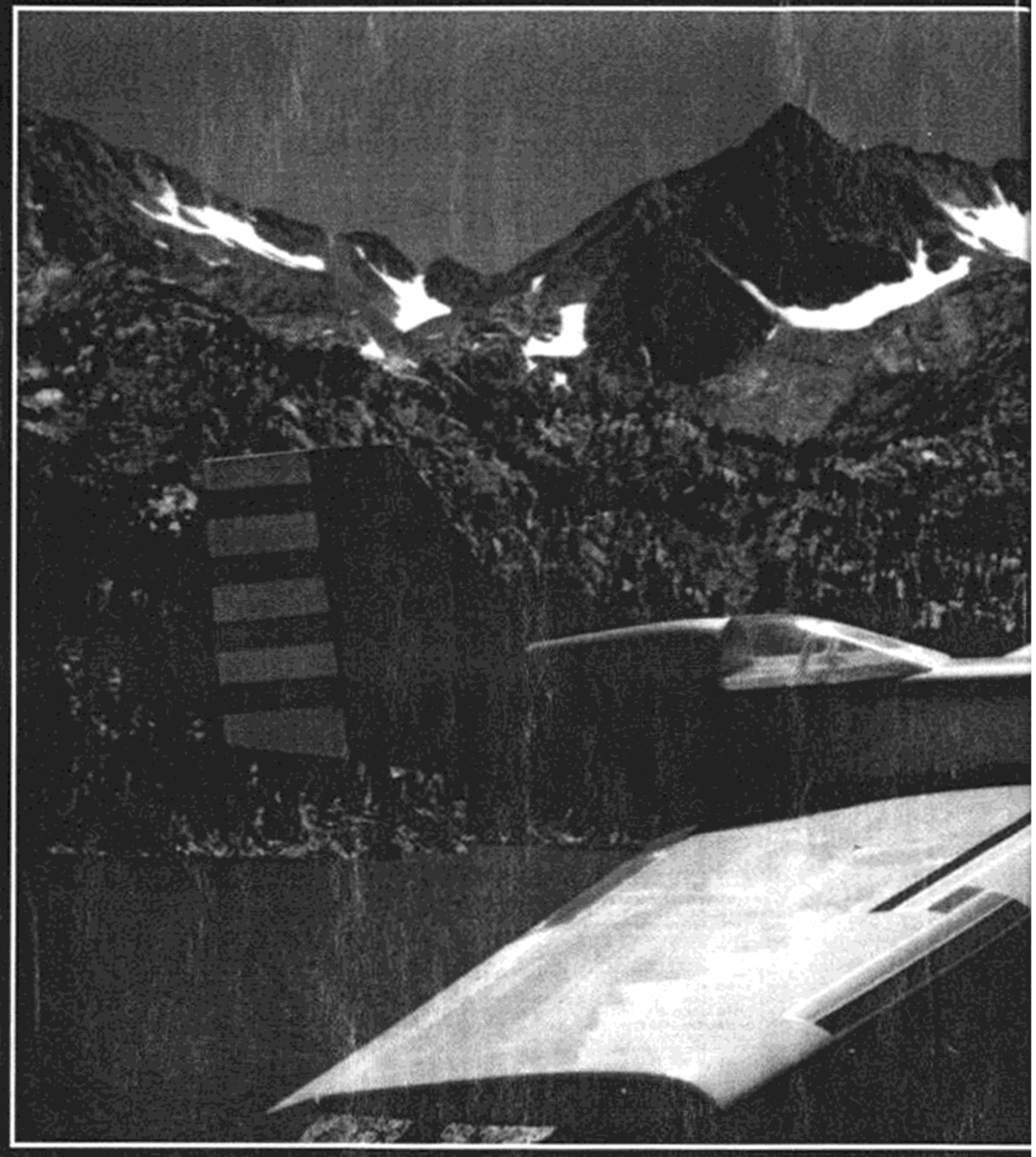
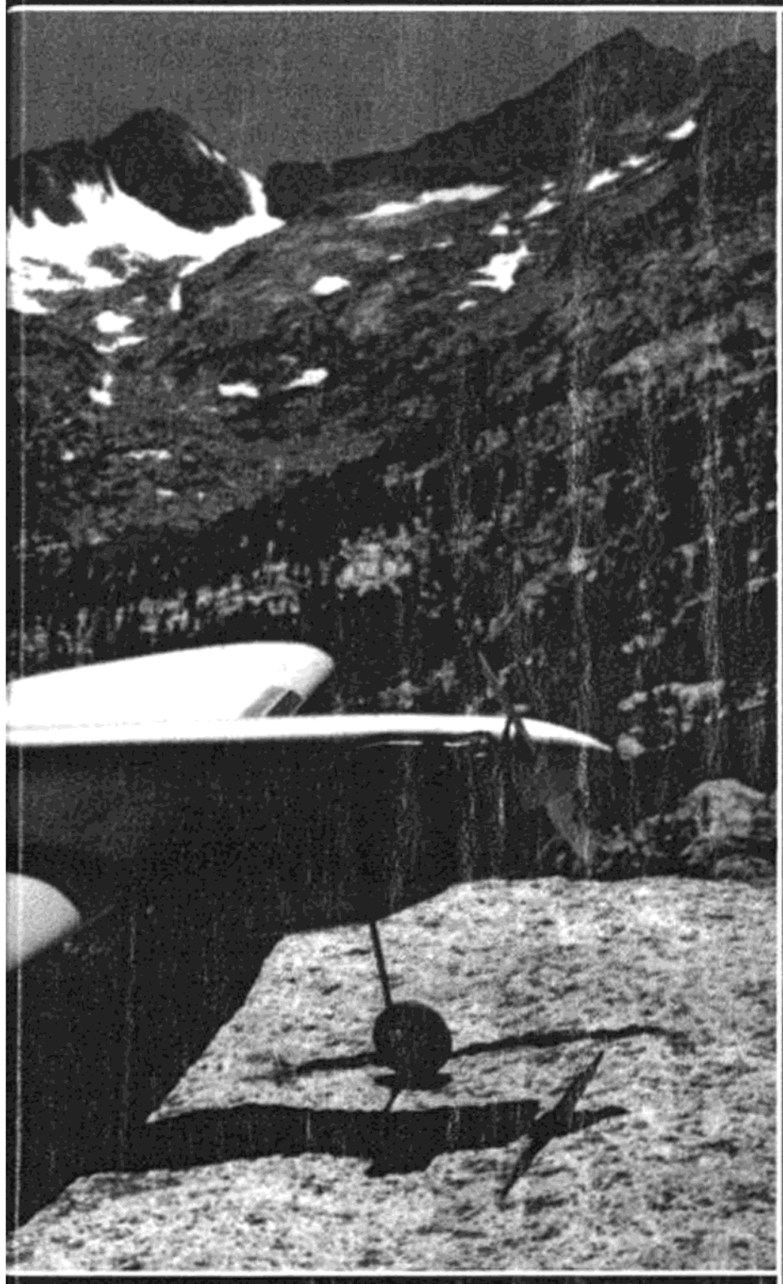
Simitar



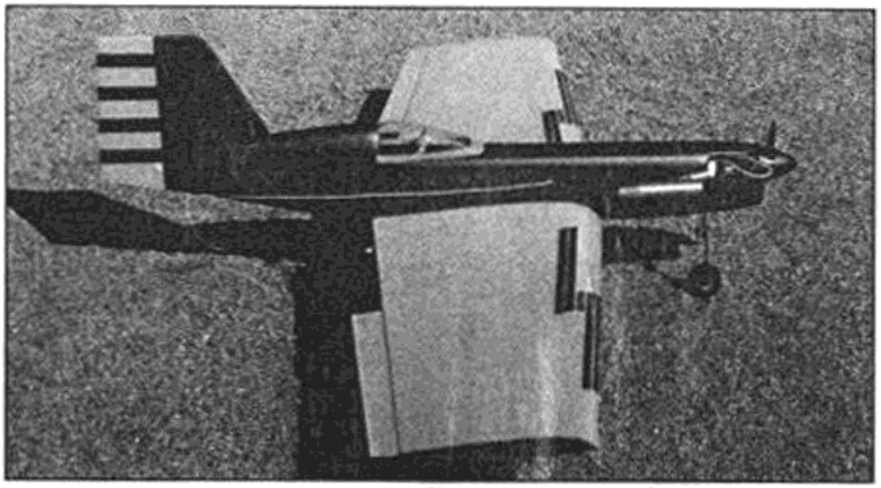
A .40-.60 Powered Simitar with the Looks of a 1930's Classic!

Classic

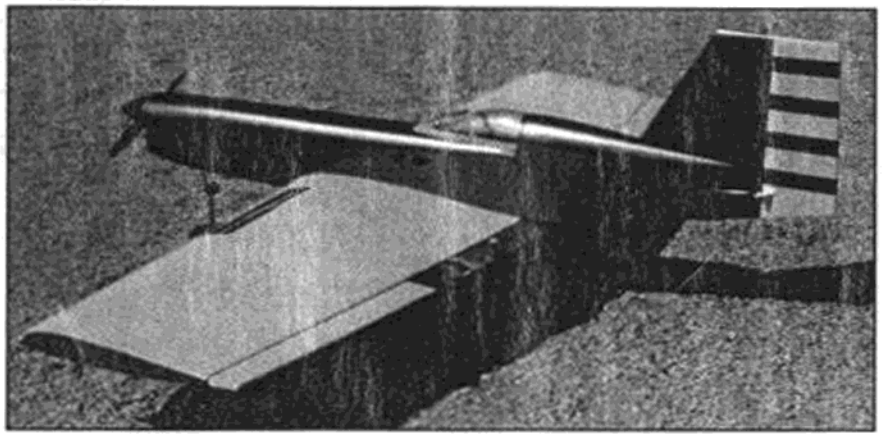


By Bill Evans

SIMITAR CLASSIC
Designed by:
Bill Evans
TYPE AIRCRAFT
Sport Flying Wing
WINGSPAN
64 In.
WING CHORD
14 In. (Avg.)
TOTAL WING AREA
880 Sq. In.
WING LOCATION
Bottom of Fuselage
AIRFOIL
ESA (Evans Simitar Airfoil)
WING PLANFORM
Tapered Wing
DIHEDRAL, EACH TIP
1/2 Inches
OVERALL FUSELAGE LENGTH
43 Inches
RADIO COMPARTMENT SIZE
(L) 14" x (W) 2-1/2" x (H) 2-1/2"
STABILIZER SPAN
N/A
STABILIZER CHORD (inc. elev.)
N/A
STABILIZER AREA
N/A
STAB AIRFOIL SECTION
N/A
STABILIZER LOCATION
N/A
VERTICAL FIN HEIGHT
10 Inches
VERTICAL FIN WIDTH (inc. rud.)
9 Inches (Avg.)
REC. ENGINE SIZE
.40-.60
FUEL TANK SIZE
6-10 Oz.
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Throt.; Elevons, Nosewheel.
C.G. (from L.E.)
1-1/2 Inches
ELEVON THROWS
3/8"-1/2" Up – 3/8"-1/2" Down
RUDDER THROWS
1/2" Left – 1/2" Right
SIDETHRUST
0°
DOWNTHRUST/UPTHRUST
0°
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply Wing
Balsa, Ply & Foam Core
Empennage ..... Balsa
Wt. Ready To Fly .... 72 Oz. (4 Lbs. 8 Oz.)
Wing Loading ..... 12 Oz./Sq. Ft.



Author with new Simitar Classic, High Sierra mountains in background.



Often I am asked how I come up with ideas for a particular design in the Simitar series of model airplanes. Most of the time it is in hangar flying sessions with my friends in the hobby where someone says something that triggers an idea. A typical example of this was the Simitar Slo Motion which came from a request by Bill Winter for a slow flying Simitar.

The Classic, however, was the result of my sitting in my shop, wool gathering and reminiscing. I looked at the array of designs hanging above me and decided that I wanted one with more Classic lines of the aircraft of the late 1930's and early 1940's. These were low wing, single place with streamlining and a "turtleback" fairing into the vertical fin. Some had air cooled radial engines and others had liquid cooled Vees or in-lines. I opted for the liquid cooled type as it is better suited to the 2-stroke model engines. Also, although the full-sized aircraft of the era were all taildraggers, I chose to fit the Classic with tricycle gear because most R/C modelers find it easier to handle during take-off and taxi. So, now you know the genesis of the Simitar Classic. As to power, the ship will fly well with 40 to 60 size 2-strokes, but my preference is the K&B 48.

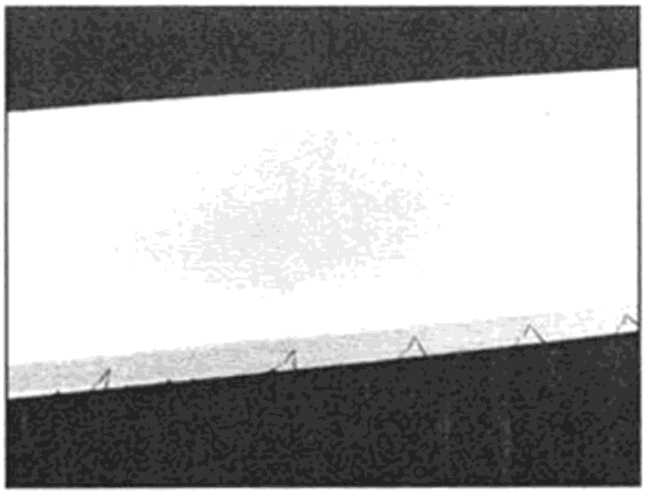
The Classic performs like all other Simitars, with aerodynamic stability over a wide speed range, no tip stall and full aerobatic capability. It will fly slow and easy for the beginner, yet it will rip at full power. Trim it out, come back on throttle and put it in a gentle turn, let go of the controls and it will continue to do 360s until you give it another command. This is a handy feature to give you time to get over the "white knuckles." We have flown the Classic in 40+ mph winds; it will hover, fly backwards, and land or take off vertically.

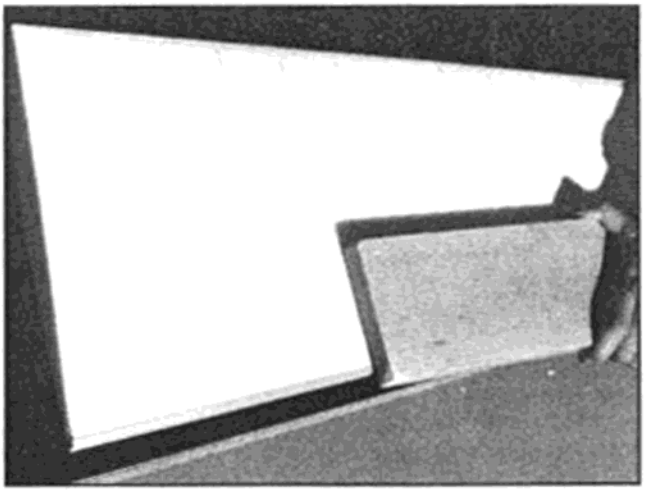
Enough of this hype. Now you want to build your Simitar Classic.

CONSTRUCTION

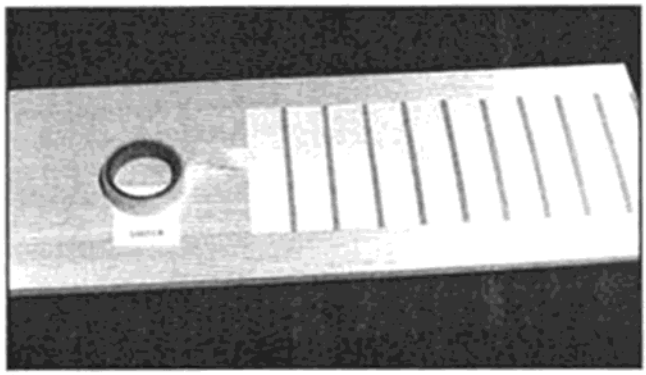
Wing:

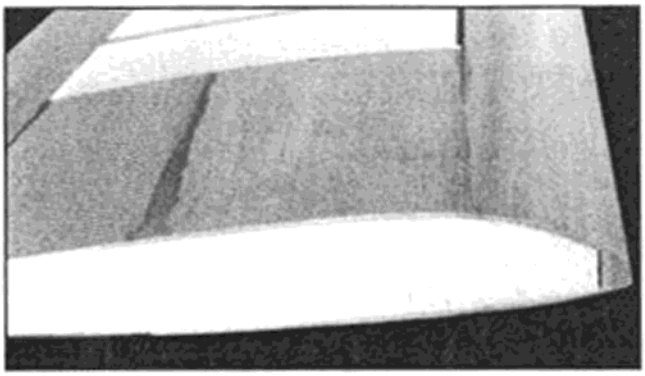
For those who do not cut foam, you may order cores for the Classic from Soaring Research, 454 Wildrose Lane, Bishop, CA 93514, (760) 873-4932. Cost of wing cores is $22.00 plus $8.00 for shipping. Make sure the wing panels are flat and straight; use weights with the core on a flat surface if necessary. Cement the 1/4" leading



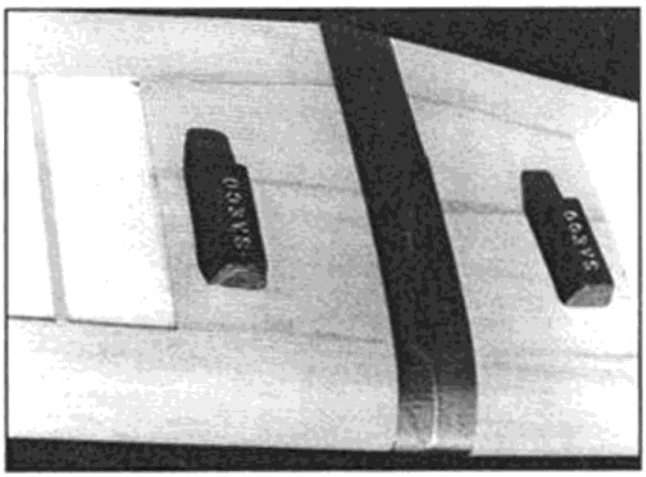


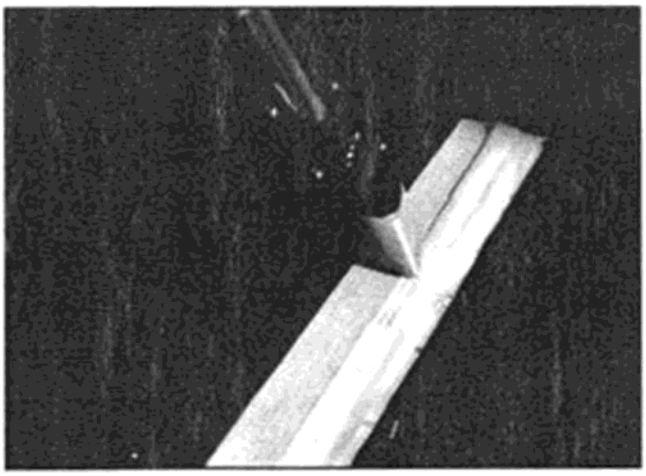
LEFT: Leading edge undercap and trailing edge spar glued and pinned to core. RIGHT: Trim and sand LE undercap and TE spar to fit foam contour prior to sheeting with 1/16" balsa.





LEFT: We used Corefilm to apply the 1/16" balsa sheet to the cores. RIGHT: Wing sheeted showing undercap and LE cap, ready to join wing with epoxy.



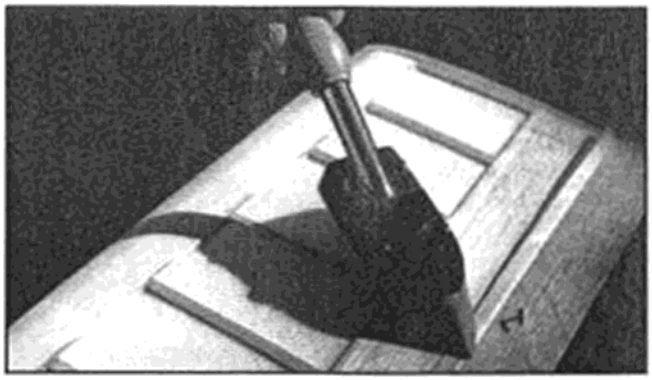


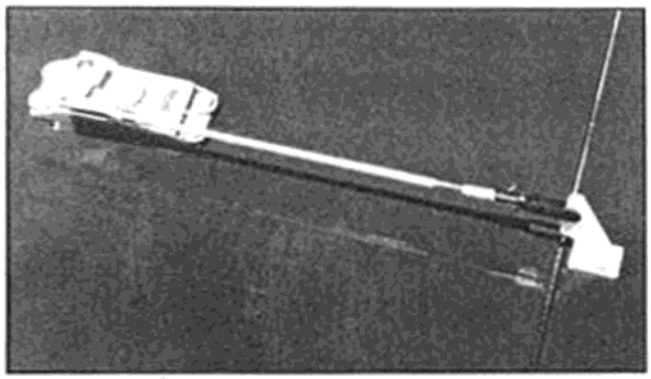
LEFT: Wing panels being joined, we used 5-minute epoxy. RIGHT: Ironing X-Hinge onto elevon prior to attaching elevon to wing.

edge undercaps to the leading edges and the 1/4" balsa trailing edge spars to the trailing edges. Use CA-UFO or carpenters glue (do not use regular CA on foam) set these aside to dry.

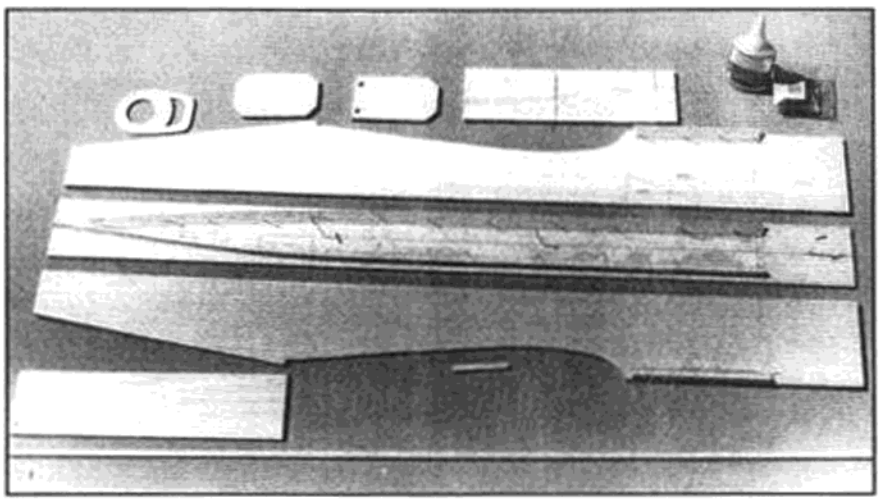
Fuselage:

Cut out the fuselage pieces; place and pin fuselage top piece on flat work surface. Place fuselage sides along side and mark the location of the firewall and bulkhead on the fuselage top and sides. Pin the 1/2" triangle longerons in place 1/4" in from edge (use fuselage side as guide). Curve these longerons from a 3" fuselage width at wing/elevon hinge location to centerline of fuselage at tail end. Glue these in place by applying thin CA to the inside edge of the longerons (the CA will run under the longerons). Pin fuselage side to fuselage top; pin firewall and former in place against top and side; CA side to top, firewall, and former. Be sure to curve side to center at rear end. Pin second side in position; CA into place. Pin and CA 1/2" triangle bottom longerons into place against fuselage sides. Pin and CA 1/4" sq. strips around back side of firewall. Sand bottom edges of fuselage sides flush with bottom longerons. Pin and CA the front fuselage bottom into place. Pin and CA 1/4" balsa fuselage bottom rear into place. Pin and CA the turtleback block into place. The fuselage construction is now complete. Shape the turtleback and the nose, round the fuselage corners as shown on the plan, and apply sandpaper as needed.



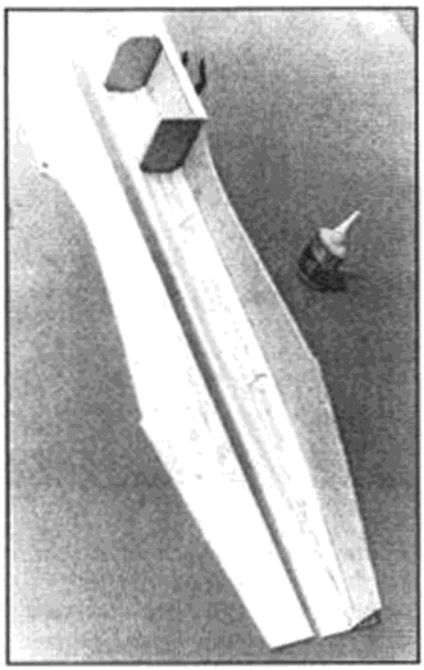


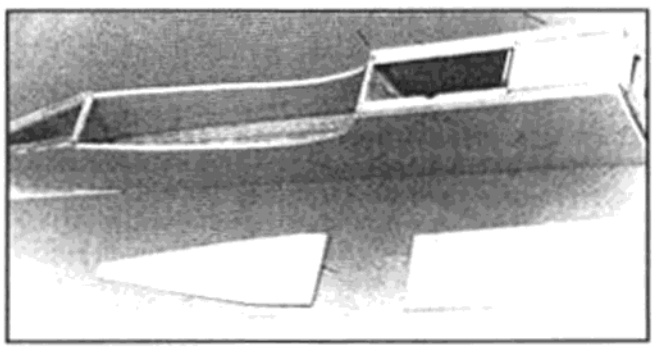
LEFT: Joining elevons to wing, we used X-Hinge. RIGHT: When using a radio with elevon mixing, we mount the servo to the bottom of the wing. Note 4-40 rod and steel links.

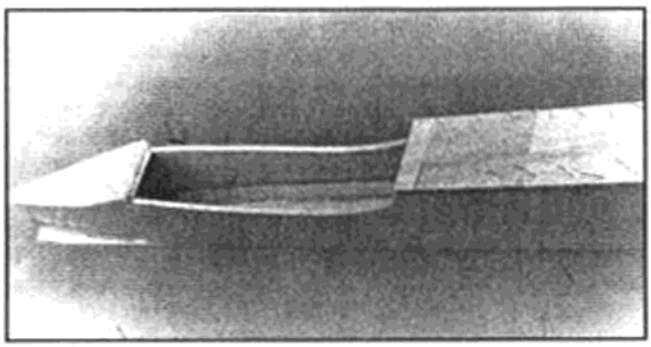


ABOVE: Fuselage top pinned down with top longerons glued in place. Parts ready to assemble

RIGHT: Left side up with firewall and wing former, all glued in place.







LEFT: Both sides up, bottom longerons in place, nose plate in place and glued. RIGHT: Fuselage bottom pieces glued in place, ready to add the turtledeck, trim, shape and final sand.

Back To the Wing:

Plane and sand the 1/4" leading edge undercaps and trailing edge spars so that the sheeting will fit over them. Do not sand any of the core away. Sheet the wings. We have used Corefilm to apply the 1/16" balsa sheeting to the leading edges, trailing edges, and center section. Now, sand the leading edge sheeting flush to the undercap and then pin and cement the 1/4" x 1" leading edge cap to the leading edge. Apply the 1/16" x 1/4" capstrips on 2" centers from the end of the inboard sheeting to the tip of the wing.

Shape and sand the leading edge. Note: the leading edge bottom is nearly flat and the leading edge top curve is fairly steep. Do not round the leading edge, a max radius of 1/16" is desirable. Apply wingtips, then carve and sand them to airfoil shape. Finish sand both wing panels. Join the wing panels using 5-minute epoxy. Fit the elevons to the wing. We used X-Hinge to attach the elevons to our wing. (Note: If you intend to use mechanical elevon mixing, form and install elevon control rods before you attach elevons.) Cut and cement end grain balsa into wing at the bolt location to eliminate crushing of wing when the bolts are tightened. Fit the 1/4" plywood wing plate into the leading edge of the wing at the center section. Set the wing and wing plate into place on the fuselage and check for fit before gluing the wing plate to the wing. Now, using waxed or greased temporary 1/4" dowels, set the

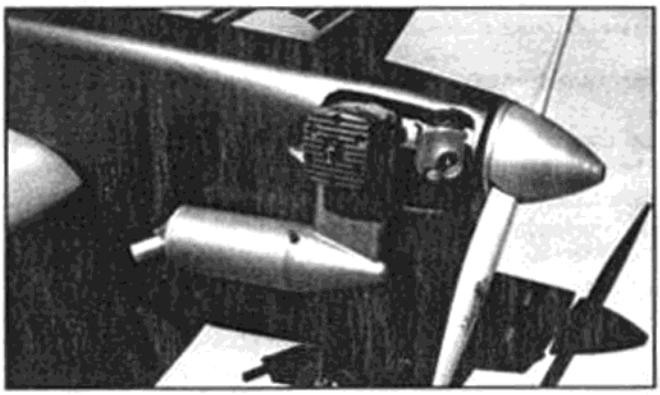
wing and plate into place, align them, and glue the plate to the wing with 5-minute epoxy. Place hardwood gear blocks at correct location on bottom of wing, mark the area and remove sheeting and foam so that the blocks are flush with the sheeted bottom wing surface. Glue these in place using 5-minute epoxy. Now, sand and cover wing. (Note: If you are going to use electronic elevon mixing, install the 1/8" plywood servo plates flush with bottom surface of wing, and dig out foam for the servo pocket prior to covering wing bottom.)

Complete and sand vertical fin (and rudder if desired for aerobatics). If you are using a rudder, install the hinges (we use X-Hinge), sand, and then cover all of the airframe components. When covering is completed, epoxy vertical fin to fuselage.

For those new to the concept of the Simitar Series, an explanation of the control surface function and component installation will be helpful. First, a Simitar requires only pitch (elevator) and roll (aileron) functions for perfect flight. Except for pattern flying, a rudder is not required. Simitar control surfaces are known as elevons which serve as both ailerons and elevators. In essence, consider the control surfaces as full strip ailerons which counteractuate to provide aileron control and also actuate simultaneously to provide elevator control. This means that some form of mixing is needed. Such mixing can be provided by either mechanical or electronic means.

The best mechanical method is to use my sliding tray, which works as follows. One of the servos in the tray is set up as you would for strip ailerons. The second servo is for elevator and its control arm is attached to the stationary bulkhead at the front of the tray so that it will slide the tray fore and aft to give the elevator function.

Electronic mixing can be provided by either a radio with built-in mixing or



LEFT: New K&B 48, swings an 11 x 7 like a 60, great choice for the Classic. RIGHT: Bob Akin of Bishop, California, showing the bottom of his U.S. Army marked Classic.

by using Ace's Christy Mixer or the Quillan Mixer which plug in-between the servos and the receiver. Both mixers work very well and are in the $25.00 to $45.00 price range. Alternatively, most of the newer radio systems have built-in elevon mixing or flaperon mixing functions. I have used several of the Futabas in this line, such as the 6VA, 7NFK, 7UAF, 7UAFS, 7UAP and 9VP.

Sliding Tray Mixer: Control Set-Up

The sliding tray fore and aft formers are of 1/4" ply. Drill the 1/8" holes for the dowel through both formers at the same time, this will make the holes parallel. Cut the 1/8" ply tray to fit both aileron and elevator servos. Push the dowels into one of the formers, then slide the red outer NyRod over each dowel, and push the other former onto the dowels. Cement the tray in place onto the NyRods (be careful not to get cement inside the NyRods), then install the servos as shown.

Electronic Mixer: Control Set-Up

Use 1/8" ply trays to mount servos into wing; epoxy the trays flush on bottom of wing after sheeting. Grind a hole in the top center of the wing and use a piece of piano wire with a hook bent on one end to tunnel out for each servo lead. The lead is then easily fished through with a piece of string.

Final Assembly:

Install the landing gear, engine, fuel tank, and all the radio components. Hook up all the controls and check to make sure there is no binding. Check to make sure your aircraft balances (level to slightly nose down) at the C.G. location indicated on the plans (approximately 1-1/2" behind the leading edge of the wing, with no fuel in the tank).

Control Set-Up:

I put in as much as I can get, then use what I need (3/8" to 1/2" of up, down, left and right is fine). Remember, control is not like a light switch (on or off), it's like a dimmer switch, use only as much pressure on the stick as you need to make it do what you want!

Set the nose wheel height so that, while setting on a flat surface, the leading edge of the wing is 1/4" higher than the trailing edge (measured at the hinge line). Also, set the trailing edge of the elevons 1/8" up with the transmitter trim at neutral. Check all surfaces for proper motion (remember left aileron command results in the left elevon going up and the right going down; and the up elevator command results in both elevons going up).

Flying:

Ah yes, flight performance of the Classic is very smooth and graceful and gives the feeling that it's an extension of yourself in the air, and are very responsive to the controls. Are the thumbs quicker than the eye? Bill Winter said to me, "Why does my Simitar do what I want it to before I tell it to? Does it read my mind?"

Remember, be safe, be courteous to other fliers, have fun! And tight turns!

Reference Material

For more information about the development of the Simitar Series, refer to the following listing in R/C Modeler magazine:

July '98, Simitar Advantage (.40-.60 power, 1930's Nostalgia with Advantage of Simitar performance).
March '96, Wiseguy (21st Century Simitar series for .25-.60 power) February '95, Zipity-do-dah (64" Fun Ship 28-40);
March '91, Pole Star (50" Jet Looker 40-60);
January '90, Leading Edge (twin fin 40 powered Jet Look);
March '88, Desperado Sixty (60 anhedral rocket), Desperado 3000 (85", 17 lb., S.T. 3000 powered).
August '86, Tracer 40 & 60 (pattern ships);
March '85, Skywalker 1/2A, 40 & 60;
November '79, Astron 40 (X-Wing fighter);
October '79, Simitar 540 (50", 40 power);
December '76, Simitar (1/2A, the first Simitar);
April '76, Saracen (72" glider, Bill's first flying wing).