



builders.

There were a few changes that I initiated on this ship which were a departure from the plans. These were not really necessary and nothing the average modeler couldn't do himself. One was to incorporate the newest Du-Bro flaperon hardware to achieve the flaperons that are used on the full scale Hiperbiplane. This change eliminates the bellcrank system and uses torque rods for aileron control. The second was to change the windshield pattern outline. The plans do not show the newest windshield pattern, but if anyone would like it, simply drop a line to me and I'll be more than happy to pass it along.

Many modelers may wish to use foam core wings in place of the built-up construction. Being that the full scale ship had fully sheeted wings, this will be fully acceptable but bear in mind that there will be a slight penalty to pay in weight. The built-up construction used is light and very strong. One of my faults is to "overkill" on construction, especially the built-up type. Foam cores will be made available to those modelers who so desire them. The price is \$9.50 which includes postage. Order them in care of Master Kit.

Remember, before you actually start building, it is easy to put on weight (especially the finish) but very hard to take it off. Try to use as little epoxy as possible and wipe all joints to remove excess glues. The best weight for this ship is 5.25-5.5 lbs.

BUILDING THAT BIPE

By Frank Massa

My fascination with the Hiperbiplane began when I first spotted it on the cover of *Sport Flying Magazine*, Vol. 10, No. 1, Spring 1976. The cover of this magazine had a very attractive view of this most unusual biplane performing seemingly effortless knife-edge flight. It was quite an impressive photo and very much characterized the hearty insatiable aerobic appetite of this out-of-the-ordinary negative stagger wing ship. As the article was carefully read and re-read, a realization emerged that the magazine's editorial staff was highly impressed with this homebuilt. Not only was the article comprehensive but complete with extensive photos and three views.

From some angles the Hiperbiplane is most unpleasing and could be considered . . . "ug-a-lee." However, from others it is unusual, and from a preferred few there can be no equal to its beauty. After one looks at this short coupled, wide bodied, two winged wonder for any length of time, many of the seemingly unpleasant views disappear. (This is due to the phenomenon called angular selection.) It is then that the true functionality of the aircraft's design becomes increasingly apparent.

The Sorrell family, who originated the Hiperbiplane, did extensive design research along with trial and error building of several biplanes to arrive at the Hiper's final configuration. The SNS6 (Sorrell Negative Stagger 6th version) is the culminating result of all their hard work and devotion to achieving one of the most classy, aerobic, daringly different designed homebuilts to date.

From actual air show spectator comments and written magazine coverage of the air show circuit, one would have to agree that Mark Sorrell (air show pilot of SNS6) does such wondrous maneuvers with the Hiperbiplane that the performance leaves the crowds awe-struck and in absolute amazement at the ship's aerobic capabilities.

The more one looks at this "chubby-



N774HB and N18RS showing detail of color designs. Taken at Branchard Field, Hartford, Connecticut.



stubby" the more one has the feeling that the ship started out as an abandoned wing of which a slice was taken at the thickest airfoiled section. As an afterthought, the wings were added for stability. Actually, this idea is not so farfetched, for the original design was that of an airfoiled fuselage that had the windshield extended to the spinner to achieve this airfoiled shape. Due to engine heat and the hot sun on all that expanse of plexiglass the present windshield shape was arrived at. All in all, the design is very successful and it was this success that inspired me to immortalize this very attractive ship in model form. Beauty is in the eye of the beholder and, to me, this ship is pure in aesthetics and aerodynamics.

I had been searching for a "sport scale" subject and wanted one that would be unique yet allow conventional building techniques at the same time. This ship certainly fits that bill. Some basic design considerations were foremost to me and these were initiated in the actual model construction. As a first step, the parameters were established and then the plans were drawn as close to these as a built-up model would allow. The following are the guidelines that the model centered around: (1)

Engines—.40-.45, (2) Weight—4 1/2-5 1/2 lbs., (3) Construction—basic and straight forward for the average modeler, (4) Wing alignments—consistent each time the wings were bolted on, (5) As accurate an outline as possible would be maintained without sacrifice to structural integrity, (6) Documentation and three views had to be easily obtainable, (7) Ample radio space, (8) Wing loading of 18 oz. sq./ft. at 4.5 lbs.

A prototype was built and many fine points were learned about the aerodynamics of the negative stagger biplane configuration. The resultant plans represent the correct incidences, moments and construction needed for exacting aerobic flight.

Several models later I came across photos in *Popular Mechanics*, January '78, of a full-size Hiperbiplane built by Ray Stephen of California which had an unusual and most eye-catching paint scheme. It almost bordered on being gaudy . . . I loved it! Some of the photos reflect my attempt at duplicating this unusually painted Hiperbiplane. As a point of information, I found out that this was the first full scale Hiperbiplane completed from the Sorrells' kit offering to the E.A.A. home-

flying weight.

On to the construction.

Pre-cut all pieces to make a semi-kit. This facilitates construction and familiarizes one with all the parts.

BOTTOM WING

The wings of a biplane are by nature more of a chore to build by the very fact that there are two of them. The bottom wing being more difficult of the two should be built first. The wing is built in three sections and then butt-joined.

Center Box—Pre-glue the four 3/16-in. ribs. (2) Place the 3/16x1/4x7-in. spar on the plans (cover the plans with wax paper first) and place the pre-glued ribs over them. (3) Shim the back of the wide ribs and the two center ribs so that they are level, when satisfied glue them into position. (4) Glue the top front and top rear spars to the ribs. Note that the rear spars are 1/8x1/4-in. stock. (5) Glue the leading and trailing edge into place. (6) Next the webbing is glued into place. (7) Glue the leading edge sheeting into place (1/16x7) after sanding the leading edge and trailing edge to shape (box is still pinned to the building board). (8) Add the rest of the top bay sheeting. (9) Add the trailing edge at this time. (10) Remove the hold-down pins and proceed to sand the bottom leading and trailing edges. (11) Glue all the 1/16-in. bottom wing sheeting in place at this time. (12) Drill 3/16-in. holes for the dowels and fit them into place but do not glue at this time.

Left half—(1) Pin the 3/16x1/4-in. spar to the plan sheet (bottom spar). Place the ribs and mark the locations. Cut the 1/8-in. rib to accommodate the tongue of the wing strut before gluing. (2) Pre-glue the ribs where the interplane strut will slip into. (3) Glue ribs into place except the rib that will butt to the center box. This rib is only tac-glued till assembly with the center box. (Make sure the ribs are raised at the trailing edge to be level.) (4) Glue the top

front and top rear spars at this time. (5) Glue the leading and trailing edges into position; when dry, sand to shape. (6) Glue the webbing into place except for the innermost bay where the tac-glued rib is. This webbing will be inserted after the proper dihedral is set. (7) Cut the trailing edge sheeting from the 1/16x3x17 1/4-in. stock and use the remainder for the leading edge. When cut, glue into place. (8) Remove this half from the board and proceed to sheet the bottom in the same manner as the top. (9) Carefully pin the center section level on the board. Establish the correct height for dihedral and remove the tac-glued rib. With a sanding block, carefully sand till the spars of the left half meet the center box's spars with the correct dihedral. (10) When satisfied with the dihedral, liberally apply glue to the loose rib and insert it in the wing, and at the same time glue the left half to the center box. (11) Add capstrips. (12) Epoxy the bellcrank mounting plate into position, noting that it is quite low in the bay. (13) Add the webbing to this bay before final gluing of the bellcrank plate. (14) Glue the wing tips on and carve to shape. Note the shape from the plans. Be careful. Only take off a small amount at a time till the desired shape is established. You will note that the curve is formed by a straight line progressively going from a near vertical at the leading edge to a near horizontal at the trailing edge.

Right Half—Follow the same procedure as the left half. (2) Insert the 1/16 diameter music wire for the bellcranks. (3) Position the bellcranks noting that the throw is cut down. When satisfied that all is working free, glue the bay sheeting into position.

Ailerons—Fit the ailerons. There should be 3/16-in. travel each way on the throw. Remove the ailerons till after glassing.

Glassing—Remove the 3/16-in. dowels before glassing. It makes it much easier. Use no less than 4-oz. cloth and if the cloth weave becomes broken during sanding add another piece and feather it in. The wings' center sections must be glassed at the butt joints. Upon completion of the glassing, install the dowels and give them a coat of resin for fuel-proofing.

TOP WING

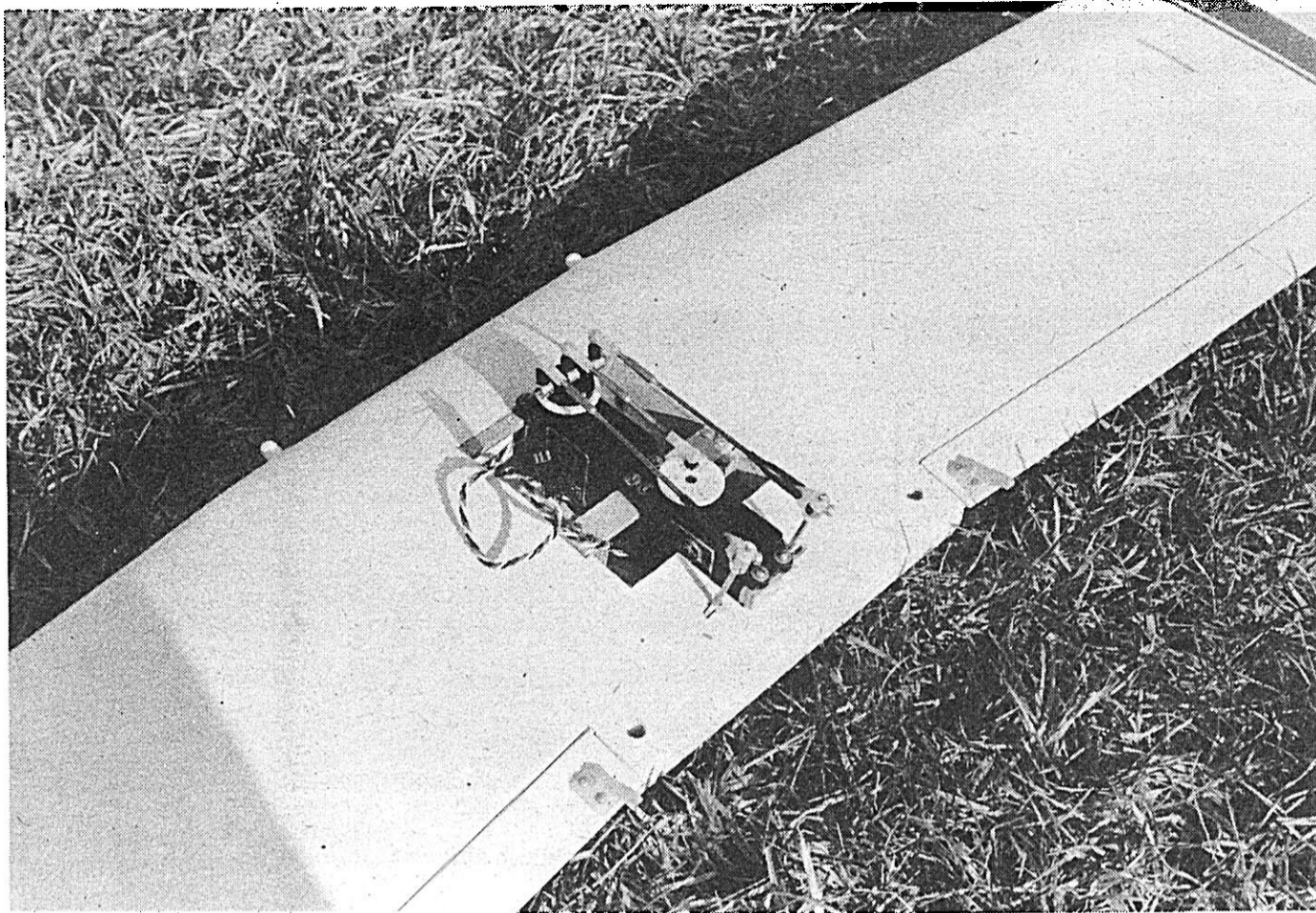
The top wing is built in the same way as the bottom except that there is no sweep and no dihedral. If you prefer, use the spar full length without cutting it except for a scarf joint which will come at the last bay where there is little strength required. The only exception to the building of the top wing will be the following: The thick ribs (built-up) are trimmed slightly before the gluing of the 1/8-in. plywood at the center box, and before the sheeting goes on, the 1/8-in. plywood center brace must be cut into the ribs behind the webbing. This wing must also be glassed. Please note that the 1/8-in. ribs where the interplane struts plug into should be notched on the bottom to accept the strut. Note: Pin all hinges and, prior to installation, scuff them with #80 paper. Use epoxy for gluing. Center fairing is epoxied to the bottom wing's center box upon completion of the fuselage.

HORIZONTAL STABILIZER

Pre-glue the pieces that make up the stab. The use of epoxy is recommended here because it minimizes warping. Use it carefully being sure not to use too much. Upon gluing, press flat till dry and wipe all seams and joints. Round off all edges and bring the elevator and HS4 to a point. The elevator throw should be 3/8-in. each way.

VERTICAL STABILIZER

Pre-glue the pieces and proceed to build up the stab with the indicated lumber sizes. Round off the leading edges and sand the trailing edges to shape. The sub-fin



Servo installation showing aileron and flaperon with MRC servos and Du-Bro flaperon hardware. Lone star aerobatic cap

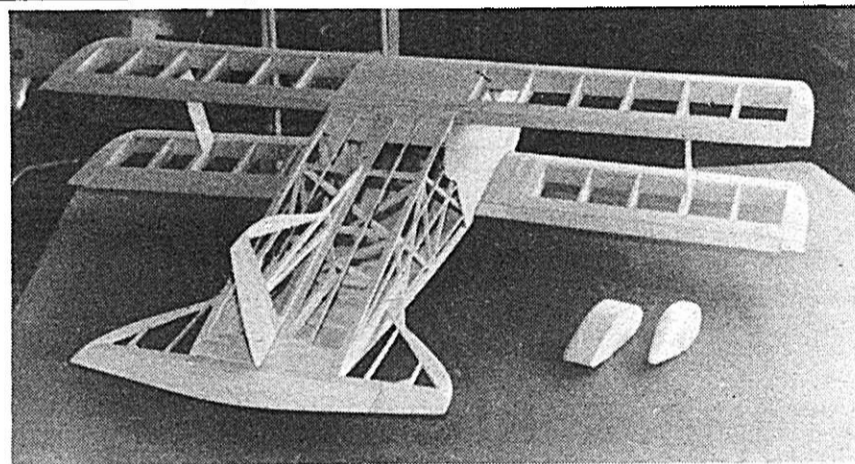
does not move with the rudder.

FUSELAGE

(1) Carefully build the fuselage framework over the plans. When dry build another set on top of the first separating the two halves with wax paper. (2) Add the bottom 1/4-in. wing saddle to each half. (3) Trace the cabin outline on a piece of paper and proceed to trace that outline on three 1/8-in. sheets. The cabin sheeting covers the landing gear place and the saddle blocks which are placed into position upon the drying of the cabin sheeting (pre-glue the cabin sheeting). (4) Glue the framework to the plywood pieces at this time. The two cross pieces at the tail are planed to the fuselage shape. Add all cross pieces. (7) Add the fuselage bottom sheeting at this time. (8) Fit the bottom wing and upon the satisfaction of proper wing incidence, drill and tap holes for the hold-down bolts. (9) The bottom fairing can now be glued to the bottom wing box. (10) Add the landing gear plate and upon the installation of the gear, cover the plate with 5/16-in. sheet. Do not sand this sheet till the cowl is made and fitted. (11) Add the 1/4-in. dash sheets (three pieces). (12) Add the 1/8-in. stringers to the sides and top. (13) Install the horizontal stab and vertical stab at this time. Check for proper alignments. Recheck for proper alignments. (14) Establish the proper incidence of the top wing and install bolts by drilling and tapping the 1/4x20 bolt holes. If shimming is necessary, Sig Epoxolite is a good way of doing it. (15) Add F3 at this time fitting it to the indentation of the top wing's center box. Glue 1/4-in. plywood braces and dowels to F3 and add the windshield contour strip in the center. (16) Remove the top wing and carefully fit the windshield. Note the small piece of material at the top of the windshield at the top of F3. This is an added gluing surface. Use Hot Stuff or Eastman 910 to hold the acetate in place and then run a bead of epoxy around the windshield. Place pinholes all along the edges of acetate to help adhere the epoxy.

WHEELPANTS

Shape the pants from balsa and ply as



Rearview of the frame. Note before and after landing gear fairing.

shown, or send for the ABS pants offered by Master Kit at \$5.98 a pair. It is recommended they be glassed with 3/4-oz. cloth (two layers) and K&B resin. Use Fox wheel collars to fasten them to the gear.

LANDING GEAR FAIRING

Fasten with silicone seal or similar material after shaping from 1/4-in. material.

Cowl—The built-up balsa cowl can be fiberglassed with 4-oz. cloth and then the balsa hogged out. Use Goldberg brackets or a similar type for attachment. A fiberglass cowl is available from Master Kit at \$12.95.

Covering—The prototype was mono-coated and weighed 4 lbs. 3/4 oz. If other coverings are used that require painting keep the primer coat light.

Engine—The prototype used an OS Max .40 FSR and it had plenty of power. It was very dependable and possessed excellent idle. A 10/6 propeller was used.

Radio—I used the new MRC 775 and found it to be responsive, very reliable, and it had the servo power I liked. We would recommend it to all sport and scale contest oriented flyers.

Scale accessories such as the spinner and wheels are standard store bought items. The plans list them and we have found them to be as near scale as possible. Three views and photos can be had from Sorrell

Aviation. See the references for their address.

Trim—The full size Hiperbipes to date have used Randolph Buterate Dope paints. Sorrell's was Datona White and Montego Green. Ray Stephen's was Pontiac red, Creme Yellow, Ocala Orange, white and Dakota Black. Top and side windows were simulated with black Monocoat Trimcoat. The decals that are available from Master Kit are for Sorrell's original paint scheme. Flying wires can be simulated with elastic thread found in most fabric stores.

Flying—The Hiperbipe flies like no other biplane in its category. It is fully aerobatic, grooves beautifully and will do any maneuver that you can concoct . . . and then some. It is a pattern oriented type ship and landings may require a bit of power. This can be overcome by using the Du-Bro Flaperon hardware, torque rod system, and keeping the model to the weight limits mentioned earlier. Takeoff requires a little right rudder. Elevator is held slightly up till takeoff speed is achieved, then neutralized. After the tail raises off the runway and the elevator neutralizes, a slight up elevator will produce a beautiful lift-off. Do not "horse" it off, for it will snap with insufficient air-speed. It was designed for the most exacting pattern and scale flyers. Once the ship is flown and its unique characteristics experienced, you won't find its equal. Knife

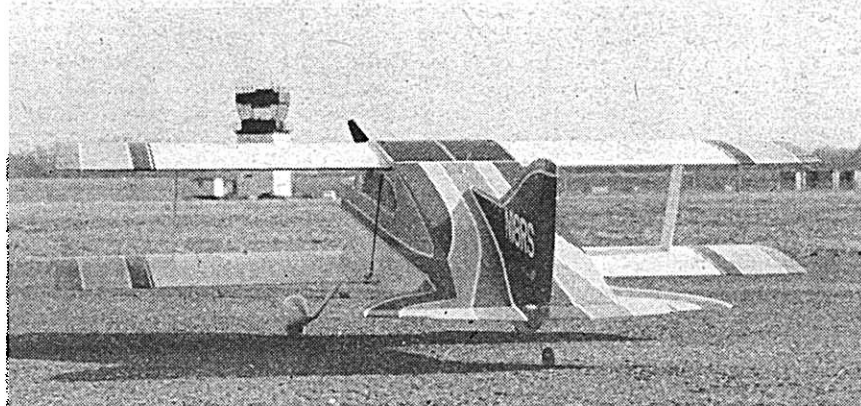


edge is a simple matter of rolling it on its side and then maybe feeding a little bit of rudder. Point rolls are absolutely beautiful and crisp. It will track and groove as though on a tightwire. Crosswind takeoffs are no real problem if the tail is kept on the ground as long as possible while awaiting

"It will track and groove as though on a tight wire."

correct lift-off speed. The design is so unusual that loops will thrill even the most uninterested parties around.

Master Kit offers the kit to modelers along with the optional fiberglass cowl and decals. ABS wheel pants and decals are in-



Three views of an ugly duckling. Ugly? Well . . . "One man's ceiling is another man's floor!"

cluded in their kit. Write them for prices.

If you have any questions about the building of the Hiperbiplane, I would be more than happy to answer them for you. However, please be quite specific in nature. Greatfly! Frank Massa, c/o Master Kits-RCS, 6 Fox Rd., Plainville, CT 06062.

"If you have any questions . . . I would be . . . happy to answer them."

References:

Sport Flying, Vol. 10, No. 1, Spring 1976. *Sport Aviation*, March 1977. Sorrell Aviation, Rt. 1, Box 660, Tenino, WA 98589. (Photo package and large three views available.)



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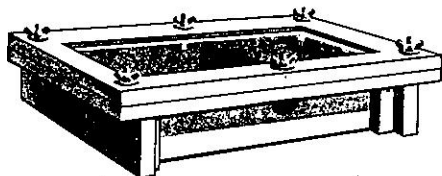
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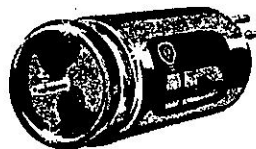
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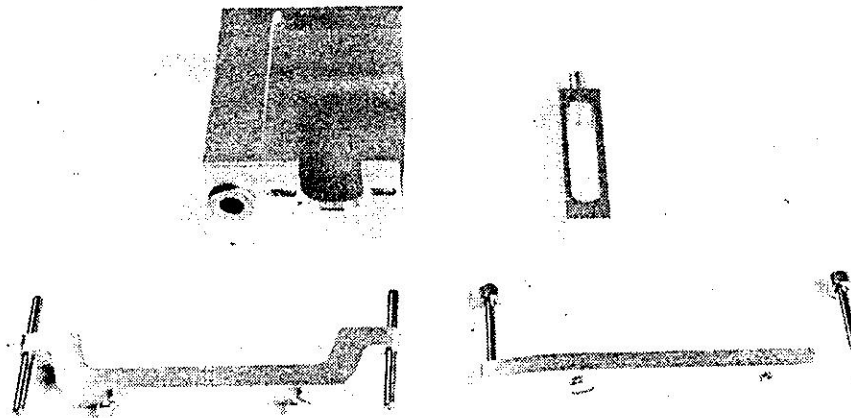
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