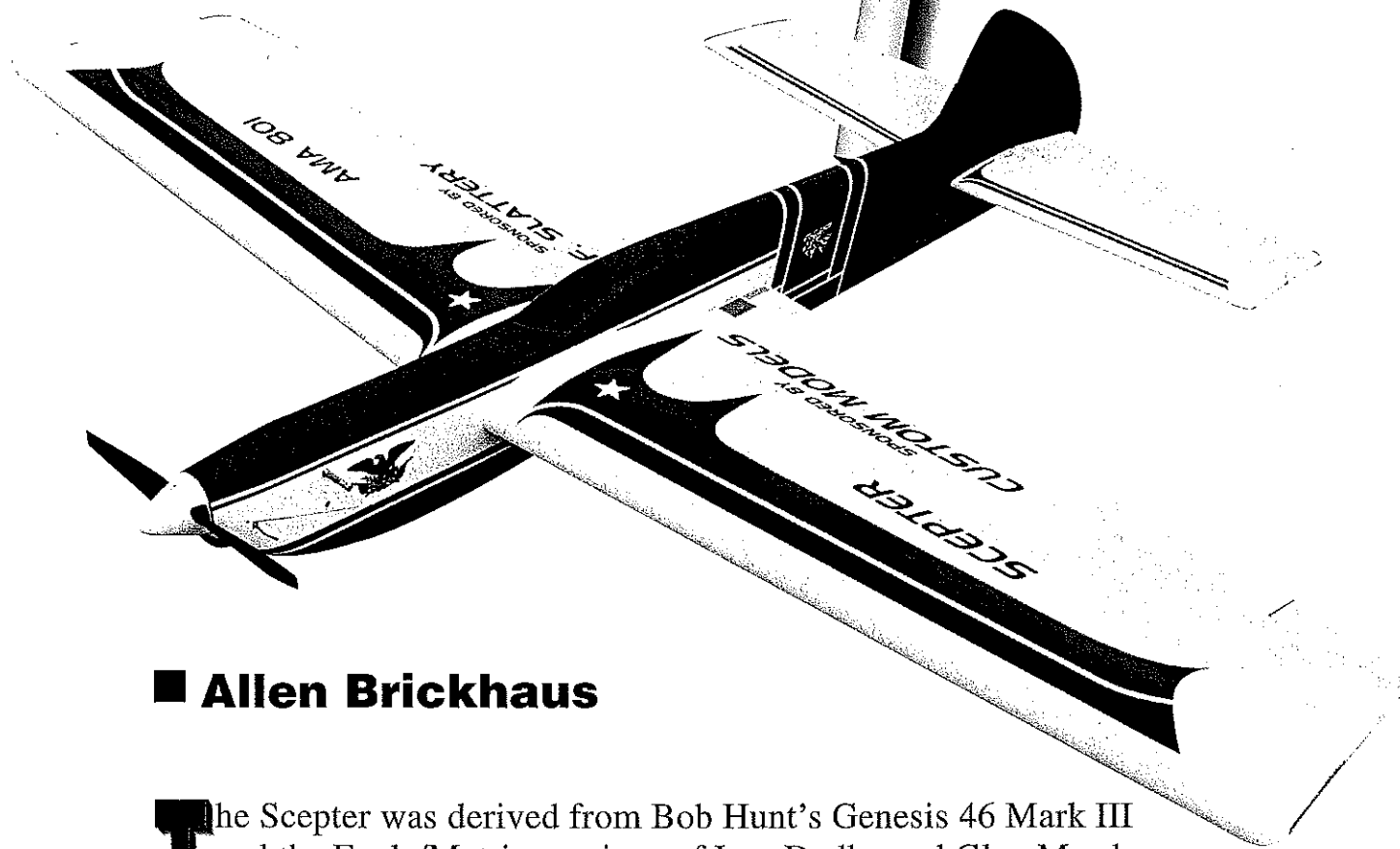


#359

Scepter



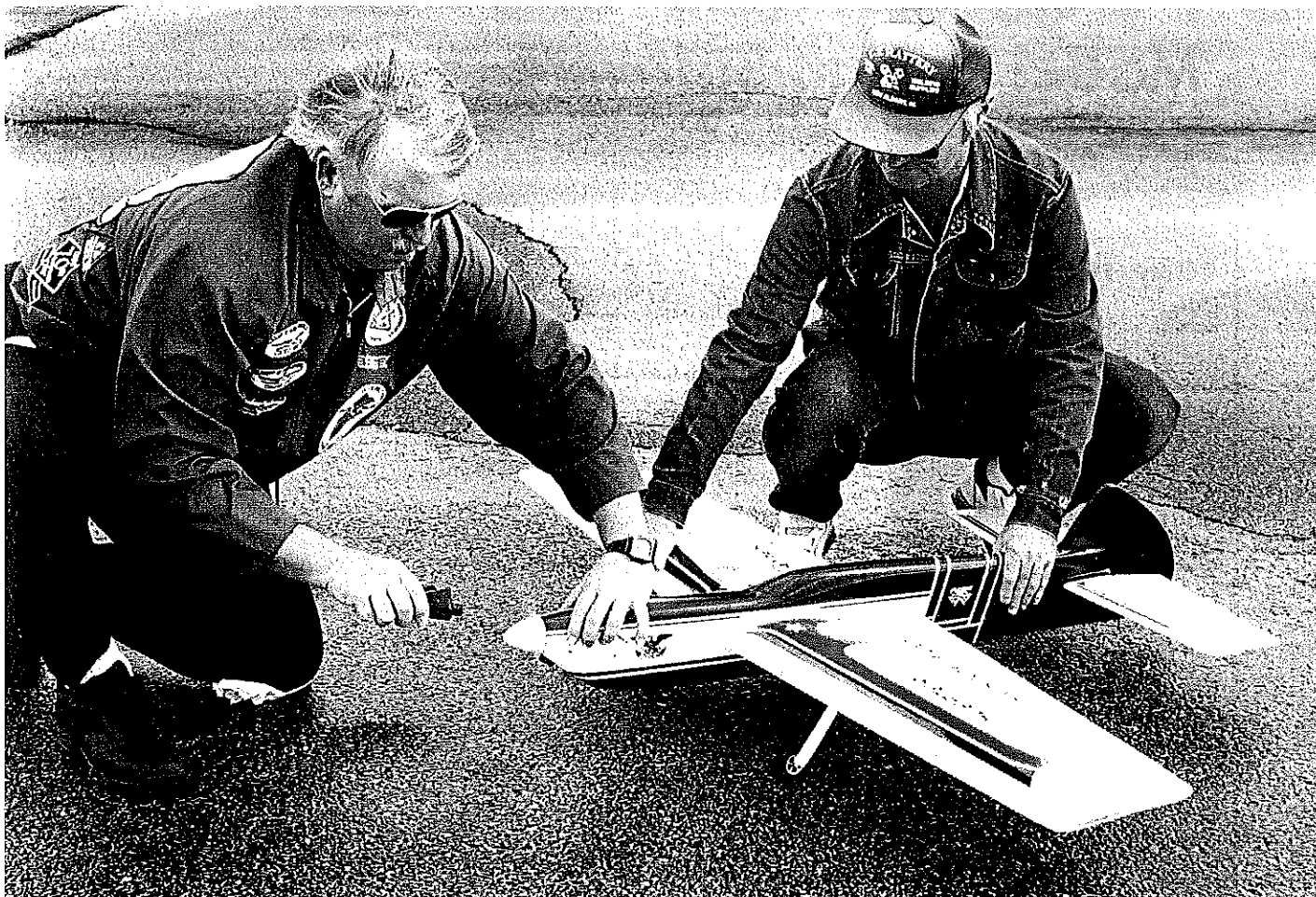
■ Allen Brickhaus

The Scepter was derived from Bob Hunt's Genesis 46 Mark III and the Eagle/Matrix versions of Lou Dudka and Glen Meador. Nose-to-tail-moment ratio was chosen as 1:1.65 (10 inches from the leading edge of the wing to the back of the prop, and 16.5 inches from the flap hingeline to the elevator hingeline). Total wing area is approximately 675 square inches, including flap surface area. The stab and elevator is 23.5% of the total wing/flap area (160 square inches).

The original Scepter came off the building board at 57 ounces and was trimmed to fly at 59.5 ounces. The first flights began in June 1995 and progressed very well until my first practice flight at the Pasco, Washington AMA Nats, when an up line broke on the handle during the third corner of the reverse wingover. Ever-tightening outside loops culminated in a rather soft inverted crash in six-inch-high grass.

The

Jer



The author (L) takes a tachometer reading (engine rpm) while Jerry Norin holds the model prior to launch.



Jerry Norin releases Scepter for a flight at Barkley Field, Paducah KY.

Scepter

Type: CL Precision
Aerobatics

Wingspan: 59 $\frac{7}{8}$ inches

Engine: PA .40 two-stroke

Flying Weight: 59.5 ounces

Construction: Built-up

Covering/finish: Heat-shrink
film, X-O Rust™

The crash seemed to be relatively minor until I watched the stab flex when I jacked the model up. A day-and-a-half was spent attempting to fix the stab, but cooler voices (and more experienced ones) told me to lay the model aside and concentrate on my backup version.

The long ride home after the Nats kept my mind busy thinking about how I would repair the Scepter and bring it back to life. The fix for the stab was a quick-but-efficient repair, and the model was back in the air August 2, 1995. Nineteen flights later, the outer wing popped off during a practice flight; a stress crack had occurred during the Pasco crash, but was unnoticed by me during the subsequent repair process. I finished the season with my backup airplane and vowed to get the correct repair on the Scepter the second time.

It took some time for my heart and soul

to look at the Scepter again in an objective manner. The slow process of rebuilding the airplane took place during the winter of 1995-96. Rebuilding probably took as much time as the original construction, but I feel that it was worth it.

Serious flying and retrimming began in June 1996. This led to several wins on the Midwest Stunt circuit and placing 17th at the 1996 AMA Nats.

CONSTRUCTION

The basic construction is very similar to my Savoy (December 1996 *Model Aviation*). The Savoy article outlines the vast majority of building techniques, which parallel this model.

Wing: If you prefer a built-up wing, the foam core examples can simply be used as a method to develop aluminum or plywood templates for the construction of a ribbed

version. The forward foam spar as shown on the plans should be the location of the wooden spars in the built-up wing. (Refer back to *MA* plan #193, the Stiletto by Les McDonald, for a very simple way to construct a built-up wing.)

I am a firm believer in using Sullivan C-D braided lines for leadout material, as long as they are bushed properly. The brass or copper tubing should be passed through a flame until the tubing is red hot. Allow the tubing to cool slowly to room temperature and it will be soft enough to bend as shown on the plans, but hard enough to serve well as a long-lasting bearing for the control system.

The tubing that goes over the braided lines should be a tight fit. The hole drilled in the bellcrank is the same exact size as the tubing outside dimension. Passing the needed drill through the hole several times will give the smooth movement of the tubing/bellcrank fit.

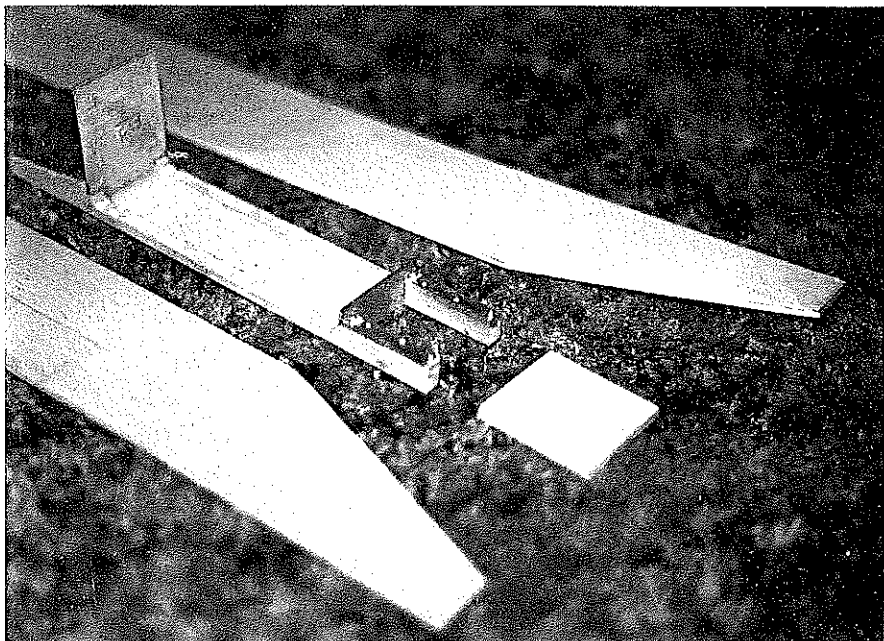
The rudder is shown hinged with brass shim stock. This is stiff enough to allow you to adjust the offset and hold that angle. If you prefer a little more stability in the rudder offset, you can put a small nylon horn on the rudder where shown on the plans and connect it to a fuselage pivot point also drawn on the plans.

Landing Gear: The plans show the original Scepter with dural gear attached to the bottom of the fuselage. The first gear drawings consisted of two pieces of $\frac{3}{8} \times \frac{1}{2}$ engine mount stock glued behind F-2 and against the fuselage doublers. This mount material is drilled and tapped for 4-40 bolts and blind mounting nuts. The gear is then bolted to the bottom of the mounts, and completes the box consisting of the fuselage sides and the top block—a very stable way to attach the gear.

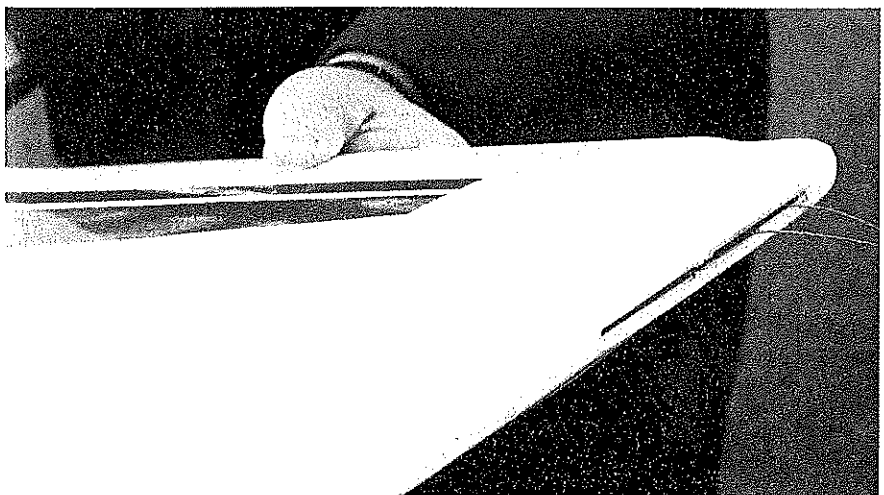
I preferred wire gear in the wing and ordered my version with the spar, landing gear clips and blocks installed from Scott Smith of Aeromsmith. Scott provides a quality product and I am providing his address and telephone number at the end of this article.

Engine/Pipe: The current engine of choice is a Randy Smith/Nelson Precision Aerobatics .40 with a Smith/Werwege carbon-fiber tuned pipe. Although the PA .51 and .61 are now available, the .40 will do the job well enough for the multitude of Stunt fliers. The PA .40 is supplied with a .181 venturi and is filtered with a Bru-Line green filter. The .181 venturi has the same characteristics as a .300 restrictor style venturi.

This airplane can also be powered by any fine-running muffled .51-.60 engine. If a muffled engine is chosen, do not cut the



Formers are undercut between formers to allow use of plastic or metal tanks.



Typical guide slot for adjustable leadouts (Sullivan C-D braided).

pipe hole in F-2, but completely close off the bottom with $\frac{1}{8}$ (or thicker) cross-grained balsa. Be sure to listen to the builder of your particular power unit and follow the advice given as to how to break in, run, and fly the engine/airplane combination. Do not forget the air exhaust hole in the bottom of the cowling.

Pipe length is set around 16.75 inches measured from the center of the glow plug to the front of the first baffle in the four-chamber pipe, which has three chambers plus a resonator section. (Finding the front of the first baffle is easy: Place a long wooden dowel or music wire in the front opening of the pipe. Where the measuring device stops is the location of the baffle.)

Randy Smith recommended wrapping some thin, brightly colored thread at that location on the outside of the pipe, then gluing the thread to the pipe with CyA (cyanoacrylate glue). This locator thread easily allows field change (not often needed) to the length of the pipe.

Ground rpm release is from 10,500-10,900. Line length is 65 feet, measured from the center of the handle to the center of the model. This should give a 5.25- to 5.35-second level-lap time.

Engine Mount: Note that the bearers are undercut $\frac{1}{4}$ inch between F-1 and F-2. This allows the use of plastic or metal tanks in the process of trimming the Scepter. When this undercut bearer is combined with the extra aluminum ($\frac{1}{8}$) bolted and glued to the bottom of the engine side of the mount, you will have $\frac{3}{8}$ shimming distance for the engine to run equally during inside and outside maneuvers. I have also run .60s in airplanes of this type, and with this style engine mount, and they are still flying today.

Finish: The finish on the Scepter is the same as for the Savoy (Heat-shrink film on the flying surfaces, glass cloth/epoxy on the nose, and thinned epoxy on the balance of the wood surfaces. Colors are Rust-Oleum™ or X-O Rust™.) I have not varied from that formula for several years, and I am pleased that the process can develop a finely finished model with less stink than other methods.

I have had some comments from modelers who have attempted to use Rust-Oleum™ or X-O Rust™ (primer) over a previously doped underbase, and have complained that the above-mentioned paints do not cure quickly. Test your combination on $\frac{1}{8}$ x 3 x 3 squares of balsa before committing to your final finish.

Fuel/Prop: I have now begun to use 10% nitro fuel with 23% oil. The oil content is 50% castor and 50% Klotz synthetic. I do add three or four ounces of castor to a gallon of fuel when the weather begins to

heat up and the humidity climbs. The prop is a Bolly $11\frac{3}{4}$ x $3\frac{3}{4}$ as measured at the #10 slot on a Prather pitch gauge.

There is still so much for me to learn in this fine hobby of Precision Aerobatics. The PAMPA (Precision Aerobatics Model Pilots Association) *Bibliography* has been collected to ease the search for helpful information. I highly encourage you to join PAMPA, and reap the rewards of hard work done by so many in the past. Send a request for an application to PAMPA, 156 Flying Cloud Isle, Foster City CA 94404. →

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Box 206
Golconda IL 62938

Sources

Randy Smith
Aero Products

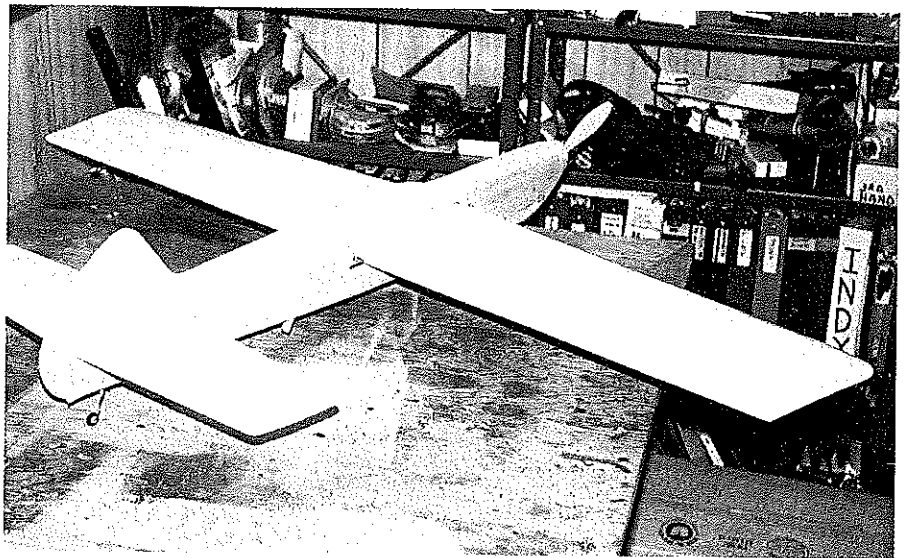
1880 Scenic Highway
Snellville GA 30278

Scott Smith
Aerosmith Model Aviation
RD#1 Box 290
Athens NY 12015

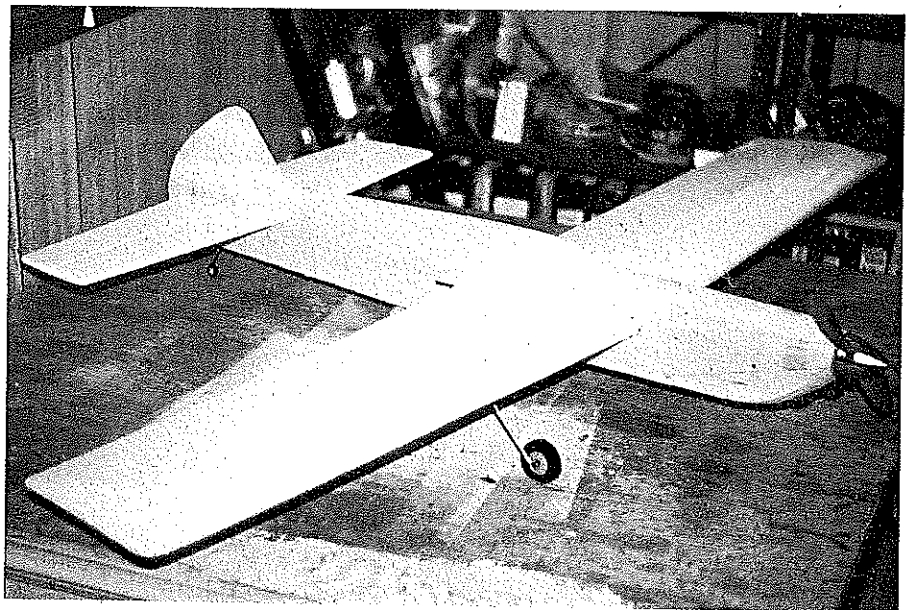
Byron Barker
C.F. Slattery
407 Mount Tabor Road
New Albany IN 47150-2206

Doug Taffinder
Carolina-Taffinder
83455 Delhi Road
North Charleston SC 29418

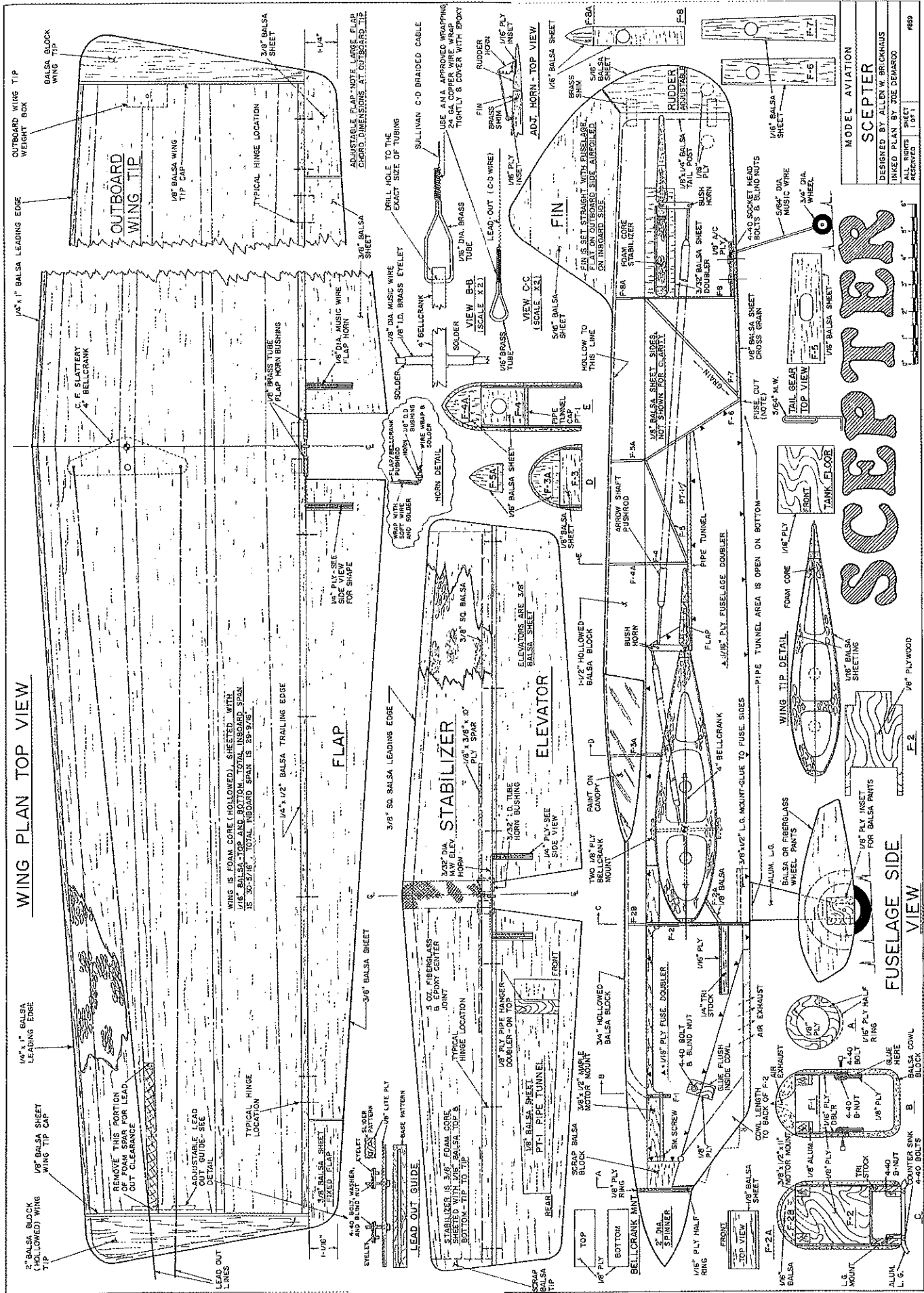
Mike Pratt
Sig Manufacturing
401-7 South Front St.
Montezuma IA 50171



Scepter in original configuration with top block and rudder taped in place.



Model weighed 59.5 ounces trimmed for flight. Built-up wing is an option.



SCEPTER

MODEL AVIATION
SCEPTER
 DESIGNED BY ALLEN W. BRICKHAUS
 TRIMMED PLAN BY JOE DEMARCO
 PARTS LIST SHEET #89
 PARTS ASSIGNED

