



SENIOR AERO SPORT





Bipes are beauteous...they're dramatically angular, yet subtly curved; antique in mood, but modern in spirit. They possess an eloquence that is awkwardly graceful./by Mark Frankel

With 67½" of span, the Senior Aero Sport aims for realistic flight performance—it's like a biwinged Senior Falcon in the air.

Have you ever noticed how realistically a really large scale model behaves in the air? As the model's size increases, its power-to-weight ratio, wing loading, and other aerodynamic characteristics (such as Reynold's number) apparently begin to approximate the full-sized aircraft's. So, in addition to the static appearance of a real plane, the large scale model presents the added thrill of handling like the real thing.

The Sport Biplane event, as proposed by Jerry Nelson, seems aimed at capturing some of that realism in Pattern-type competition. The NSPA rules are clearly intended to simulate the barnstorming stunts and aerobatics of full-sized aircraft, as opposed to the AMA and FAI Pattern events, which feature overpowered missiles performing feats that no man or machine could survive.

The Senior Aero Sport is an example of a large model that satisfies the philosophy of the Sport Biplane event. Furthermore, its exact scale outline allows it to compete in the AMA as well as Stand-off Scale events.

I considered building the Senior Aero Sport for several years; however, various obstacles (such as military service) kept me from undertaking the project. Fortunately, I discovered that the designer of the full-sized aircraft, Nicholas D'Apuzzo, lives in my general area. Mr. D'Apuzzo supplied me with three-view drawings of the aircraft and several photographs of various versions constructed by homebuilders across the country. He also provided me with a list of completed Senior Aero Sport projects, including the names and addresses of the builders.

It turned out that two outstanding examples, Jim Frankenfield's N112JF,

and Tom Luckey's N4030Q, were hangared nearby. An inspection of these aircraft would humble even the most gifted model builder. Tom Luckey's biplane, the aircraft that I chose to model, won the "Grand Champion Homebuilt" award at the 1968 EAA International Convention. Jim Frankenfield's air-

plane, featuring a beautiful paint scheme, also has won many awards. It is a very photogenic airplane and, consequently, has been the subject of many homebuilt aircraft articles.

Tom Luckey's N4030Q is now owned by Alvin Levenson, who hangars it at Zahn's Airport on Long Island,



The author taxis the Aero Sport out for another aerobatic practice session. The shot gives some perspective of the dimensions of this 10½ lb. dream ship.



The paint scheme is dashing, with straight lines playing across and around curved form.



A side-mounted Fox 78 gives plenty of power for the NSPA aerobatic sequence. The engine is well-disguised in the cavernous cowl.



Being a homebuilt project, the Aero Sport—seen from two angles here—has plenty of scale documentation readily available. The full-size plane won the EAA's Grand Champion Homebuilt Award.

N.Y. When I visited Mr. Levenson, I found that he had enhanced its beauty by re-upholstering the interior, adding Navy squadron insignias to the fin, and chrome-plating the spinner. Jim Frankenfield's N112JF is currently based at Executive Airport in Ft. Lauderdale, Fla.

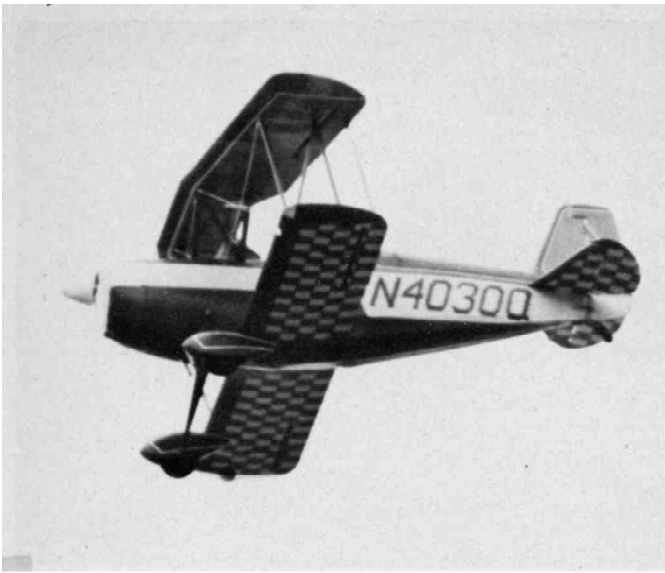
Of course, there are many other examples of the Senior Aero Sport across the U.S.—I even heard of a Navy lieutenant who was building one aboard the USS Roosevelt! I'm sure that a letter to any owner would bring mounds of photographs and other scale data for your modeling project. And, a letter to Nicholas D'Apuzzo, 1029 Blue Rock Lane, Blue Bell, Pa., (with a check for \$3.00) will get you a set of three-views, with photographs and a list of all completed Senior Aero Sports.

In addition to these sources, the following periodicals contain certain information on the Senior Aero Sport: *Sport Flying*, February and August, 1970; *Flight Digest*, fall 1969; *Sport Aviation*, March, 1961 (this article covers the PJ-260, single-place version, forerunner of the Senior Aero Sport), and November, 1968 (cover photo of N112JF). If you have any trouble obtaining scale documentation, please send me a letter in care of AAM, and I might be able to help.

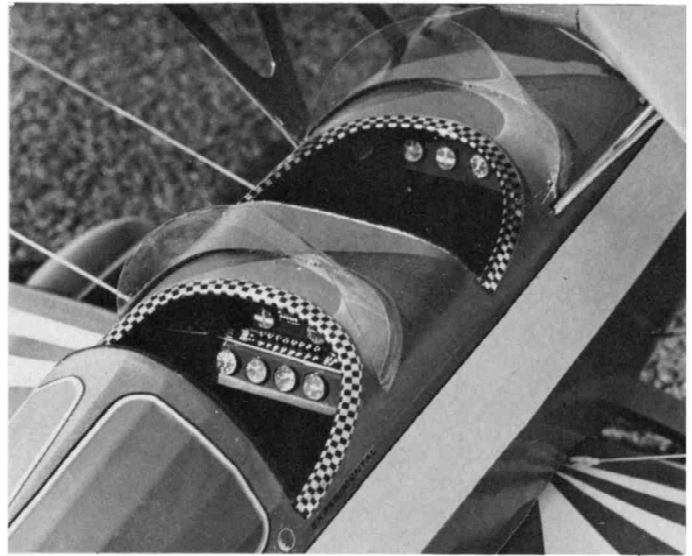
CONSTRUCTION

Construction of the model can begin with any of the major components: wings, fuselage, or tail surfaces. I'll describe wing construction first, as it represents the major time investment.

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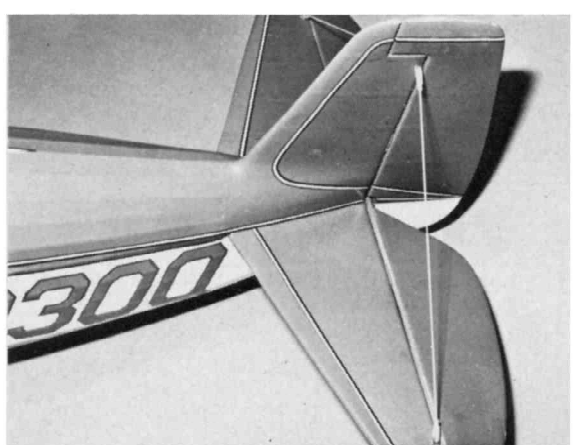
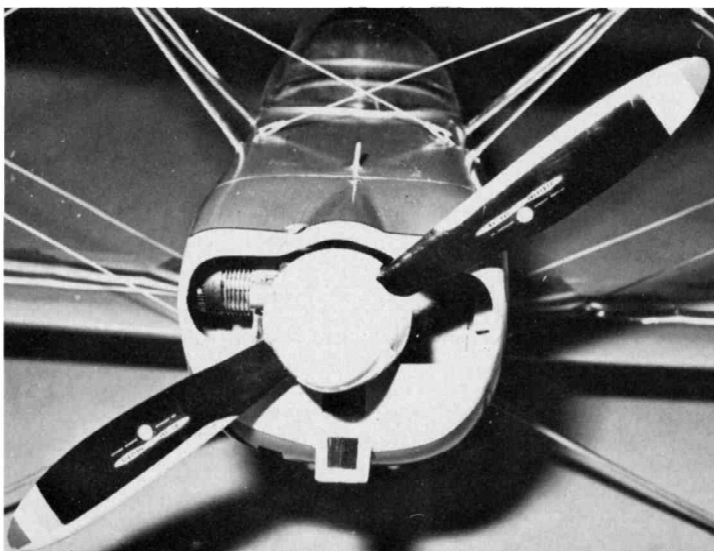
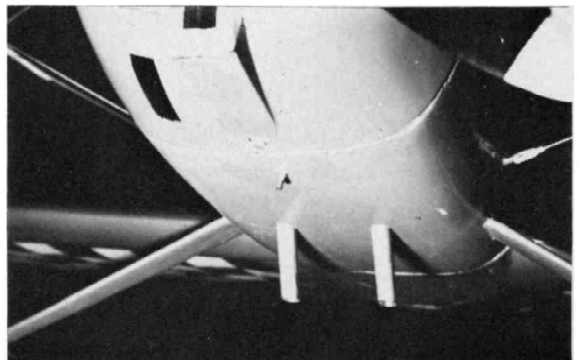
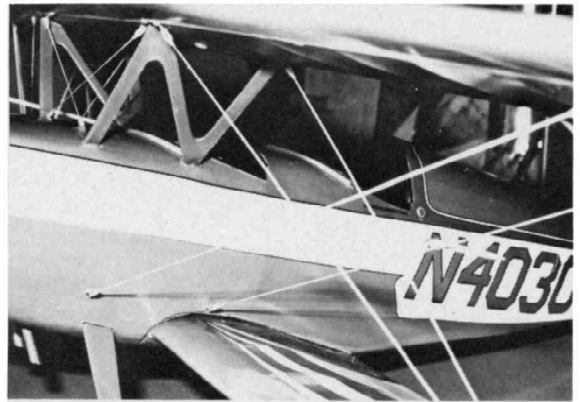
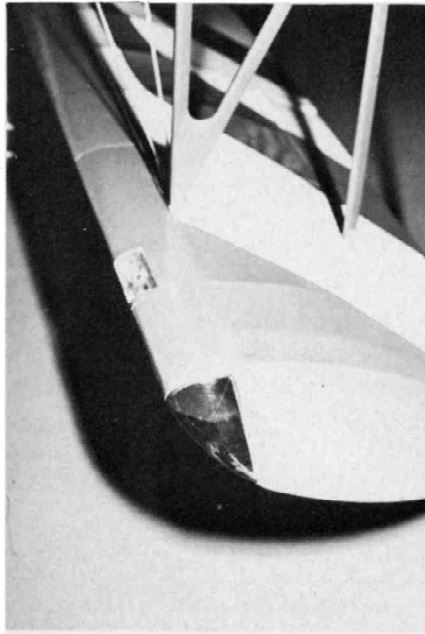
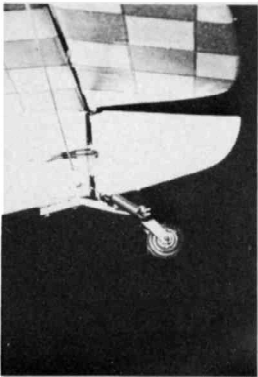


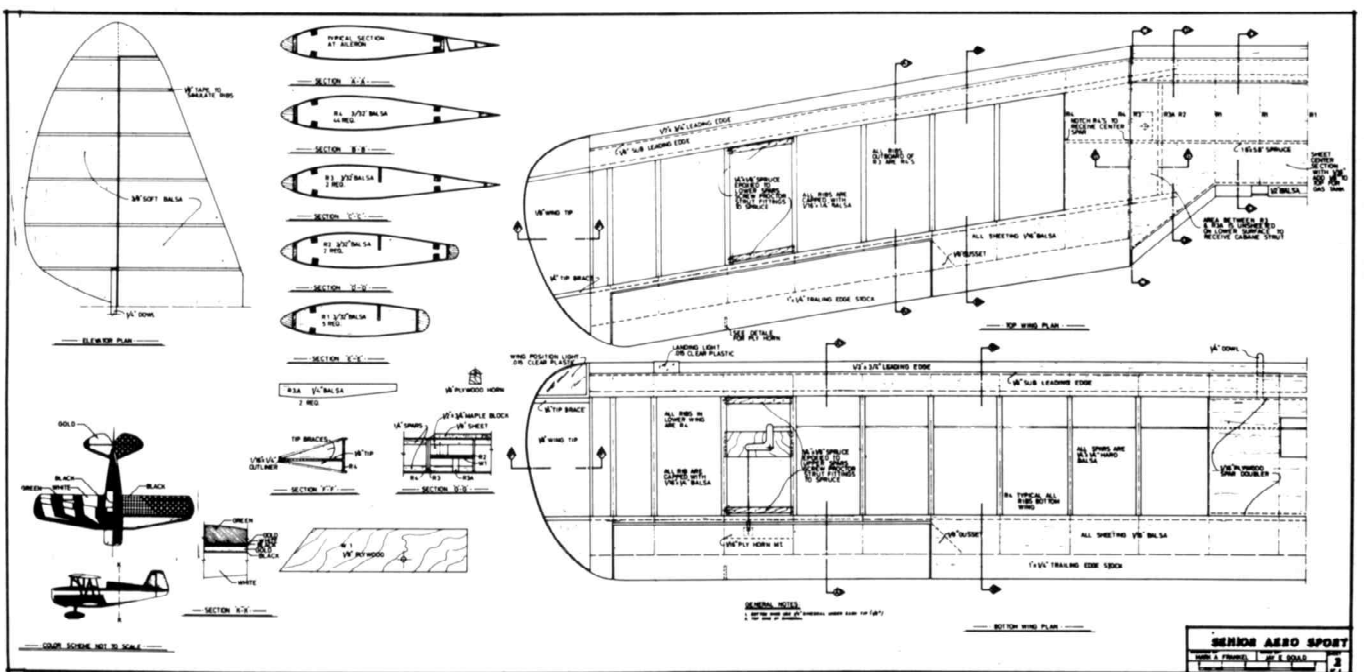
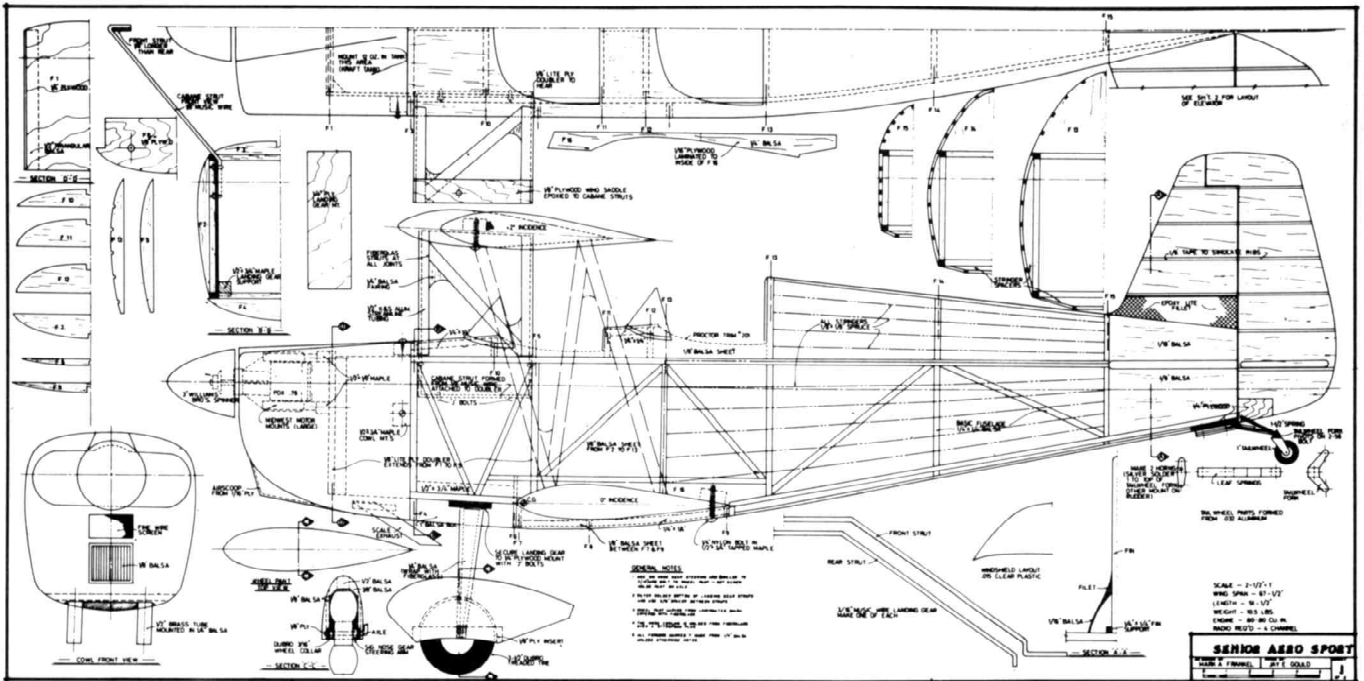
Checkerboard underpainting adds to design's racy appearance.



Detailed cockpits aren't very difficult on a model this size. They add that final touch to any project.

DETAILS,
DETAILS,
DETAILS,
DETAILS





AERO SPORT

(Continued from page 20)

Wings: Begin by cutting forty-four R4, two R3A, two R3, two R2 and five R1 ribs. Pin and glue the trailing edge stock and the lower rear spar on the lower TE sheeting. The ribs are then glued into position, followed by the upper rear spar and sheeting, the two forward spars, and the 1/8" subleading edge (this 1/8" provides a base for the 1/16" LE sheeting).

When completely dry, remove the wing panel from the building board and add the LE sheeting. The LE of 1/2 x 3/4" soft balsa is then glued into position and carved to shape. At this point, the ailerons can be cut from the wing panel. Use an X-acto razor saw with the stiffener removed; the blade will remain stiff enough to make a fine cut through the trailing edge. After installing the aileron control horns, the wing and ailerons are faced with 1/8" balsa. The 1/8" facing on the wing panel will be resting against the rear spar. The aileron hinges pass through this facing into the upper rear spar.

The wing tips can be added now, followed by 1/16 x 1/4" balsa capstrips on all ribs not covered by center section sheeting. After careful sanding, the lower wing panels are ready for joining. The lower wing has a 1/2° dihedral angle, or 1/4" elevation under each tip. Epoxy a 1/16" dihedral brace to both the rear and forward spars.

The upper wing panels are joined through a center section constructed of the remaining ribs. The 1/8" plywood W1s are epoxied between R2 and R3. It is important that W1 is glued on the chord line of R2 and R3, since any deviation will affect the incidence of the upper wing. Epoxy the outer panels to the center section so that R3 butts against the first R4 and all four of the panel's spars butt against R2, and the center section's 5/8 x 1/8" spruce spar fits into the first two R4s.

Now, epoxy scrap blocks of balsa between the spars and W1 to bring the spars in contact with W1. Glue maple blocks to the upper surface of W1 to receive the wing mounting bolts. Use 1/16" sheet balsa to cover the center sections of both wings as shown on the plans and wrap both wings with fiberglass strips at the wing panel joints.

In some Senior Aero Sports the center section of the upper wing carries the fuel, so it is a bit thicker than the out-

board panels. This can be simulated by adding a layer of 1/8" sheet balsa to the upper surface of the center section. The bottom of the center section is left open between R3 and R3A to receive the cabane struts. Note that some of the lower rear spar will have to be trimmed to allow proper seating of the wing on the cabane struts.

Before covering the wings be sure to epoxy 1/8 x 1/4" spruce strips to the spars as shown on the plans. These strips serve as mounts for the Proctor strut brackets (Proctor scale accessory No. 315).

Fuselage and Cowl: The basic fuselage is simply a box structure formed from two built-up sides of 1/4 x 1/4" balsa. A 1/8" plywood doubler is epoxied to the inside of each fuselage side. This doubler supports the firewall (F1), the 1/8" music wire cabane struts, and the landing gear mount.

The basic box structure is formed by gluing F1 and all cross members into position between the two sides. Now all formers and stringers are added; the music wire cabane strut is secured with "J" bolts; and the 1/4" plywood landing gear mount is epoxied into position. The next task is to install the fuel tank behind F1, followed by the main landing gear which is fabricated from two 3/16" music wire struts.

The gap between the struts is filled with balsa and fiberglassed to simulate Cessna-type landing gear. I avoided commercially available sheet metal landing gear because none was large enough, nor were the struts narrow enough to give a scale appearance. The 3/16" struts are bolted to the 1/4" plywood mount with "J" bolts.

Note that the fuselage doublers are lined with 1/2 x 3/4" maple rails on the lower edge. These provide a strong gluing surface for the 1/4" plywood landing gear mount. Once the internal work is completed, the forward portion of the fuselage is sheeted with 1/8" balsa and a 1" balsa block is added between F4 and F6. After sanding, the cockpit openings are cut from the upper sheeting.

I formed my cowl over a foam mold. I like to work with foam, since it carves and sands easily and is relatively inexpensive. The major disadvantage is that the mold must be destroyed to free the finished component. To build the Senior Aero Sport's cowl, simply lami-

nate foam blocks forward of F2, F3, and F4 to match the approximate shape of the cowl. Three-M's Spray-ment is excellent for laminating foam. Be sure the foam adheres to the fuselage structure *only* at F2, F3 and F4. This will allow easy removal by simply cutting the mold free on that line. If the mold adheres to the doublers or firewall, it may be impossible to remove in one piece. When shaping the foam, try to sand it approximately 1/16" undersize in all dimensions to compensate for the thickness of the fiberglass cloth.

After removing the mold from the fuselage, glue a hardwood strip to the inside. This "stem" can be mounted to a vise to hold the mold while you apply the fiberglass cloth. I applied five layers of medium-weight cloth to the mold, each held in place with 3M Spray-ment. The cloth is then liberally saturated with Hobbyoxy Formula II and allowed to cure. The mold is removed by dissolving it with lacquer thinner. The exterior of the cowl is then smoothed by mounting it on the fuselage and adding a layer of Epoxolite. When the Epoxolite is sanded smooth, the necessary openings for ventilation can be cut.

Tail Surfaces: The tail surfaces are formed from light 3/8" sheet balsa. The elevators are joined by a 1/4" dowel, and 1/8" masking tape is used under the covering to simulate ribs on the tail surfaces. The wheel pants are carved from laminated balsa. The pant is retained on the axle by a Sig nose wheel steering arm (drilled to receive the 3/16" axle), which is bolted to the plywood insert on either wheel pant. The entire wheel pant is covered with fiberglass cloth and coated with finishing resin or epoxy.

The tail wheel strut is fabricated from .032 K&S aluminum. The "N" struts are built from 1/2" K&S streamlined tubing. Each strut is cut to length after the wings are bolted into position. The forward and rear struts fit into Proctor strut mounting brackets. The diagonal member is epoxied between the two upright members. When dry, the strut assembly is removed from the brackets; the joints are fiberglassed and blended smooth with Epoxolite.

Finishing and Rigging: With the exception of the cowl and wheel pants, my entire airframe was covered with

Silkspun Coverite. Be sure to use an iron that produces enough heat to effectively seal the Coverite. Once the model is covered, the rigging can be fitted. Use white elastic cord for the flying wires. The cord is cut to approximately three-quarters of the distance between the points of attachment. Goldberg "Mini-Snap" nylon clevises are knotted on each end of the elastic cord. The nylon clevises not only simulate the clevises used on full-size biplanes, but allow quick assembly or breakdown of the rigging.

I used Du-Bro metal landing gear straps for anchoring the flying wires to the airplane. The straps are screwed into hardwood in such places as the "N" strut attachments or they can be inserted into the wood and epoxied in such places as the fuselage and tail surfaces.

I painted my model with acrylic lacquer plasticized by Southern R/C Product's Flex-All. Two coats of primer were applied and sanded. Then the entire airplane was sanded with three coats of white. After the white had completely dried, I masked for the first trim color, gold.

The checkerboard pattern on the lower flying surfaces was masked by identically cut squares of vinyl contact paper. Avoid applying extremely wet coats of lacquer over the contact paper, as it tends to lift when covered with excess paint. The final color, green, is followed by the addition of pinstripes—black pinstripes on all lines where gold meets white, and gold pinstripes where

green meets white. Goldberg's Multi-Stripe tape is recommended. I then added two coats of clear lacquer to seal the finish. You may want to try clear Super-Poxy, since it probably will provide a harder finish.

Windshields of .015 clear plastic are attached to the fuselage with Ambroid Cement. Cockpit detail, such as instrument panels and seats, can be added at this point. Another advantage of a large scale model is that the radio gear can be easily hidden to permit an unencumbered cockpit. I mounted the servos horizontally under the rear seat. The batteries and receiver were placed just above the landing gear mount, forward of the front cockpit.

FLYING

A reliable radio and engine, coupled with a warp-free structure and a properly located CG should ensure a well-flying model. Unfortunately, my first flight was not trouble-free, since I built my model with scale wing incidence of 2° in both wings. This is far too much incidence for the model, and the Senior Aero Sport staggered into the air at a dangerously low airspeed. Even with considerable down elevator, it flew in a nose-high attitude. After a full stall landing (literally), I realigned the wing incidence and the Senior Aero Sport has behaved like an airplane ever since. The plans reflect the current setup of 2° in the upper wing and 0° in the lower.

I am using a Fox .78 with a 14 x 6 Top Flite prop. This power combination is ideal for effortless takeoffs and large,

graceful maneuvers. While the Sport Bi-plane event limits engine size to .61, this should present no problem for the Senior Aero Sport. Several engines in the .61 category will fly the model with ease.

One thing is clear about the Senior Aero Sport—it has a definite personality. It relies more on aerodynamic forces than brute power to accomplish its maneuvers. The result is that a realistic style of flying must be employed. The coordinated use of throttle, rudder, ailerons and elevators becomes a necessity, and this is what the Sport Biplane rules seem to have in mind.

I have flown my model from both grass and hard surface runways. Neither presents a real problem, but the model seems to track best on grass. On takeoff, be sure to advance the throttle slowly, holding a slight amount of up elevator during the early part of the roll to obtain positive steering from the tail wheel. As you gain speed, ease off the up elevator so that the model assumes a level attitude. As the engine reaches its peak rpm, add a touch of up elevator and you're airborne. Beware of overcontrolling with the rudder during the takeoff roll and, above all, stay ahead of the airplane—anticipate what it is going to do.

Landings are almost too easy, since the Senior Aero Sport lands more slowly than most pattern ships. In a five-knot wind you could easily trot along next to the model at touchdown. This characteristic can have its drawbacks—it requires that you maintain power until the runway is made, and it is easy to land short with all that drag impeding the biplane's forward progress.

I would be interested in seeing photos of your completed Senior Aero Sport, and will be glad to answer any questions you might have concerning its construction. Address your correspondence to me in care of AAM.

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