil out of the fuselage.



Two nylon ¼" x 20 wing bolts hold the wing center section in place. They are hidden under the flap. Drill and tap their holes while the wing is aligned and in place. Hide the radio switch under here too.

Using the wing filet pattern on the plans, trace the outline of the wing filet onto the fuselage. Wet the inside surfaces of the wing filets to make them flexible. Glue in place with yellow glue and CA. Harden the filet edges with CA glue Secure with masking tape until dry.

Trace the wing filet pattern onto the fuselage. Attach the balsa sheet filets with yellow glue, moistening the inside surface if necessary to make them pliable.

The upper part of the windscreen is the only part of the canopy that requires molding. It is small enough to be done without vacuum-forming: Carve a balsa block while tack-glued in place. Then, soften some clear plastic with a heat gun and pull it over the block. Remove and trim.

Form the upper windscreen from hot plastic. Or purchase a complete windscreen from Micko Aircraft and Accessories.

If you prefer, a complete vacuum-formed windscreen is available.

Vacuum-forming is not necessary. Instead, trim clear flat plastic to shape, roughen the inside edges with a Dremel tool or stick sandpaper and glue each canopy section in place with epoxy. Hold in place with clamps, clothes pins, tape, and T-pins. Clean up smudges with alcohol & Q-tips before the epoxy sets. Fill the seams between sections with auto body filler.

All the other canopy sections are flat sheet. Glue them, one section at a time, rear to front, to the painted canopy frames with epoxy. Clean up with alcohol before the epoxy sets. Fill the seams between the sections with auto body putty.

Assemble the cowl frame from wood, or purchase a fiberglass cowl from Micko Aircraft and Accessories. Note attachment tabs and blind nuts.

Assemble the cowl frame. Blind nuts attach it to four tabs on the fuselage former F1. Cut the cowl skin slightly oversized. Pre-bend the ply cowl skin by soaking it in hot water and wrap it around the frame. When dry, epoxy it in place. Alternatively, a fiberglass cowl is available.

Fiberglass wheel pant is lighter and more scuff-resistant. Wheels are standard wheel chair wheels. 14 oz. each. Most include ball-bearings.

Oleo struts can be made using a band saw and a drill press. Patterns are on the plans. Alternatively, struts can be purchased, ready to install. Assemble either wooden or fiberglass wheel pants around the oleo struts. The entire pant moves up under load, the upper portion going into a cut-out in the wing. The spokes of a standard wheel chair wheel are covered with thin aluminum. Pants are secured by the axle, sheet metal screws to the strut, and internal wooden guide blocks. They are removable for repair if necessary. Fiberglass pants are recommended because they are lighter and sturdier.

Assemble the outer wing panel's upright over a flat surface. Cut a tapered *washout stick* per the plans. Place it under the rear portions of the ribs near the rear spar. Partially sheet the wing, leaving the wing socket areas exposed. Turn the panel over onto the other washout stick and partially sheet the lower surface. The end rib, R15, is too short for the washout stick, so it has tabs to hold it at the proper washout angle.

During this process, add the ribbed aileron skins. Cut them loose with a razor saw after the wing has been partially sheeted. Install the ailerons servos and the aileron linkage and hinge the ailerons. Sand the ailerons flush with the wing.

Washout is built into the outer wing panels during assembly. Tapered washout sticks, cut per the patterns on the plans, uniformly elevate the rear of the ribs. The end rib, R15, is too short for the washout stick, so it has its own alignment tabs.

Join the wing panels at the dihedral angle shown on the plans. Glue the wing tube sockets in place and cut thru the junction with a backless razor saw. Add shear webs and lots of epoxy.

Join the wing panels, elevated to the dihedral angle shown on the plans. Install the wing tube sockets to a loose fit. Epoxy the sockets in place. Then cut thru the sockets with a backless razor saw. Add the shear webs to the spars, contacting the sockets. The sheeting of the wing may be completed. The airplane is now ready for glass, primer and base color.

Kanji patterns appear on the plans from which paint masks can be cut or purchased. This one reads Divine Wind.

Cut paint masks from the patterns shown on the plans or purchase them from Pro Mark. Full-size markings are shown on the plans and on separate files. The author's prototype model was painted with Klass Kote epoxy.

The two small, scale exhaust pipes are cut from an Estes model rocket body tube. The larger exhaust pipe is formed by carving a balsa block to shape, covering it with three layers of 6-ounce glass cloth, sanding smooth and drilling away the balsa block. Both are painted flat black inside and copper outside. Then the bases are lightly airbrushed with thinned black to simulate oil and dirt. Gray on the ends simulates hot ash. The small exhaust pipes are glued to the lower cowl mounting tabs. The larger exhaust pipe is attached to the fuselage with two layers of double-faced foam tape, right side only. The ignition switch is mounted on the firewall above the large exhaust pipe.

三菱 朝日新聞社

Good Building & Flying!

Babs contemplates the trees at the end of the runway

For more information about this airplane visit http://www.MNBigBirds.com or contact the author directly at:

davidpandersen64@msn.com

Dummy scale exhaust pipes are painted copper on the outside, flat black inside, airbrushed black near the inner end to look like dirt and light gray at the open end to look like ash. Ignition switch nearby. Note one of four cowl mounting tabs.