



SUPER DRONE

493



Opposite page: Antenna wire and charger plug exit neatly out the left side of the fuselage, though not visible in the upper picture. Ground handling is very stable with the high and wide landing gear arrangement, and it saves a lot of propellers at the same time.

THE INSPIRATION for this airplane came about several years ago when Wing Mfg. Co. marketed its Drone kit. However, I wanted something larger and more powerful while still retaining the military appearance. This model was the result.

Rather than trying to design an entire airplane, I chose to modify an existing kit model: the Goldberg Sr. Falcon. The airplane presented here was scratch-built using Sr. Falcon kit parts for patterns.

If this model appeals to you and you wish to build it, there are several choices to make life easier than scratch-building everything. You may use the Sr. Falcon kit and make the necessary changes (or build the fuselage from the accompanying plans and use the kit otherwise). Another alternative, which is what I did, is to obtain a Wing Mfg. Co. (P.O. Box 33, Crystal Lake, IL 60014) foam wing and stabilizer kit. Lastly, you may purchase a Sr. Falcon wing and stabilizer kit in wood

Building the author's version of the Sr. Falcon will let you show up at the field with a proven RC plane that doesn't look like all the rest. Several construction options are available.

■ **Alvin E. Johnson**

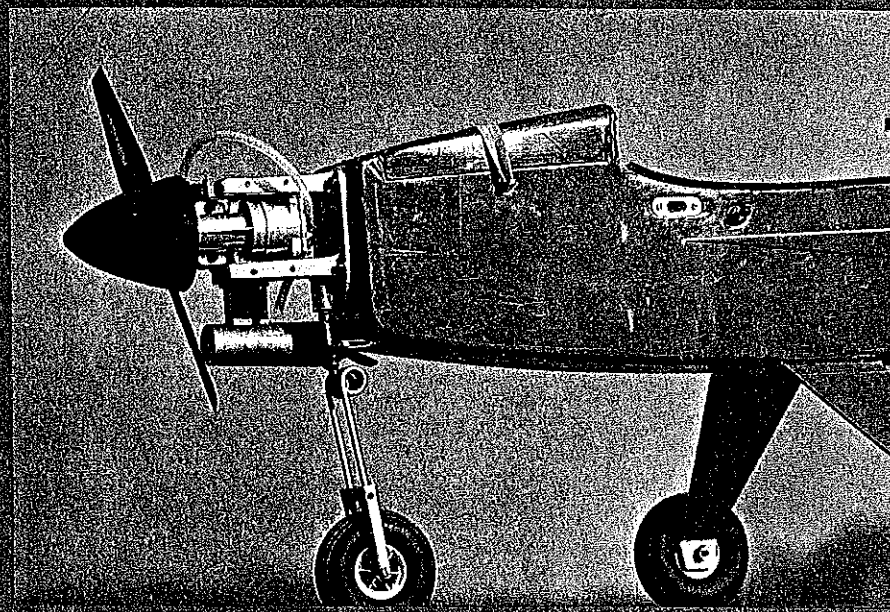
from Carl Goldberg Models (4735 West Chicago Ave., Chicago, IL 60051).

Wing. If you decide to use the Wing Mfg. foam wing set, assemble according to the directions supplied by Wing Mfg. Note that I used block balsa "slash" type wing tips. Dihedral for the Sr. Falcon wing should be $4\frac{1}{4}$ in. at one wing tip when the other wing half is flat on the workbench.

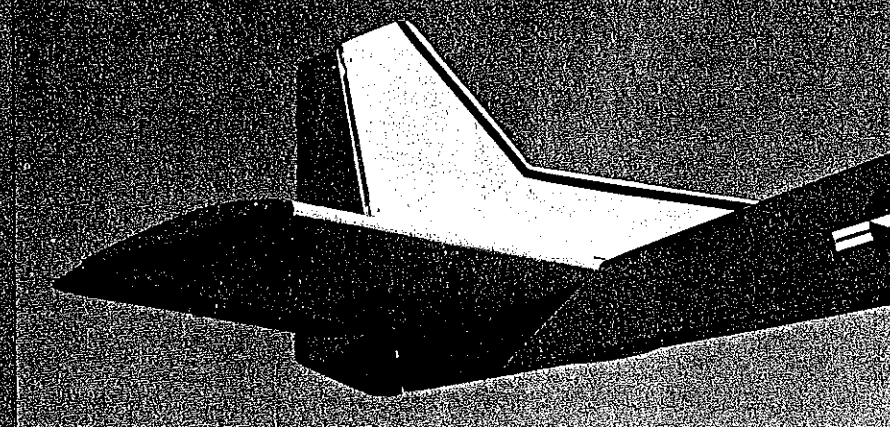
I prefer to use the bolt-type wing attachment system. However, if you would rather use rubberbands, dowel locations are shown on the plans. When installing the front wing pin for the bolt-type attachment, epoxy-glue the dowel securely in place, and drill the matching hole in the fuselage slightly lower than the indicated point to assure a tight-fitting wing. Du-Bro 24-20 bolts and anchors are shown on the plans.



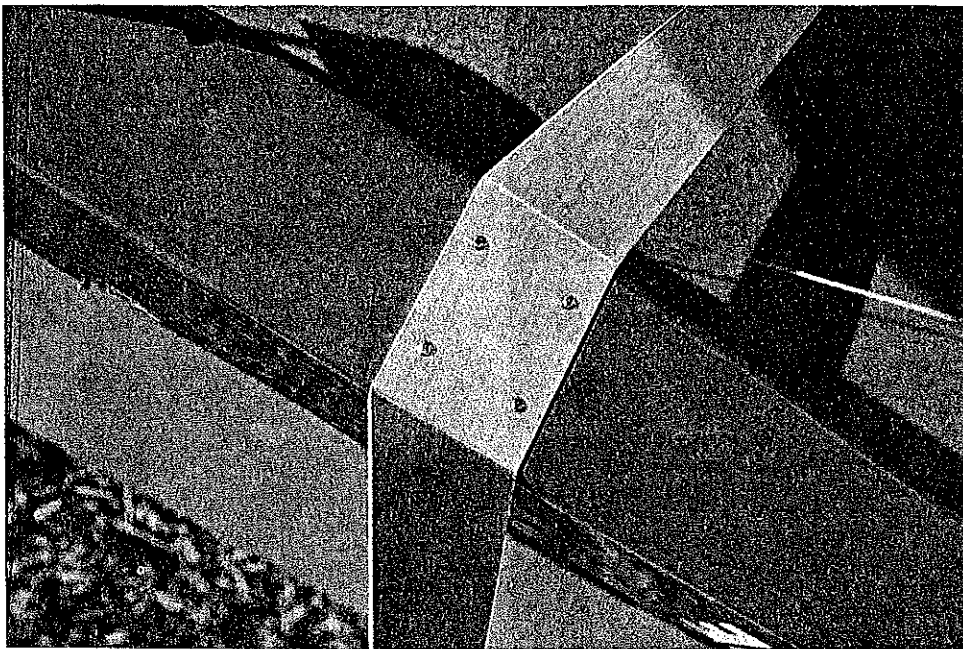
Our author/designer Al Johnson and the highly modified Sr. Falcon that has become the Super Drone, much like a semi-military target drone. Pic snapped, obviously, on a chilly day.



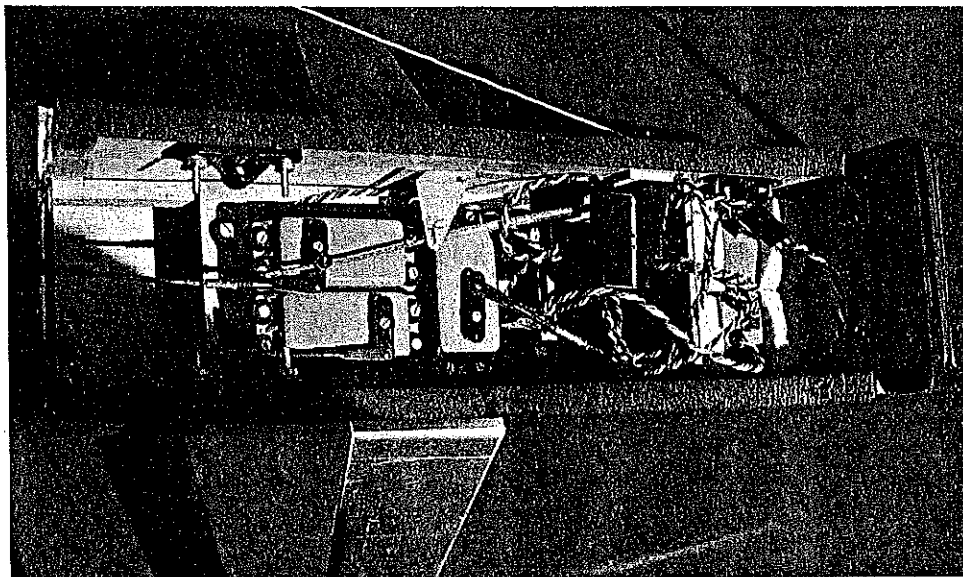
Mounting the engine on its side helps keep some of the exhaust oil off the model. You may have to shop to find this particular dual-style nose gear, but its heavy-duty spring action makes the Super Drone a rugged airplane capable of being flown from the roughest fields.



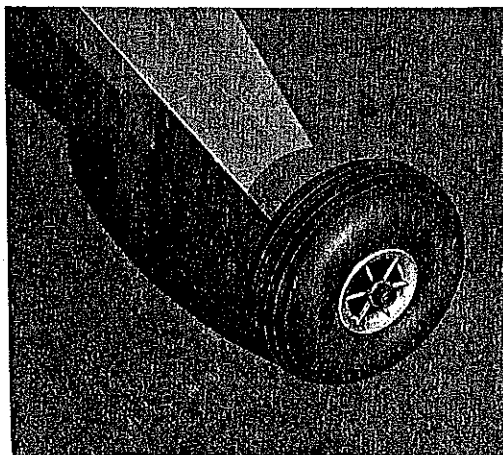
Stabilizer pictured was made from a Wing Mfg. Co. foam kit for the Sr. Falcon. Built-up balsa wing/stab kits are available from Carl Goldberg Models if you prefer that type to foam.



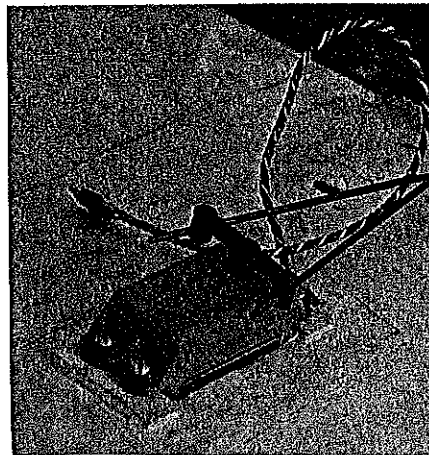
The stamped aluminum main landing gear is a Bridl L-4 now produced by Great Planes. Attach with four 4-40 machine screws and blind nuts through the 1/4-in. plywood mount.



Radio installation is straightforward, and there's room to spare. Note the use of a discarded control horn as a stand-off for the nose gear steering cable. The wing (either foam or built up) is attached with nylon bolts into the anchors shown. Ruggedness is the key word.



Main wheels are 3-in. treaded Du-Bro running on 8-32 x 1/4 socket-head bolts for axles. Such bolts are durable and often are easier to locate than manufactured axles.



The aileron servo is mounted in hardwood blocks that are epoxied into the foam wing. Strip aileron hardware is supplied with the Wing Mfg. foam wing kit for the Sr. Falcon.

The wing center fairing is block balsa with a 1/8 ply plate glued on where it mates with the fuselage and nose hatch. Carve and sand the fairing to blend in with the contour of the nose hatch.

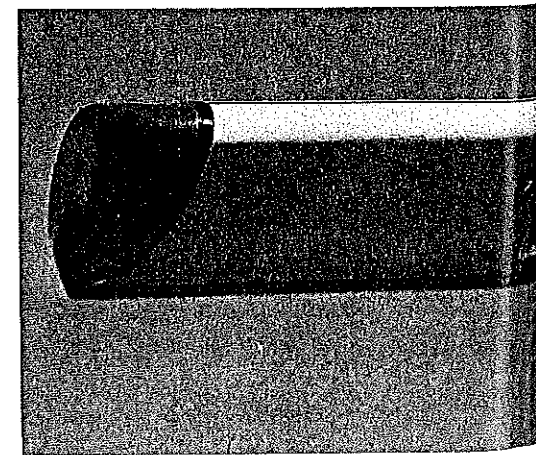
Make the ailerons from trailing edge stock, and install the strip aileron linkages supplied by Wing Mfg. with the kit. I recommend Klett or Du-Bro hinges. Be sure to pin all the hinges with round toothpicks and cyanoacrylate (CyA) glue.

Fuselage. It may take some shopping to find the required 42-in.-long 1/8-in. sheet balsa for the sides. Once you have secured it, trace and cut out the sides per the plans. If you expect to use wing-seating tape, I suggest cutting down the wing saddle 3/32 in. more than the plans show. Pin the fuselage sides together, and sand them evenly.

Laminate the doubler parts onto the sides at the front and rear (while taking care to avoid making two left—or right—sides). The 1/16 balsa doubler must be attached first, followed by the 1/8 ply wing saddle. Unlike the regular Sr. Falcon, an extra 1/16 ply doubler is fitted over the first 1/16 balsa one. This is needed to strengthen the nose, as the original beam engine mounts aren't being used. Note that the ply doubler ends at the rear of the landing gear plate. Be sure to clean off all excess glue before it dries. If you plan to attach the wing with rubberbands, this is the time to drill the holes for the dowels.

Cut out all the formers, and add the top and bottom stiffeners to them. Clothespins are handy for holding these pieces until the glue dries. Drill a 1/2-in. hole in the center of Former #2 for the battery wire.

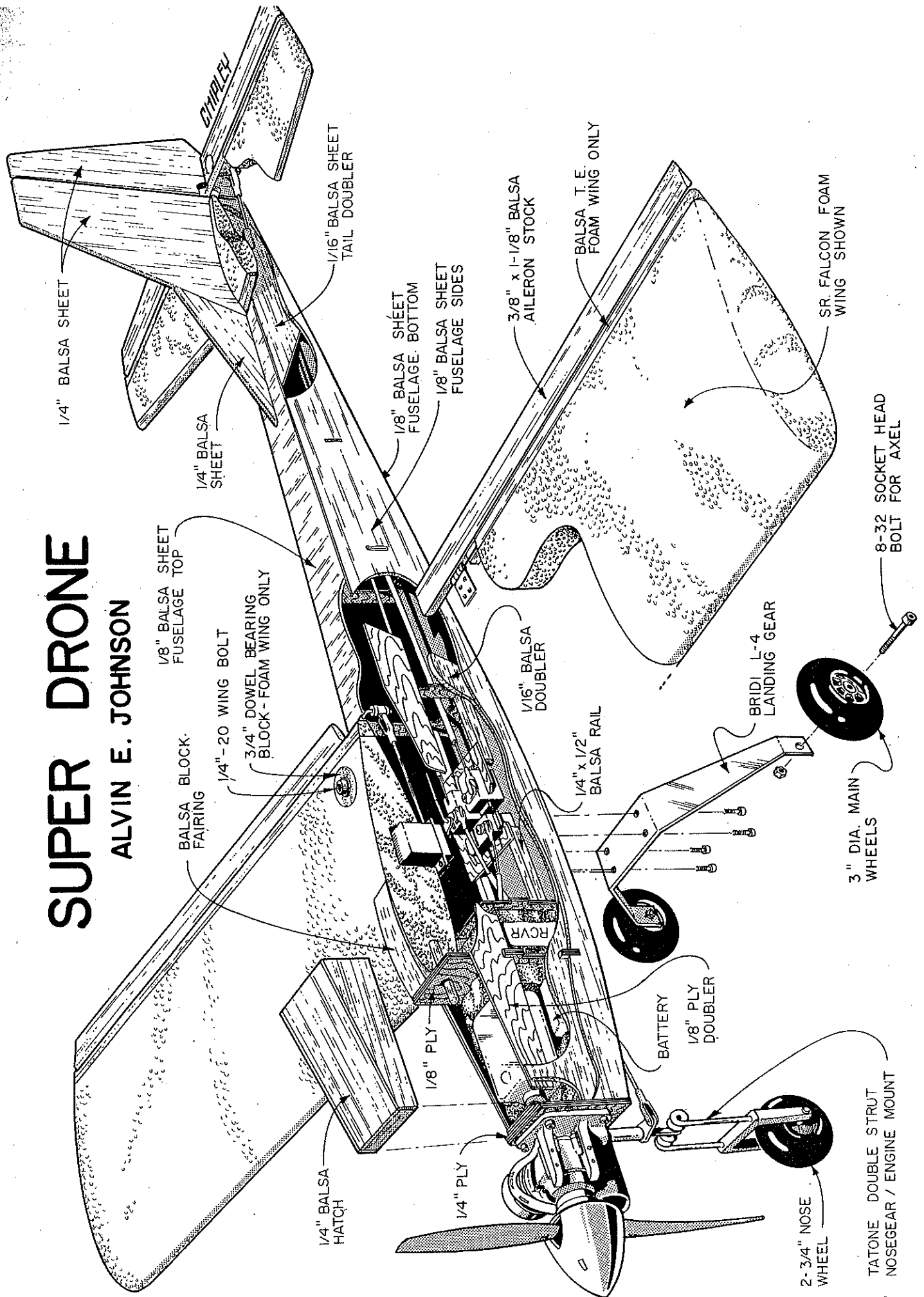
Test-fit all formers into the notches on the fuselage sides. When satisfied that all are in alignment, glue in Formers #1, #2, and #3 onto the right fuselage side, with the side pinned or clamped to your workbench. Check the alignment of these formers with a small square before the glue dries. When dry, attach the left side. Weight or clamp the two sides together, and leave in this position until the glue is



The "slash"-type wing tips are made from block balsa, attached to the foam wing and covered with Solarfilm. (Materials for making the tips do not come with the foam wing.)

SUPER DRONE

ALVIN E. JOHNSON



1/4" BALSAL SHEET

1/4" BALSAL SHEET

1/8" BALSAL SHEET FUSELAGE TOP

BALSAL BLOCK FAIRING

1/4"-20 WING BOLT

3/4" DOWEL BEARING BLOCK - FOAM WING ONLY

1/4" BALSAL HATCH

1/4" PLY

1/8" BALSAL SHEET FUSELAGE - BOTTOM

1/8" BALSAL SHEET FUSELAGE SIDES

1/16" BALSAL SHEET TAIL DOUBLER

1/16" BALSAL DOUBLER

1/4" x 1/2" BALSAL RAIL

3/8" x 1-1/8" BALSAL AILERON STOCK

BALSAL T. E. FOAM WING ONLY

BATTERY

1/8" PLY DOUBLER

2-3/4" NOSE WHEEL

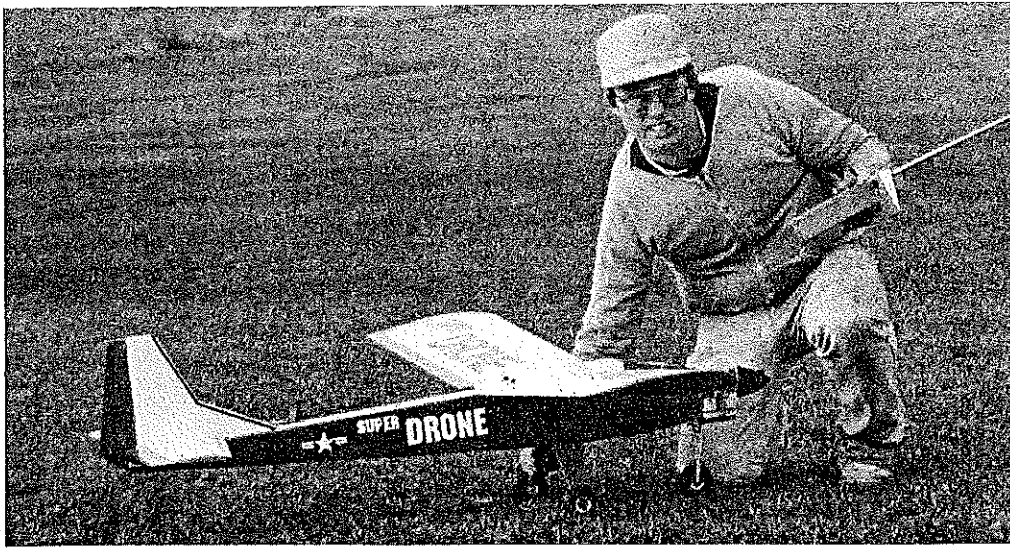
TATONE DOUBLE STRUT NOSEGEAR / ENGINE MOUNT

3" DIA. MAIN WHEELS

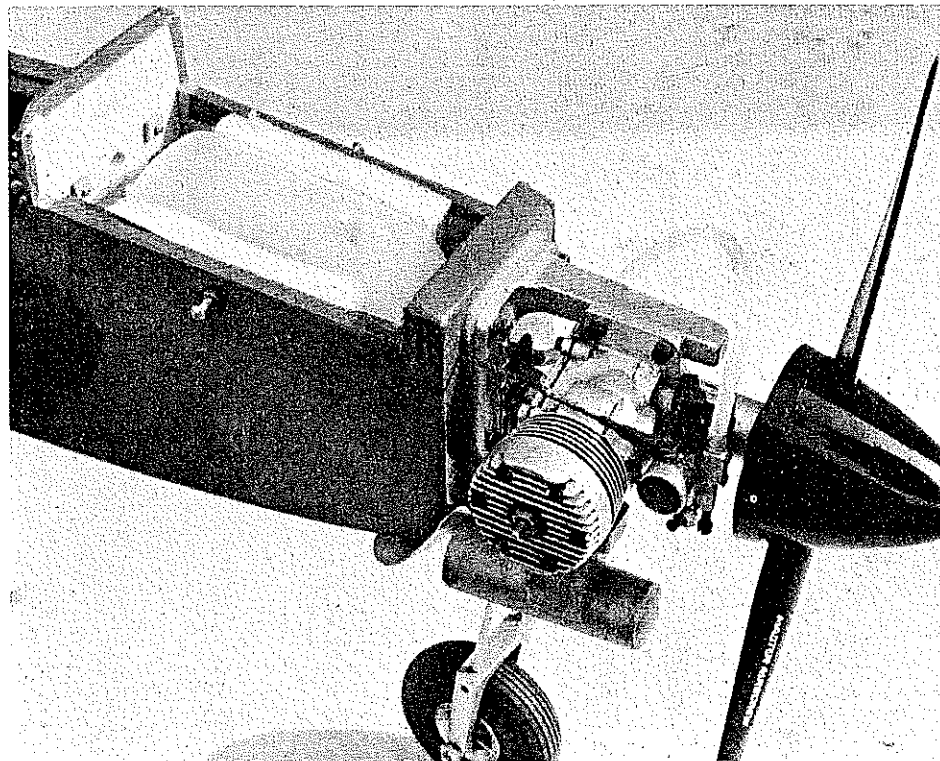
BRIDI L-4 LANDING GEAR

8-32 SOCKET HEAD BOLT FOR AXEL

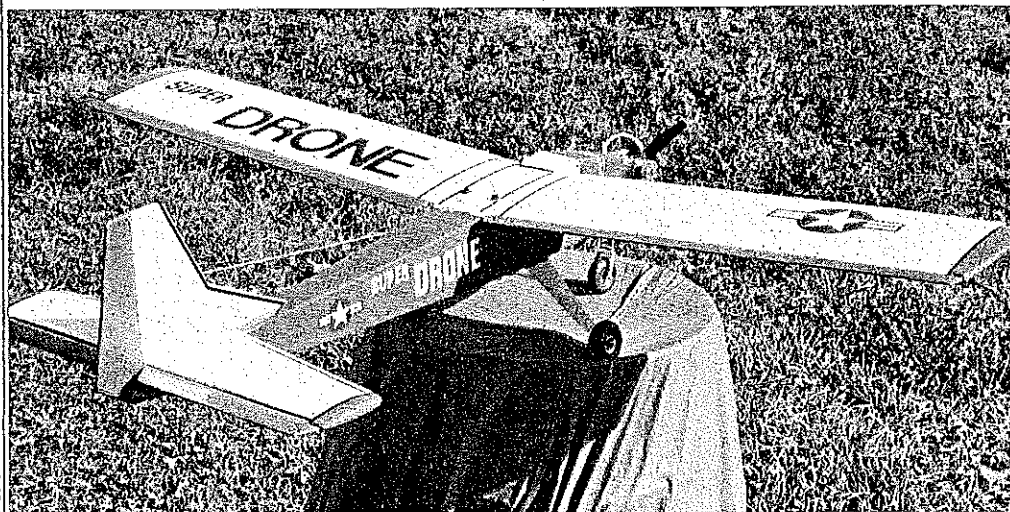
SR. FALCON FOAM WING SHOWN



Ed Frank Jr., slightly frozen in the fall chill, returns the Super Drone to the Cloud Kings RC Club's field plts. Ed and brother Jeff are members of the Alfa Squadron AMA Show Team.



There's plenty of room for tank installation (a Sullivan SS-8 in this case), and the exhaust deflector helps to protect the covering by guiding the oil spray away from the plane.

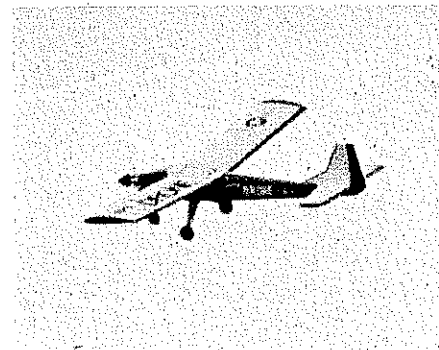


This view of the Super Drone reveals the location of the name and insignia. Lettering is Coverite, 1 in. and 2 in. Insignia is from Wing Mfg., but similar sets available in MonoKote.

completely dry. Then remove the fuselage from the bench, and pull the tail post ends together and glue using clothespins as clamps. Install Formers #5, #6, and #7 now (or as you glue the tail post ends together).

Cut out the firewall from ¼-in. aircraft plywood, and laminate the ⅛ ply doubler onto the back of it with epoxy. Note that the doubler is not the full width of the firewall in order to leave room for the fuselage sides to be attached. Be sure to scrape all epoxy out of the edge groove so that the fuselage sides will fit tightly when attached. Fit your engine mount to the firewall, and drill it for the proper holes.

Epoxy the firewall in place, and hold it with clamps or several No. 64 rubberbands. Clamps are best. (My clamps are made from two ½-in. sq. maple engine mount sticks with 6-32 threaded rods through the ends and wing nuts.) Place against the front ends of the fuselage sides and tighten securely—with the firewall carefully aligned. Allow the epoxy to harden overnight before removing the



The Super Drone banks against a gray autumn sky while being flown by Ed Frank, Jr. Ed also helped to build the model, and he was its test pilot. Everything checked OK.

clamps. Scrape excess epoxy out of the inside corners at the firewall to allow installation of ½-in. balsa corner braces later.

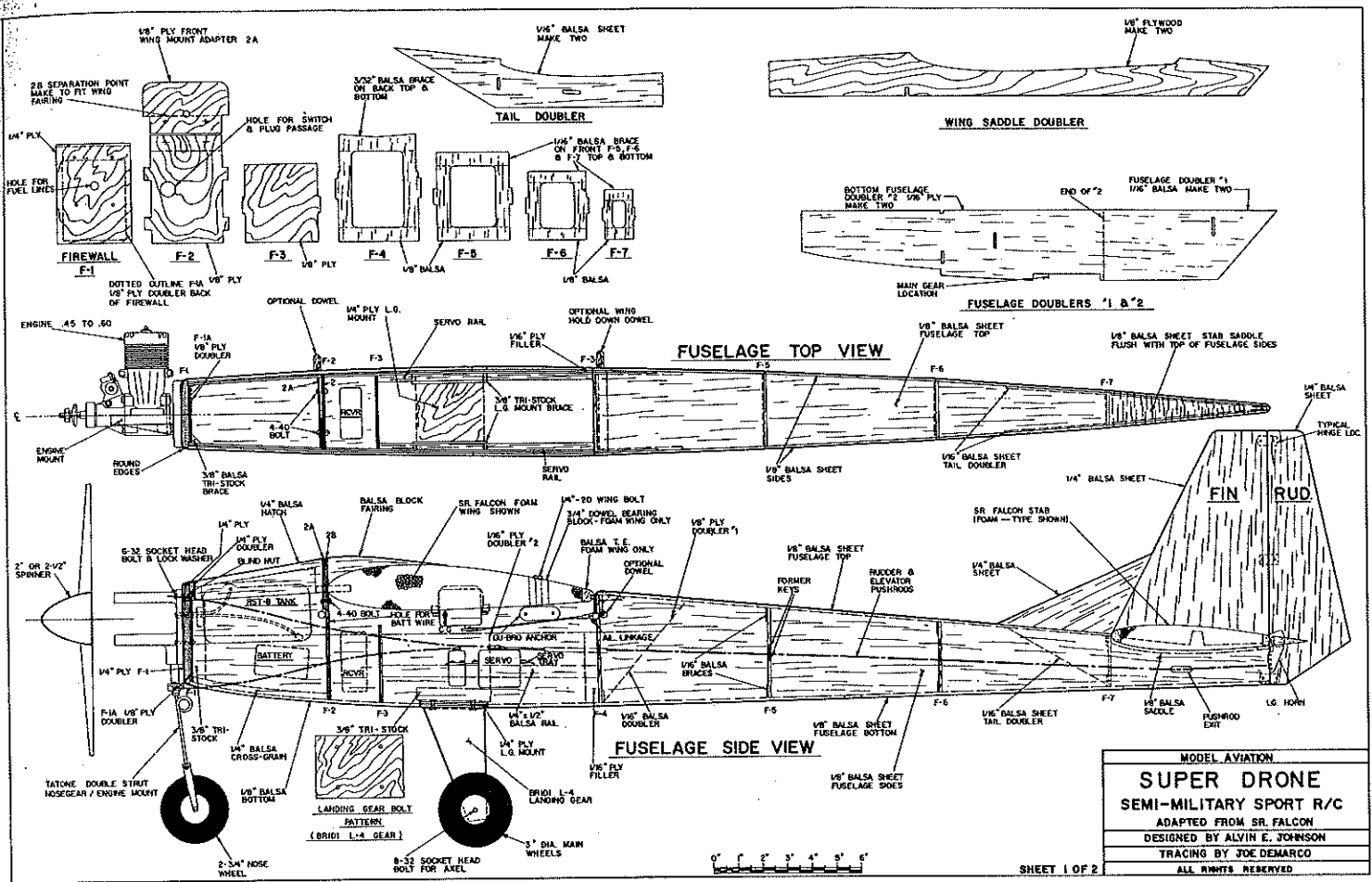
Epoxy-glue the ¼-in. cross-grained balsa tank compartment floor and the ¼-in. aircraft ply landing gear mount. Epoxy on the ⅛ balsa fuselage bottom from the firewall to the landing gear mount. Before adding the rest of the bottom, mark the centers of Formers #4, #5, #6, and #7 on the bottom. Also draw a centerline on the ⅛ balsa bottom sheet. Match up these lines as you attach the bottom sheeting to help keep the fuselage straight.

Before gluing on the top sheeting, it's best to install the pushrods and guide tubing. I used Du-Bro No. 102 control rods for the rudder and elevator. When the rods are in place, glue on the top sheeting.

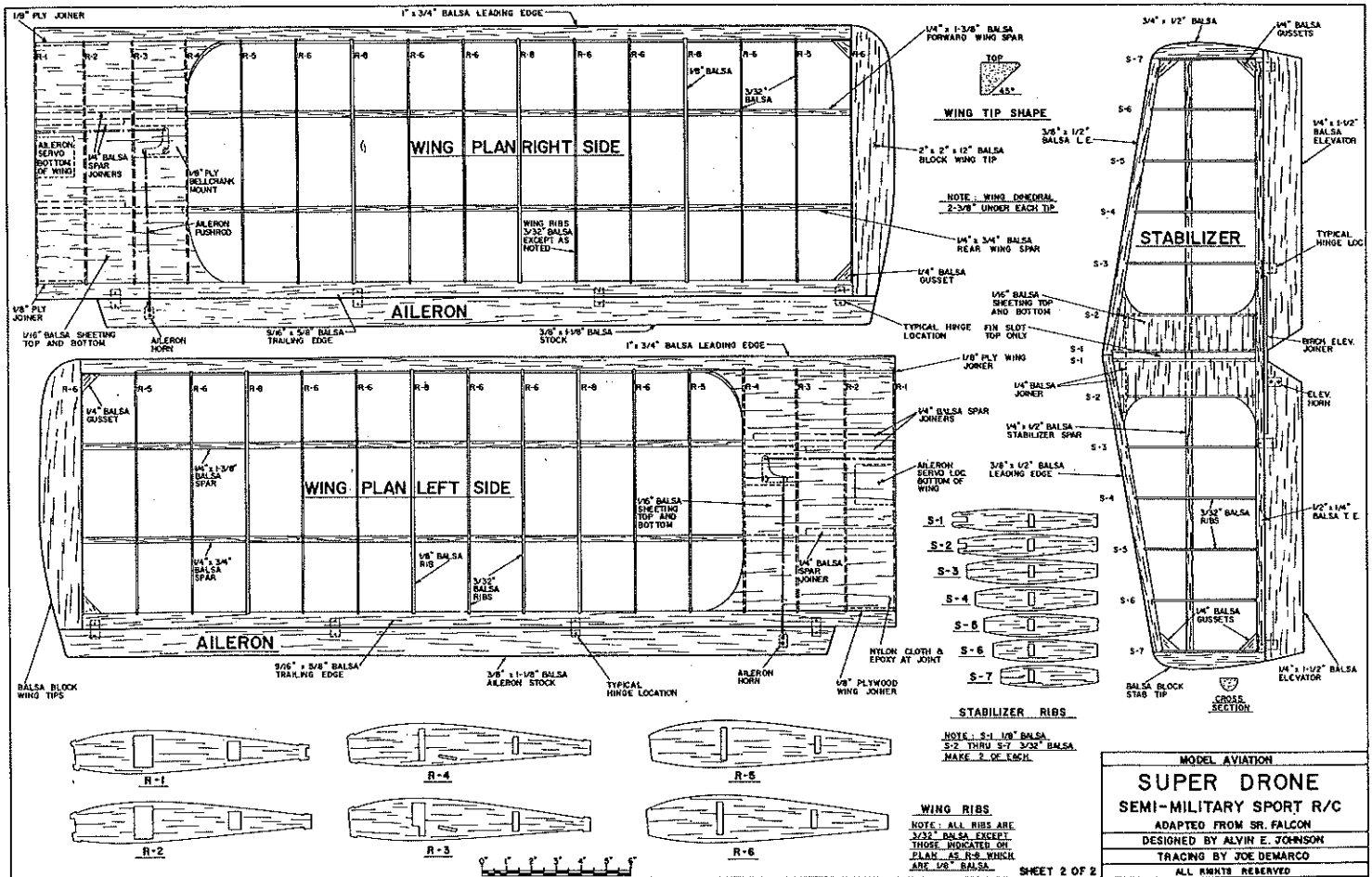
Be sure to glue in the stabilizer saddle at the tail to provide sufficient gluing surface for the stabilizer.

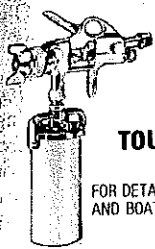
Now is the time to put in the ½-in. balsa triangle stock pieces behind the firewall and above the ¼ ply landing gear plate. A small piece of ¼ ply is glued behind the top of the firewall for extra holding power

Continued on page 131



Full-Size Plans Available . . . See Page 180





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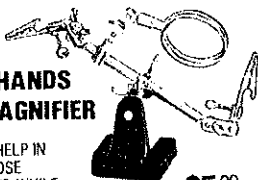
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Polk's modelcraft Hobbies

Plane Talk/Winter

Continued from page 30

We say that a symmetrical section cannot lift at zero degrees of attack. So here I was having an ignorant ball with elevators always in precise neutral. How does a plane fly inverted without down-trim or even down-elevator when its $\frac{3}{8}$ - $\frac{1}{2}$ airfoil is upside down (which should be impossible)? Inverted must have been entered with the nose up some, slightly surfboarding. I wonder. Once, on an extended flat low pass, I rolled inverted without elevator compensation—and lost the radio! (Reed servos maintained neutral without signal.) The ship continued on the same line, slowly faded left in the distance, then faded right, circling the entire area at wide distance, still flat. It came back overhead. I regained control, rolled upright, throttled, and landed dead ahead. If drag and/or power not on a line like present Pattern ships (with the wing and tail) maintained level flight upright, how could it do so when inverted with such an airfoil without compensation? No climb. No dive.

It had other points, too. Taxi at walking speed, hold full-up, and one could walk beside the plane in flight, nose-high on the ground cushion. Picture a flared landing at that speed. On another occasion the radio was lost except for the rudder (How did one lose eight out of 10 channels?), and the plane was saved and landed. There was shallow dihedral—you can see its importance on a true basic trainer. I consider a Falcon Senior in the same ball park with .35 power.

We hackers are snowed by guys who insist you gotta have "POWER" to get out of tight spots. If we get into a tight spot, all that power is, in nine out of 10 cases, pouring kerosene on the fire. The farm was already bought! We are reassured that we can always throttle back. I don't believe in the tooth fairy. Beginners don't—they freeze. One supposes that good takeoff technique remains a forever problem with many hotshots. Firewall the thing, blast down the runway briefly, yank elevator, and bore skyward. STOL? What scares them is the incipient takeoff snap. A Kadet, et al, simply is not a full-scale F-15. Son, you *must* fly F-15s. It's fashionable.

Maybe I will go fly the Cox Rally ultralight.

Bill Winter, 4432 Altura Ct., Fairfax, VA 22030. P.S. If anyone wishes to argue about any of the above, don't bother. I'm beyond redemption.

Stunt for Fun Lou Roberts

*Oh, you say you've turned in a circle
Many and many a time;*

*Perfecting the form of the pattern
And it still doesn't look worth a dime!*

*Well, buck up and don't get discouraged—
Remember the aim of this game;
Very few can win and be satisfied,
But we all can stake fun as our claim.*

Super Drone/Johnson

Continued from page 36

and as a fairing for the tank hatch.

Cut out the extra piece of $\frac{1}{8}$ ply for the top of Former #2. I suggest bolting this in place. Build up the tank hatch with $\frac{1}{4}$ -in. balsa. The hatch on my model is held on with a rubberband over 4-40 machine screws; however, an internal hold-down would look better if you don't mind spending the extra time to do that. Round off all corners on the fuselage by sanding, especially at the front of the firewall. Install servo rails.

Landing gear. The main gear is an L-4 size put out by Great Planes. Drill four 4-40 holes in the gear top plate, and attach it to the fuselage ply mount with No. 4 sheet metal screws (or put in blind nuts and use machine screws). I used Sig 8-32 x $1\frac{1}{4}$ -in. socket head bolts for wheel axles with a plain nut at the wheel and an elastic stop nut inside the gear. This works just fine with 3-in. Du-Bro treaded wheels.

The nose gear is a Tatone No. 206S two-leg unit. (I chose a side engine mount because it seemed to offer a better appearance.) If the Tatone unit isn't available to you, good substitutes would be the Fults Tooling Co. gear or a Royal heavy unit. This landing gear arrangement produces a very sturdy setup; the model taxis positively, and it clears unmowed lawn grass with ease. The nose wheel is a treaded $2\frac{3}{4}$ -in. Du-Bro, and steering is via a Du-Bro cable.

Tail surfaces. The model in the pictures has a Sr. Falcon foam stabilizer from Wing Mfg. Co., assembled according to instructions included with the kit. You may prefer to use the Goldberg balsa stab which comes with the kit or to build one from scratch. With the foam stab, cut out the required notch for the fin, and epoxy the finished stab onto the fuselage. Take care to align it properly. When cured, epoxy the $\frac{1}{4}$ -in. balsa fin into the notch, and add the dorsal. Make the sheet balsa elevators and rudder, and hinge them to the stab and fin.

Miscellaneous. My Super Drone is powered by a plain-bearing Fox .45 RC engine. Power lovers might prefer a ball-bearing-type .45 or even a .60 (if they have the skill and reflexes). I had difficulty fitting the muffler, requiring a $\frac{1}{8}$ -in. nylon spacer behind the engine mount and an exhaust deflector attached to the corner of the firewall. Take your particular muffler into account when mounting the engine. A different brand of engine mount may allow fitting the muffler more easily.

I suggest socket head bolts for engine mounting. You may use either blind nuts or elastic stop nuts and washers inside the firewall.

I used a Sullivan RST-8 fuel tank. Try to keep the tank level with the engine's

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ENGINE CLEANER:

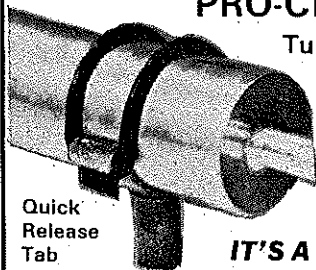
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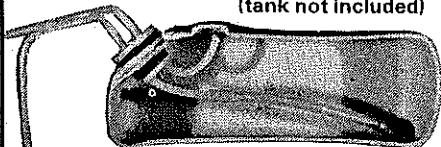
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carburetor as closely as possible. Loosely pack the tank with foam plastic or foam rubber to dampen vibration.

I used olive drab MonoKote covering on the fuselage and white Solarfilm on the wings and stab. Lettering on the wings is the press-on type that I purchased at a local office supplies store. Coverite lettering was used on the fuselage. I was unable to buy the proper size insignia locally, so I used the ones from my Wing Mfg. Co. Drone kit. A similar insignia is available in MonoKote.

Flying. First, balance the Super Drone at the point shown on the plans. Mine required the addition of 3½ oz. of lead under the fuel tank (wrapped in foam rubber). A larger or different engine might lessen the amount of ballast needed.

Since the Super Drone is basically a Sr. Falcon, it flies just like one. It was first flown by Ed Frank, Jr., an expert test pilot and fellow member of the Cloud Kings RC Club. No changes were required on the plane, I am pleased to say.

I wish to thank Eddie Frank for his help in completing the Super Drone and for serving as test pilot. I am dedicating this article to the memory of Eddie's dad, Ed Sr., who succumbed to a heart attack on August 20, 1983. Ed Sr. was an avid RC flier and club officer. He is sadly missed.

I would be happy to hear from fellow AMA members who build the Super Drone. Pictures of your versions would be of interest. Al Johnson, 201 Cream Rd., Oxford, PA 19363.

Radio Technique/Myers

Continued from page 39

models are too big, too fast, too powerful, and too dangerous to continue without fundamental changes in the way that we do things. How many designs ever see a rudimentary *stress analysis*? How many structures are subjected to adequate *proof-testing* prior to first flight? How many aircraft are launched without an adequate *preflight inspection*? How many pilots take other people's lives in their hands every time they fly, due to an inadequate *education* in the situations that can lead to failure, and how to react to them?

I think that this magazine should lead the way into a safer, more responsible future: by addressing the subjects in the paragraph above in detail. What do you think? Send a postcard with your opinion on it.

George M. Myers, 70 Froehlich Farm Rd., Hicksville, NY 11801.

IMAA Festival/Hard

Continued from page 43

Airtronics, 27; World, 16; EK, 8; Cirrus, 6. Control modes used: single stick, 13, Mode 1, 19; Mode 2, 54. Flights recorded: over 700.

States represented: Alabama, California, Arkansas, Texas, Louisiana, Mississippi, Michigan, Missouri, Indiana, Ohio, North Carolina, Virginia, New Jersey, New York, and Kansas.

Some of those attending were Jerry Rhodes and his wife, Martha, from Eagle Pass, TX; Mel Santmyer and his wife from Anaheim, CA; Joe Utasi and his group from Cincinnati, OH; R.C. (Dick) Garmhausen and Miles Reed from Canton, OH; Bob Campbell, Dist. III IMAA director, and his group from North Canton, OH; Howard Mottin and his group from Sterling Heights, MI.

Dick Bennett and his wife and children from Granger, IN; Tom Wilkinson and his group from Montgomery, AL; Wendell Roberts, his wife, Glenda, and their group from Little Rock, AR; Bud Atkinson from Blue Springs, MO; Burnis Fields from Jacksonville, FL; Bob Dean, IMAA Dist. IV director, from Charlotte, NC; Don Godfrey, IMAA president, from Binghamton, NY; Jerry Smith, "official" photographer and IMAA Dist. VI assistant director, from Osceola, IN; Les Hard, IMAA Central Control, and his wife, Mary, from Lansing, MI; Mel and Dorothy Nypuik, IMAA Accessories, from Canton, MI; Pat Massey and his wife from Pampa, TX; Al Willaert from Carrollton, TX.

Sam Hopkins from Folsom, LA; Rusty Allen from Lago, TX; John Vogel and his wife from Gibsonsia, PA; John Violette from LaPlace, LA; Chris Joiner from Columbus, GA; Bennet Aiken from Suwanee, GA; Warren Shea from Westfield, NJ; Doss Steed from Belle Mead, NJ; Al Feeley and his wife from Jacksonville, FL; Ian Senior from Jacksonville, FL; Dick Koncle from Smyrna, GA; J.W. Jones from Dallas, TX; Dick Wrangler from Nashville, TN; Chuck Pumilia from New Orleans, LA.

George Jordan from Cocoa Beach, FL; Bill Edwards from Picayune, MS; Sam Rosenbloom from St. Louis, MO; Dave West from Perry, OH; Budd Crane from Madison, OH; Bob Anderson from Lillian, AL; Larry Horbacz from Brunswick, GA; Jim Barrett from Metairie, LA; Ben Beaird from La Grange Park, IL; Mario Yederlinic from Boca Raton, FL; Bob Smolinski and his group from Mt. Clemens, MI.

There were many more registrants attending, participating, enjoying the warm southern clime, and marveling at the many Giant Scale aircraft on display and being flown.

Manpower was furnished by members of IMAA Chapter 29: Bob Archer, M. (Bumper) Lyons, Jerry L. Bates, Larry E. Brown, Bruce Lund, Dick McKenzie, Mike Richardson, Rolf Skimmer, Robert Shoels, Bart Waltman, James Waltman, Sam Chest, Nolan T. Gray, Arthur Chadwell, James McGowen, Charles Moses, John Swope, Henry Waltman, Jeff Williams, and Mark Hilton. The local Boy Scouts assisted with car parking.

Even though the Fifth Rally of Giants