JULY, 1969 — 50 CENTS

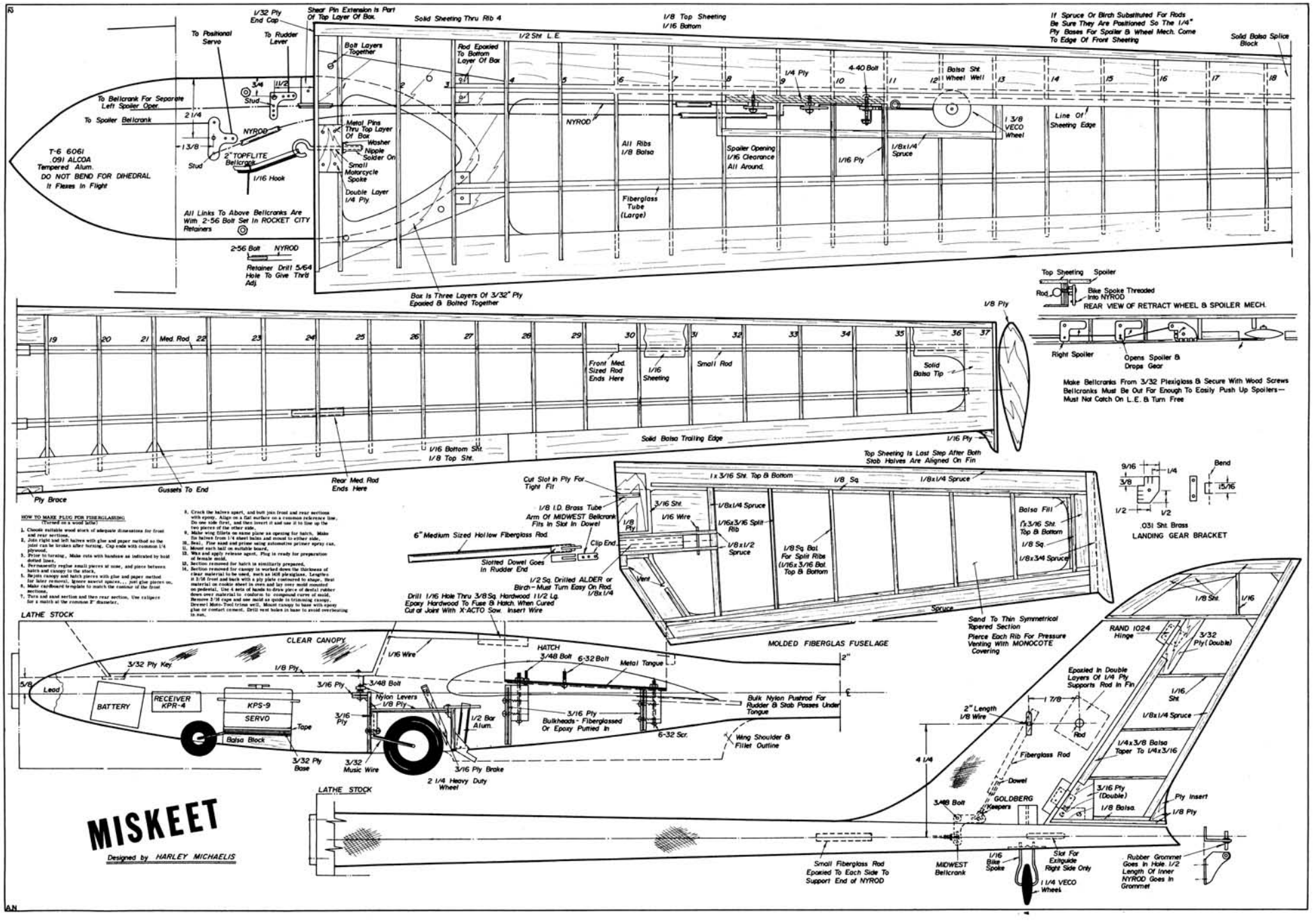
# flying models

Radio Seaplane:
Willem Aarts'
"SCAMPI"
Flying Boat

Carl Lorber on
UNDERSTANDING THE THERMAL

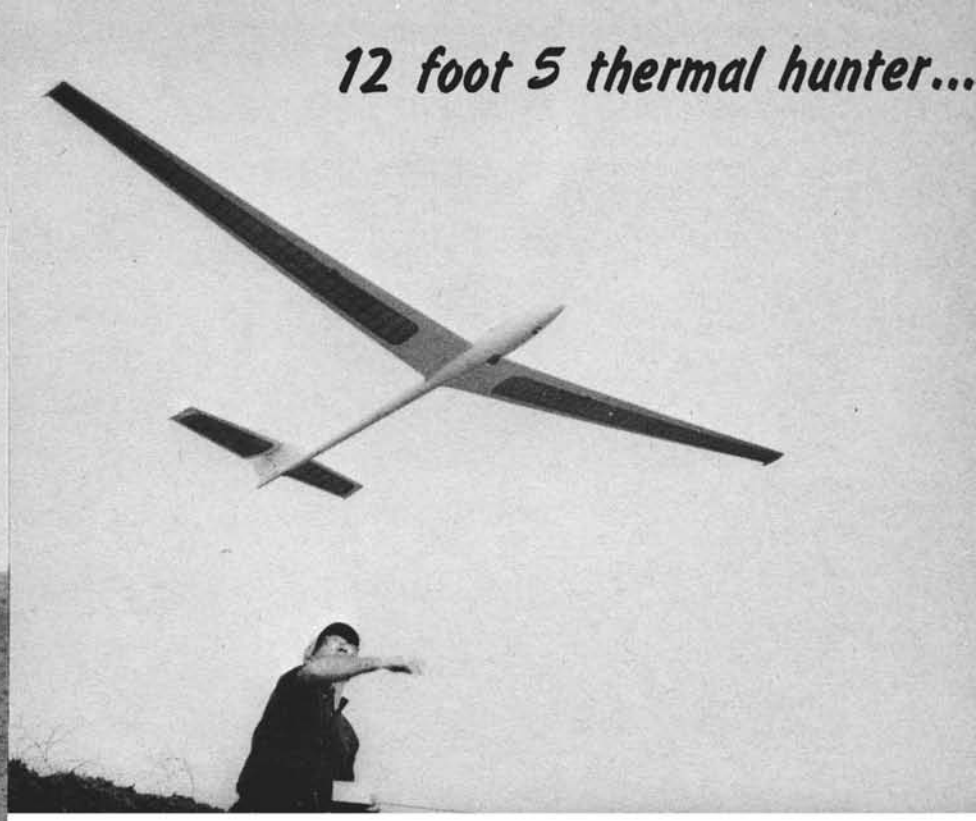
Harley Michaelis'
"MISKEET" SOARER
12'5 Giant R/C

NEW JERSEY
R/C SHOW


MISKEET
Designed by HARLEY MICHAELIS
T-6 6061 .091 ALCOA Tempered Alum. DO NOT BEND FOR DIHEDRAL It Flexes In Flight
To Bellcrank For Separate Left Spoiler Oper.
To Spoiler Bellcrank
2" TOPFLITE Bellcrank
All Links To Above Bellcranks Are With 2-56 Bolt Set In ROCKET CITY Retainers
To Positional Servo
To Rudder Lever
1/32 Ply End Cap
Shear Pin Extension Is Part Of Top Layer Of Box.
Solid Sheeting Thru Rib 4
1/8 Top Sheeting
1/16 Bottom
1/2 Sht L.E.
Bolt Layers Together
Rod Epoxied To Bottom Layer Of Box
Metal Pins Thru Top Layer Of Box
Washer
Nipple Solder On
Small Motorcycle Spoke
Double Layer 1/4 Ply
NYROD
All Ribs 1/8 Balsa
Fiberglass Tube (Large)
Box Is Three Layers Of 3/32" Ply Epoxied & Bolted Together
Spoiler Opening 1/16 Clearance All Around.
1/16 Ply
1/8x1/4 Spruce
1/4 Ply
4-40 Bolt
Balsa Sht. Wheel Well
1 3/8 VECO Wheel
Line Of Sheeting Edge
If Spruce Or Birch Substituted For Rods Be Sure They Are Positioned So The 1/4" Ply Bases For Spoiler & Wheel Mech. Come To Edge Of Front Sheeting
Solid Balsa Splice Block
2-56 Bolt
Retainer Drill 5/64 Hole To Give Thrill Adj.
Front Med. Sized Rod Ends Here
1/16 Sheeting
Small Rod
Solid Balsa Tip
1/8 Ply
Solid Balsa Trailing Edge
1/16 Bottom Sht.
1/8 Top Sht.
Gussets To End
Rear Med. Rod Ends Here
Ply Brace
Top Sheeting Is Last Step After Both Stab Halves Are Aligned On Fin
Top Sheeting Spoiler
Rod
Bike Spoke Threaded Into NYROD
REAR VIEW OF RETRACT WHEEL & SPOILER MECH.
Right Spoiler
Opens Spoiler & Drops Gear
Make Bellcranks From 3/32 Plexiglass & Secure With Wood Screws Bellcranks Must Be Out Far Enough To Easily Push Up Spoilers— Must Not Catch On L.E. & Turn Free
Cut Slot In Ply For Tight Fit
1/8 I.D. Brass Tube
Arm Of MIDWEST Bellcrank Fits In Slot In Dowel
6" Medium Sized Hollow Fiberglass Rod.
Clip End
Slotted Dowel Goes In Rudder End
1/2 Sq. Drilled ALDER or Birch - Must Turn Easy On Rod. 1/8x1/4
Drill 1/16 Hole Thru 3/8 Sq. Hardwood 1 1/2 Lg. Epoxy Hardwood To Fuse & Hatch. When Cured Cut at Joint With X-ACTO Saw. Insert Wire
1 x 3/16 Sht. Top & Bottom
1/8 Sq.
1/8x1/4 Spruce
3/16 Sht.
1/16 Wire
1/8x1/4 Spruce
1/16x3/16 Split Rib
1/8x1/2 Spruce
1/8 Sq. Bal. For Split Ribs (1/16x3/16 Bal. Top & Bottom
Balsa Fill
1/8 Ply
Vent
Spruce
MOLDED FIBERGLAS FUSELAGE
Send To Thin Symmetrical Tapered Section
Pierce Each Rib For Pressure Venting With MONOCOTE Covering
9/16
1/4
3/8
1/2
Bend
15/16
.031 Sht. Brass LANDING GEAR BRACKET
HOW TO MAKE PLUG FOR FIBERGLASSING
Thread on a wood bolt!
1. Choose suitable wood stock of adequate dimensions for front and rear sections.
2. Join right and left halves with glue and paper method so the joint can be broken after turning. Cap ends with common 1/4 plywood.
3. Prior to turning, Make cuts with bandsaw as indicated by bold dotted lines.
4. Permanently reglue small pieces at nose, and piece between hatch and canopy to the stock.
5. Rejoin canopy and hatch pieces with glue and paper method for later removal. Ignore nearest spaces... just glue pieces on.
6. Make cardboard template to match the contour of the front sections.
7. Turn and sand section and then rear section. Use calipers for a match at the common 3" diameter.
8. Crack the halves apart, and butt join front and rear sections with epoxy. Align on a flat surface on a common reference line. Do one side first, and then invert it and use it to line up the two pieces of the other side.
9. Make wing fillets on saw me plane as opening for hatch. Make fin halves from 1/4 sheet balsa and mount to either side.
10. Seal. Fine sand and prime using automotive primer spray can.
11. Mount each half on suitable board.
12. Wax and apply release agent. Plug is ready for preparation of female mold.
13. Section removed for hatch is similarly prepared.
14. Section removed for canopy is worked down the thickness of clear material to be used, such as 1618 plexiglass. Lengthen it 3/16 front and back with a ply plate contoured to shape. Heat material on cookie sheet in oven and lay over mold mounted on pedestal. Use 4 sets of hands to draw piece of dental rubber down over material to conform to compound curve of mold. Remove 2/16 rope and use mold as guide in trimming canopy. Dremel Moto-Tool trims well. Mount canopy to base with epoxy glue or contact cement. Drill vent holes in base to avoid overheating in sun.
LATHE STOCK
CLEAR CANOPY
3/32 Ply Key
1/16 Wire
1/8 Ply
HATCH
3/48 Bolt
6-32 Bolt
Metal Tongue
2"
3/16 Ply
3/48 Bolt
Nylon Levers
1/8 Ply
Bulk Nylon Pushrod For Rudder & Stab Passes Under Tongue
3/16 Ply Bulkheads - Fiberglassed Or Epoxy Putted In
6-32 Scr.
Wing Shoulder & Fillet Outline
1/2 Bar Alum.
3/16 Ply
Tape
Balsa Block
3/32 Ply Base
3/32 Music Wire
3/16 Ply Brake
2 1/4 Heavy Duty Wheel
5/8
Lead
BATTERY
RECEIVER KPR-4
KPS-9 SERVO
LATHE STOCK
Small Fiberglass Rod Epoxied To Each Side To Support End of NYROD
MIDWEST Bellcrank
1/16 Bike Spoke
Slot For Extguide Right Side Only
1 1/4 VECO Wheels
Rubber Grommet Goes In Hole 1/2 Length Of Inner NYROD Goes In Grommet
RAND 1024 Hinge
3/32 Ply (Double)
Epoxied In Double Layers Of 1/4 Ply Supports Rod In Fin
1/16 Sht.
1/8 Sht.
1/16
1/8x1/4 Spruce
1/4x3/8 Balsa Taper To 1/4x3/16
2" Length 1/8 Wire
7/8
Rod
Fiberglass Rod
4 1/4
Dowel
GOLDBERG Keepers
3/48 Bolt
3/16 Ply (Double)
1/8 Balsa
Ply Insert
1/8 Ply

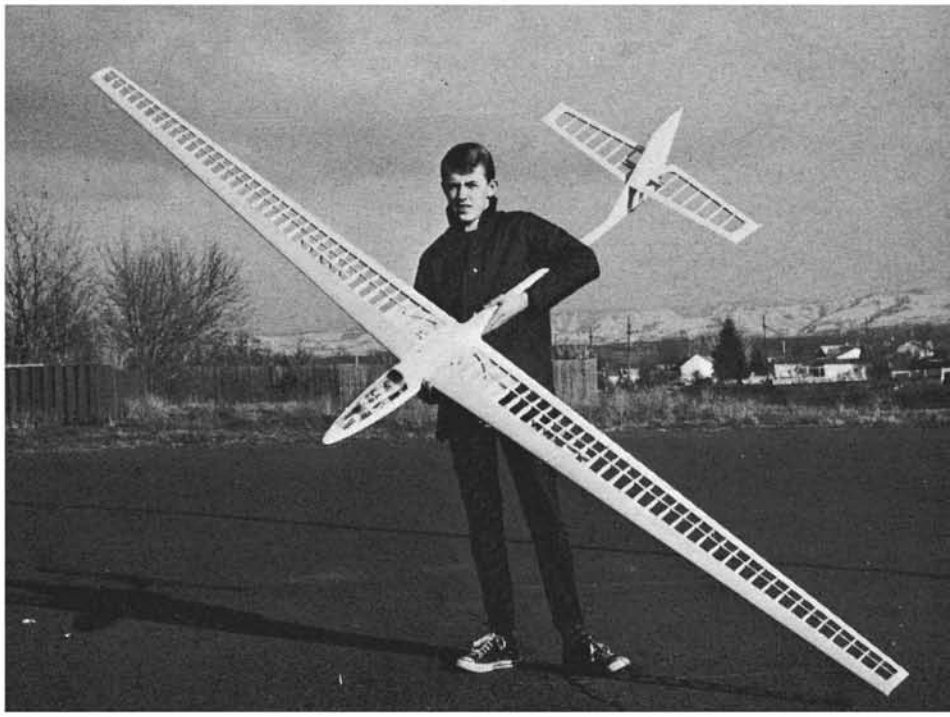
**An R/C towhook release, radio triggered wheels in wing... two servos commanding spoilers, arrow-shaft spars, fibreglass fuselage... almost the ultimate soarer!**

*12 foot 5 thermal hunter...*



*Harley Michaelis'*

# "MISKEET" Soarer



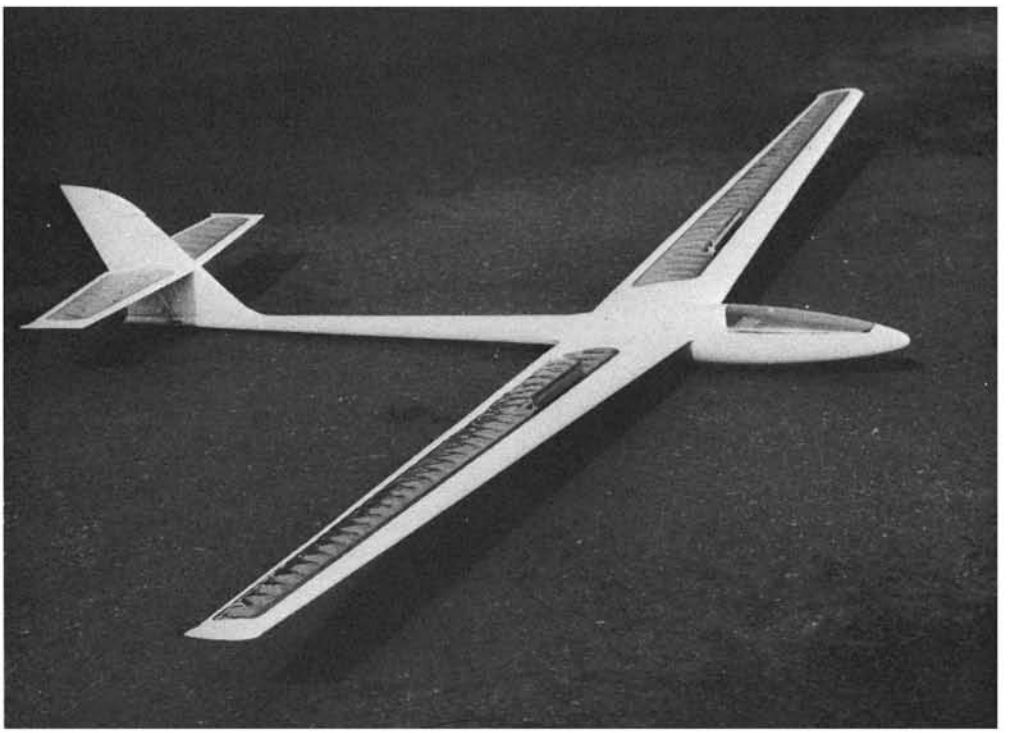
Son Greg is dwarfed by the 12 foot framework.

### INTRODUCTION— MISKEET SOARER

♦ The Miskeet is 150" of soaring proficiency. Its performance is magnificent. You see its sink rate, its glide ratio, its mastery of soaring flight . . . and almost don't believe it. Its beauty is such to stop and draw the breath of most any passerby. Eight separate control functions from only 3 servos give an exceptional degree of control sophistication. Building it is an ambitious project that will bring out the best of your skill and talent. As you go along, visions of its capability will fire your imagination, feed your creative urge and make it become an adventure full of excitement and promise.

The "Miskeet" is much that doesn't

# "MISKEET" Soarer

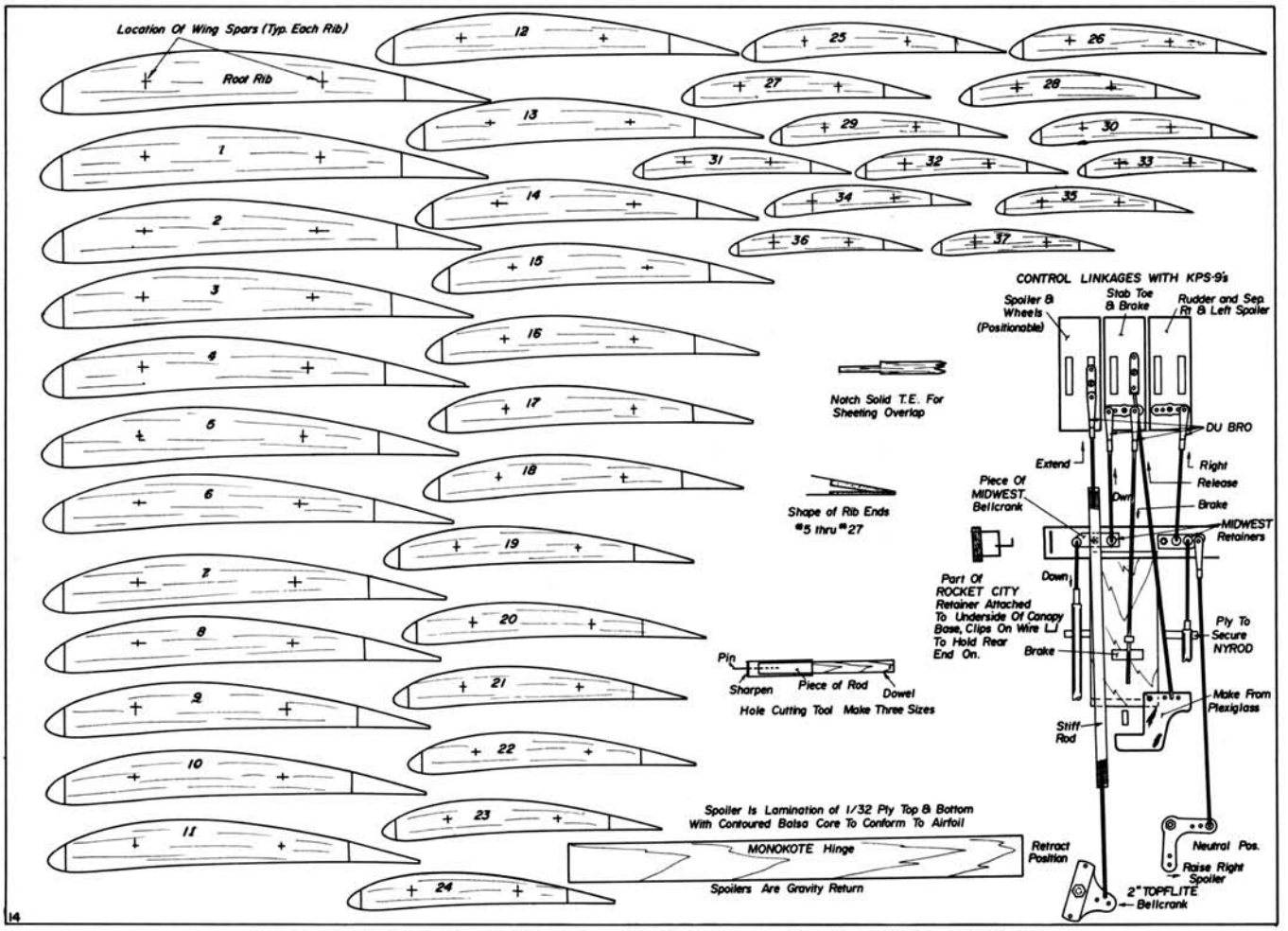


Spoilers raised, effective for turns and descent.

meet the eye and your attention needs directing. Foremost, it is an R/C soarer designed specifically for use with today's state of the art gear, and to at least partially utilize this gear's great potential. Aside from the large, clear canopy, a pretty that just couldn't be resisted, its design is wholly functional. Yet, its lines are grace and symmetry befitting today's high performance, full scale soarer.

The 8 function control system includes unique devices which permit (1) voluntary tow release, (2) proportional wheel brake and (3) proportional spoilers. 4th and 5th controls are rudder and stabilator, on which the ship will handle quite well alone. The spoilers give additional control and are dual-purpose, subject to the command of two separate servos. On a positionable channel, a separate servo operates them as normal spoilers to assist in descent and approach. Simultaneously, wheels retract from the wings as a 6th function to support the wings in landing and for ROG tow. Ailerons are eliminated by the independent operation of the separate right and left spoilers, a function of the rudder servo, giving the 7th and 8th controls.

Consider the practicality of the rud-




**FULL SIZE PLANS AVAILABLE THROUGH "MODEL PLAN SERVICE"**

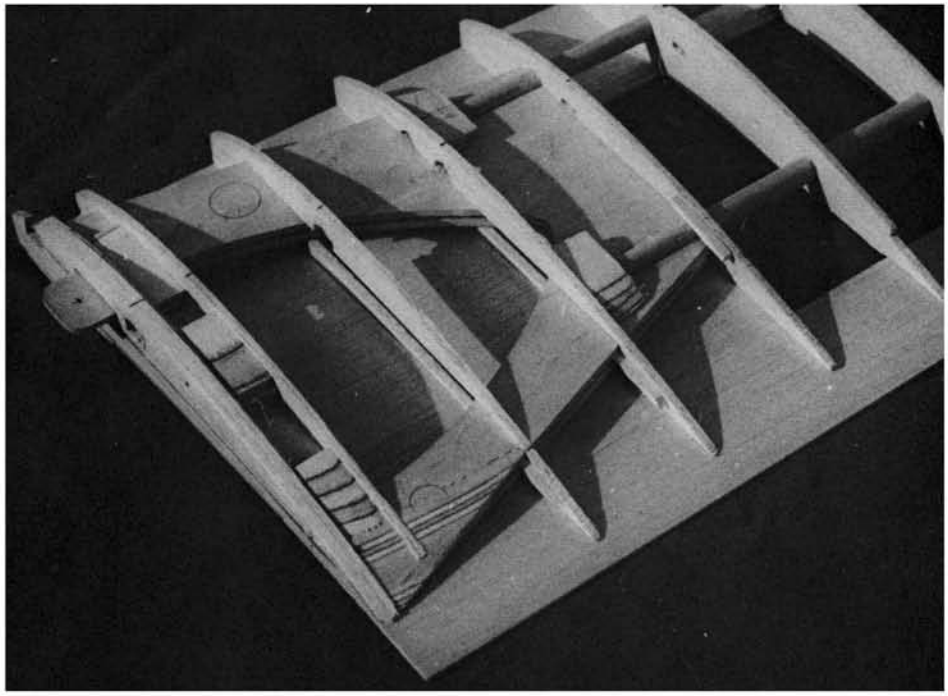
der-spoiler arrangement versus coupled rudder-ailerons. First, you eliminate the fabrication and upkeep of the ailerons, about 10 feet of pushrod, linkages, bellcranks, keepers, hinges and also those horns that stick out and fan the breeze. Since, in sailplanes, any ailerons are primarily used for turn assist, rather than for rolling maneuvers, the same objective is more simply accomplished when a single spoiler extends along with rudder motion. It creates some drag and cuts some lift to help make the turn. In the landing approach, you are taught in full scale flying to hold the ship straight with rudder only as you near touchdown. Coupled rudder-ailerons give an unwanted rolling tendency and this is eliminated in the "Miskeet" spoileron system since only rudder is effective when the spoilers are opened together by the positionable servo.

Rudder and stabilator are aerodynamically balanced to avoid loading the servos excessively, a factor to consider in large moving surfaces. Fiberglass spars give a wing of exceptional strength that permits great flexing. A molded fuselage, clear canopy and wing hatch are yours for less than you could do it yourself. The rest of the ship is quite readily asembled from plans. Linkages into the wing panels that control the spoilerons employ the Rocket City retainer for instant connect and disconnect, and its less than a 5 minute job to assemble the ship for flight. Dismantled it goes in an ordinary V.W., with room left over for your lunch and even a small wife! Your electric winch won't take much room and the tools you need for soaring in pure form will fit in your shirt pocket!

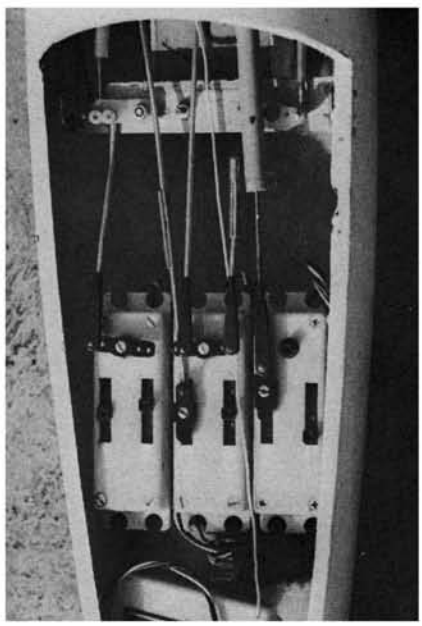
Look over the exterior. Note the almost total absence of visable hardware. Only the rudder horn and a bit of its linkage shows. The receiver antenna is safely tucked away down the fuselage. Not a single bolt, dowel, screw or rubber band disrupts the clean lines. You peer into the canopy and see only its base . . . no servos, wires or connecting linkages. Ya gotta have a pilot? . . . make a head from a ping-pong ball. See the receiver switch? . . . no you don't! what nonsense! When you may be up all day, what's a second to lift the canopy and flip the switch? Why mar the side with an ugly hole?

You fine artisans who combine wood and cover and finish to dazzle the eye, we envy your able hands . . . what "Miskeets" you will form into being! Us average builders, though . . . we can pull it off, too. Step by step it really isn't so tough and our "Miskeets" will also catch an eye or two along the way and be remembered.

Fair warning now to those susceptible to the soaring bug . . . BEWARE OF MISKEET FEVER! This is a highly contageous malady usually caught at first sight of a soaring Miskeet. Its symptoms are sleeplessness and daydreaming coupled with endless visions of soaring overhead . . . and you at the transmitter, in mastery of the thermal and the slope. The only possible cure is owning a "Miskeet" of your very own, and eventually you may get it out of your system!



The wing tongue slips into beefed up wing ends.



Links on left side of board are (from top down): 1st servo; main link to rudder intermediate lever. 2nd servo; 1. to tow release bellcrank. 2. to brake lever. 3. main link to stab intermediate lever. 3rd servo; positionable channel to spoiler bellcrank on wing tongue.

Links on interboard: Kwik-link to spoiler bellcrank (Midwest) on tongue. Rudder Nyrod under tongue to tail end. Link on bottom end of 2nd lever is stabilator pushrod to end of tail.

### DESIGNER'S NOTE

*The MISKEET has been the most exciting thing in my life since meeting my wife, Pat (Jan. Flying Models cover). She doesn't dig this soaring madness, but has sympathetically watched over me during my personal case of "Miskeet Fever," now four months along. I caught mine in bed one night half-asleep, half-awake, wondering "What next?" after the TRI-BELLE. It passed briefly overhead, all white, reflecting the golden rays of a setting sun, and I haven't slept well since.*

*In truth, its design and construction were more than I could readily handle and many times the project would lay near-abandoned. When ways to engineer and build it were finally found, I became ambitious about auxiliary controls for tow release, wheel brake, spoilers and retracting wheels to support the tips. The market and mags offered either nothing at all, or nothing applicable. Practical ideas for these eventually came to mind. Those in the prototype may be somewhat crude, but they work as planned. If, they are sometime offered in molded nylon, the precision and convenience of a pre-built device will be worth the price.*

*To the first 3 builders reporting a finished and flying 'MISKEET" with all 8 functions installed and working, I am personally offering a cash award . . . $15 for 1st, $10 for 2nd and $5 for 3rd. You are strictly on your honor, fellows. To qualify I want a photo of you and your "Miskeet" together and the date and local time it first became airborne off a tow or slope. Please describe how you rigged up your controls with your particular gear and if possible, include photos. I'll try to twist "All Wet's" arm to run the pics.*

*Now let's build! MISKEET weather is here!*

*Harley Michaelis*
*26 S. Roosevelt*
*Walla Walla, Wash. 99362*

**Building the Miskeet**

### BUILDING THE MISKEET

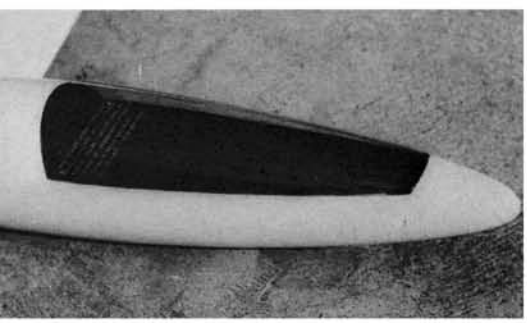
● It cost me over forty dollars to build my fuselage, hatch and clear canopy from scratch and is a beastly job. The

*(Continued on Page 36)*

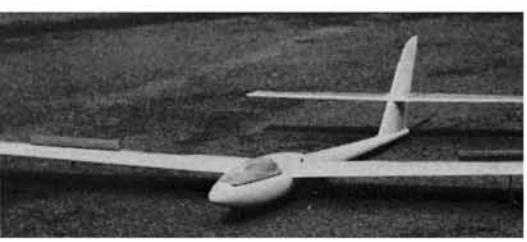
# "Miskeet" Soarer

*(Continued from Page 15)*

plug was lathe turned, fillets and fin added, female molds made and then final fiberglass parts. Those of you familiar with the procedure may want to form your own. However, I made arrangements for these items to be purchased for twenty nine dollars and ninety five cents shipped prepaid to you. You may order direct from PMP Co., 2893 Shoshone Ave., Englewood, Colo. 80211. Give color preference including second choice. The fin comes unjoined so the internal hardware may be installed. An epoxy putty compound is included t oclose it up. Details follow in this article. The wing panels use hollow fiberglass rods for spars in 3 telescoping sizes. These give a warp-resistant wing of exceptional strength. The rod that support the stab halves is also fiberglass and a bit is in the fin. While you may want to substitute balsa or spruce for these parts I highly recommend their use. With them the wing is simple to build and align and you simply cannot fold a panel. The rods can be re-used. Arrangements were made with a local archery manufacturing firm for the required rods in the ship and you can order the complete set from me at seven dollars and fifty cents, prepaid. These are prime rods, especially chosen for the purpose. Once you build a wing with them, I don't think you would again use other materials. Send me a stickum label with your name and address on it. One 6 foot roll of the new transparent Monokote is more than enough to cover all open



The molded canopy adds the final grace.



Kraft system buries smoothly within the pod.

areas and the results are beautiful. Note other hardware items on plans and pick up or order so all will be on hand.

While waiting on plans and orders you might study the way I set up the 8 function control system with KPS-9's and try to get a system lined out with your particular servos. Through the use of the intermediate levers, even a servo that moves in a single direction on command can be linked up to give multiple functions. Note how a center pivoting lever with holes on either side can move stabilator, brake and tow release simultaneously. Direction is changed by hooking the wire connector from servo to lever to a hole on the opposite side of the pivot point, so it is immaterial which direction the servo goes. The requirement is that the arm for the stab and brake move rearward on down command, and that the arm for the tow release move forward. If your servos have a single rotary output, like the new ultra-miniatures, you migh hook directly to the servo. However, if you first run to a lever you can better space the holes to control throw and not crowd the installation. Note that in all set ups, that brake motion is very small, about 1/16" and that the Midwest nylon retainer that shoves the brake lever makes contact only near full down. Tow release motion is large, adjustable both at the lever, and on the release bellcrank that is mounted on the device. Throw for stab is such to move it in an arc of about ¾". This will permit spins, but in normal flight just a hair of motion will be enough. All holes are a source of bind or slop and should be accurately fitted to retaining links to assure that surfaces will return to neutral. Choose clevises without end play.

Note that each function has its independent trim adjustment. However, the threaded connectors that go in the inner tube of the nylon within nylon pushrods for rudder and elevator are strictly deeply set with epoxy. Do some dry runs with copper wire and ply levers and use as patterns in cutting and shaping the final items. Make sharp right angle bends in the wires so they fit holes nicely and cut the vertical portion long enough to accept the little yellow donut-shaped Midwest retainers. Construction should begin with fuselage items, but while waiting for it, you can work on the stab, if you get the plans first.

**Stab Construction:** On a flat surface, join the bottom 3/16" sheet tip, leading and trailing edges of one of the halves. Add the various ⅛" thick members. Invert the structure and build an opposite on it back to back. Pin both in position on plans. Cut and notch the ends of the four ⅛" by ½" spruce pairs that support the drilled alder sticks. Cut the arms off a nylon bellcrank to ¾" length and slot the ends like a Rocket City retainer. Shave down the sides equally to just fit inside the ends of the 6" hollow fiberglass rod on which the stab halves with pivot. See notes under wing construction regarding source of the 6" rod. Slot a pair of ⅞" long dowels ½" deep to accept the retainers and fit as units in the rod ends without bind or slop. Slip in, leaving ¼" retainer exposed. Position between stab halves and mark the spruce pairs where the 1/16" dia. holes must be drilled to align with the retaining holes. Drill holes and slip 1/16" dia. music wire in them. Glue the drilled alder sticks between the spruce pairs and then secure the pairs in precise position with 3/16" sheet to fit between the open areas on the bottom. When this supporting rod is secured to the fin and the stab halves mounted to it, it will become apparent where the precise position of the retaining units will be. The units will then be pinned in this precise position in the rod, and the wires permanently epoxied to the spruce pairs. The two halves are put in the same plans, on the rod. Note how the brass tube that fits on the ends of the "T-bar" is epoxied in a slot in pieces of ⅛" ply. The tube fits snugly and can be first adjusted vertically for proper alignment while the ply is held flush to the bottom 3/16" sheeting. It is then epoxied to the ply. The ply is then glued to the 3/16" sheet so as to align the tube with the T-bar end and permit easy insertion. It is well to have the ply pieces cut with a little play on all sides. You can fill in around them with ⅛" balsa, prior to topping off the structure with the upper 3/16" sheeting. Add the 1/16" by 3/16" soft balsa half ribs and sand the assemblies to thin, symmetrical, tapered sections. If you plan Mono-Kote use, each rib and the inside ⅛" members should be pierced to allow for pressure relief in hot weather. Inside edges of halves are parallel to each other and fit 1/16" away from the fin surface. They should freely pivot on the rod.

**Rudder:** Note that plywood reinforcers are built in the areas where the hinges go. Be sure to file a thin slot between each set to accept the Rand 1024 hinge. Set 1/16" dowels through the ply and hinge to secure in position. After the sheeting is added, the dowels won't show, and the Hobby-Poxy "Easy Does It" treatment eliminates covering and provides a nicely finished surface.

**Fuselage and Fin:** Note in photos and plans what goes in the fin. Apply masking tape to mark position and shape of slots and holes. A Dremel Moto-Tool is a great help in cutting, but the job can be done with a drill and round files. The "T-Bar" (part of a medium sized fiberglass rod . . . see item (b) in Wing Construction text) actuates a Midwest bellcrank positioned so its center hole falls on the centerline of the fuselage side. The bellcrank is drilled to freely pivot on a 3/48 bolt. The bolt is supported by a plywood plate on either side. One plate is first epoxied to the left side and a bolt hole drilled through side

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Stab and Rudder pushrods are bulk nylon within nylon type. In the prototype these run down fiberglass rods I epoxied along either side for reinforcement. However, PMP Co. deemed this reinforcing unnecessary, and you will have to epoxy a 2" length of small rod (see Wing Construction text, item (b) under Small Rods) along the centerline of each side to position and secure the end of the pushrods. Make the T-bar linkage of such length that you have neutral stab setting when the lower arm of the bellcrank points straight down as in the photo. When the sides are finally joined, all this becomes rather irrevocable, so do it right. The threaded connectors are deeply set in the inner tubing and further secured with epoxy. The small grooved block in the photo of the fin interior permits a removable tailwheel to be inserted after the pushrods are in and the seams closed up. The rudder pushrod runs between the tailwheel wires and to the side of the wheel. Use the Micro-Molding exit guide. Note the rudder connector comes out and straight up into the rudder horn. Form the special shaped rudder horn as shown from whatever plastic box or container you might find. I stole a piece of Tupperware off my wife . . . a fairly stiff nylon divider or partition of some kind with a nice right angle in it. Drug stores have many plastic containers lining the shelves and almost any stiff one will do. Note that the threaded connector slips into a piece of the inner nylon pushrod that is secured by a rubber grommet set in the hole in the rudder horn. This permits the rudder horn to move up and down as it travels and eliminates bind.

The rudder uses the Rand 1024 hinge. Set in pieces of harder wood on either side of the fin, top and bottom, and cut a thin slot to accept the hinges snugly. Secure with epoxy and dowels in final assembly. Note that the rudder similiarly contains ply reinforcers in which the hinges go.

The plywood block that supports the rod for the stab is made from two pieces of ¼" ply and is fitted to neither bulge or compress the sides when they are finally joined. The rod should tightly fit the hole and doesn't pivot. Insert and secure the rod after the fin is joined. Each stab should clear the fin about 1/16" and the rod must be thus positioned in the hole. I joined the fin of the prototype with a border of balsa around the edges of each half. PMP uses an epoxy putty to do so . . . take your choice. The remaining unjoined seams at the fuselage end can be joined with the putty, or fiberglass resin or epoxy glue and a thin fiberglass cloth layed inside. Avoid bonding the inner tube of the pushrods.

The wing tongue is secured by 5/32" dia. bolts set in hardwood blocks that are glued and screwed to ¼" ply bulkheads. The bulkheads are secured by fiberglass and resin . . . plenty of it. Note photo of the block and bulkhead setup. The prototype tongue uses Alcoa tempered aluminum T-6 6061, .091" thick (about 3/32"). This can be cut to shape (slowly) on a jigsaw. Mount it in place without any bend. The wing will bend it just right in flight. The solid tongue weighed 12 oz. and with the cutouts, 6½ oz. The retract wheels support the wings on the ground so they don't sag. Try the solid tongue first, and consider making cutouts only if it seems necessary to lighten the ship.

**Gear Installation:** With Kraft gear the prototype required 12 oz. lead to balance at ⅓. After initial test glides 6 oz. were removed balancing 50%. Handling characteristics remained satisfactory with good directional stability. No tendency to fall off abruptly or snap roll appeared at higher angles of attack and slower speeds. If you have heavier gear, balance should be no problem, particularly with the pair of fiberglass rods being left out of the PMP fuselage. Keep gear well forward and extra ballast may be completely eliminated. The canopy base will have to be open to house the original Heathkit received. Other gear should fit under a solid base okay.

The main belly wheel, wheel housing, brake, tow release and intermediate lever board is assembled into a single unit. Prior to securing it permanently in the ship, all intermediate levers should be in final form and attached to the interboard. Use a heavy duty wheel as it will have to take a pounding. The interboard should extend to the sides so the inverted "U" shaped wires that hold the canopy base down can be secured in proper position near the ends. Note that part of a Rocket City retainer is secured under the canopy base and clip over these "U's". Drill 1/16" dia. holes for the U ends, about ½" apart and then bend the U to fit. If holes are loose when you try to press the retainer over them, put a drop of water in the holes to tighten up. When precise position is determined vertically, remove canopy base, and epoxy the U's to the board with a drop around each wire.

The edges of the canopy base are beveled and the clear canopy is roughed up where it contacts this base and is epoxied to it. It is important that your base fit flat on the fuselage prior to affixing the canopy to it. Put identification on top of the base.

Contour a solid balsa base to fit the fuselage under the servos and fiberglass or epoxy this to the fuselage. Form the small front wheel and its 1/16" dia. wire gear. Cut a hole for it in the fuselage bottom and groove the solid balse base so these wires lay in it. Then put a 3/32" ply cap over the balsa to secure the wheel. This ply cap is the servo base. Use serve mounting tape. When servos are secured, form your links from servo to intermediate levers. Make sure every hole is bind-free, but without slop. Drill holes in the wing tongue for the bellcranks that operate the spoilerons. These are the Top Flite 2" and Midwest bellcranks. Drill holes in them so the retaining wirestuds fit very tightly. Use Du-Bro wire here for tighter fit to the Rocket City retainers. Put washers under the Top-Flite bellcrank to get enough space under it so the link from the spoiler servo doesn't grind against the tongue. Shave a bit off the underside, so it will still turn freely when the nut is tightened down on the nylon insert, and use a lock washer. Drill out the Midwest bellcrank to turn freely on a 3/48 bolt. Secure the bolt tightly with a lock washer and nut and then hold the bellcrank on with a nylon lined nut.

**Wing Construction:** The set of fiberglass rods has 4 large, 3 medium and 3 small rods in it. Carefully cut these, as follows:

Large rods: Cut each to 31 ¼" to fall midway between ribs 18 and 19. Save the ends. These are first spar sections.

Medium sized rods:

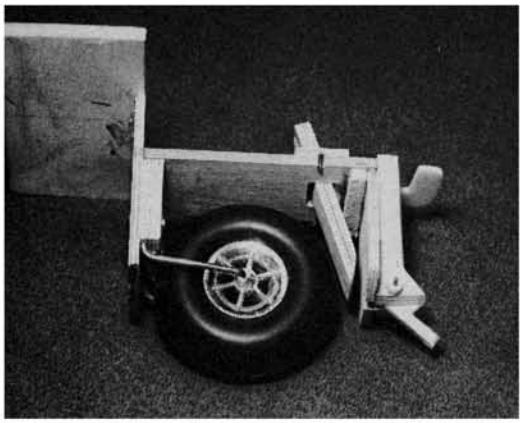
(a) cut two to 23 ¾". These are inserted in the large rods to fall between ribs 29 and 30. Then cut the remainders to 6" length for stab supports. Save the ends.

(b) Cut one into two 13½" lengths. Insert these in the other pair of large rods forming the rear spar, and to fall between ribs 24 and 25. The piece left over may be used for the link between the stab bellcrank and the "T-bar". See plans and text on fin hardware.

Small rods:

(a) Cut one in half and insert in the front spars to reach to rib 36.

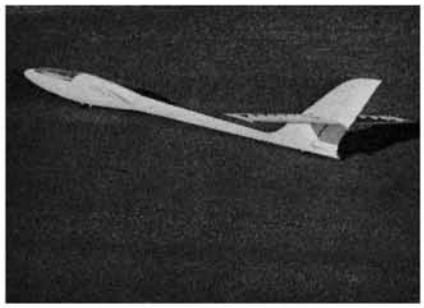
(b) Cut two to 25" and insert in rear spars to reach to rib 36. Cut two 2" pieces off the excess for use in the end of the fuselage as support for the



The wheel brake assembly.

pushrods. See plans and text on fuselage and fin items. Save the ends.

Use and end of each size to make a hole cutter as follows: Sharpen an end by rotating it against a file. Then file notches or teeth in it about 1/16" apart with a small triangular file. Fit a dowel to each piece as a handle, and center a pin in the dowel. Recess the dowel 3/32" in the cutter. Pin cutter to the dowel. Press cutter into balsa and rotate to cut holes in ribs. The boxes in which the wing tongue slips are made entirely of 3/32" ply. To avoid splitting under stress the 3 layers should be epoxied and bolted together. The large rods lay on the top of the bottom layer, so notches are cut in both the spacer and the top layer of the box. Epoxy the rods in such position on the bottom layer so their centerlines match the plans to properly fit holes in ribs from #4 on out. Hold rods flush to the ply with a heavy weight until cured. Cap over rod ends with a clip made of ¼" ply, glued and screwed down. The most difficult part of wing construction is getting a good fit to the fuselage shoulder. I suggest you first cut the 1/32" ply root rib cap to fit the shoulder on the fuselage. Then cut the slot in it to fit over the wing tongue and shear pin extension, and shove the tongue fully in the box. Cut and slip on rib 4. Then cut the split ribs between the root and 4 and eyeball them for a nice lineup between the root and 4, keeping in mind that ⅛" sheeting goes on top and 1/16" on the bottom. The rear of the box will have to be tapered down with a disc sander for sheeting to fit. Drill and insert a small dowel or stick in the rear side of the spacers to hang the stub end of the ribs 2 and 3 on. The wing hooks are bent from 90 Honda or other smaller motorbike spoke, and the nipples secure them to the plywood block that is epoxied between root ribs and 1. All ribs after 4 are simply friction fitted on the rods and are not glued. Note that some ribs have smaller holes in the rear than in front. Don't get "hole happy" and ruin a series of ribs with oversize holes in the rear. Do not put on the leading edges until the ¼" ply bases for spoiler devices and retracting wheels are in. Prior to top sheeting between root and rib four, it is necessary to fit and install the pushrods and linkages for these devices.



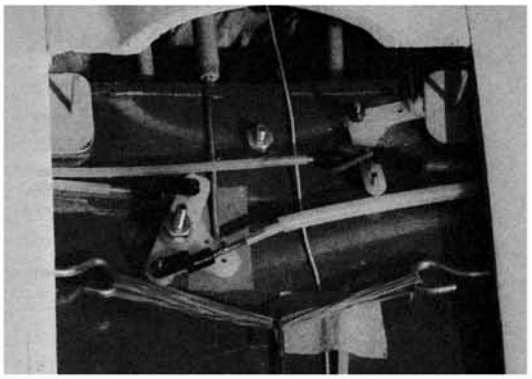
Red; gold; turquoise; marigold; apricot; bronze; river green; gun metal; royal blue; purple; maroon; emerald green; silver; Prussian blue; sand and bright orange colors are possible on fibreglass fuselages to fit. So, I suppose you want a pale, pale black.

Any desired amount of washout may be put in the tips simply by twisting the rods on the ribs. If the holes fit tightly the position will hold. I covered the open areas of the wing and stab with transparent MonoKote, cutting with use of a 6 foot length of flat bar aluminum obtained at a hardware store. I lapped 5/16" over finished Silron on the wing and ¼" on the stab. Black regular MonoKote cut ⅜" wide and a hair over ¼" were then placed over the joint as trim. The Silron, of course, was put only on sheeted areas, and wrapped around leading and trailing edges to eliminate seam lapping. The transparent MonoKote is the spoiler hinge. The spoilers must be fitted loosely and with about 1/16" space between spoiler edge and front sheeting so they retract and seat themselves by gravity. The devices that move them do so by push contact and are not linked in anyway to pull them back down.

Here are some specifications on the ship:

Span: 150", with vortex tips
Root chord: 10"
Tip chord: 4"
Area of panels: 1008 sq. in (7 sq. ft.)
Aspect ratio: 21/1
Airfoil: NACA 6412 at 3 degrees incidence
Combined fin and rudder areas: 6% of wing (60 sq. in.)
Fin sweep at hinge line: 30 degrees
Nose and tail moments: 1/3 and 2/3
Overall length: 65"
Ratio of span to overall length: 2½/1
All up weight with Kraft gear and 6 oz. ballast: 6½ pounds.
Loading on combined areas of wing and stab: 12.3 oz./sq. ft.

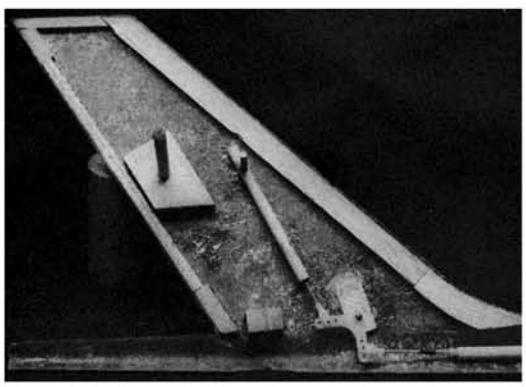
For you guys who think soarers should have 8 oz. loadings to fly, let me say this one slope soars on 10 knots, and thermals on light lift. My experience indicates that heavier ships generate higher airspeeds that improve all around efficiency, handling characteristics and take a better beating.



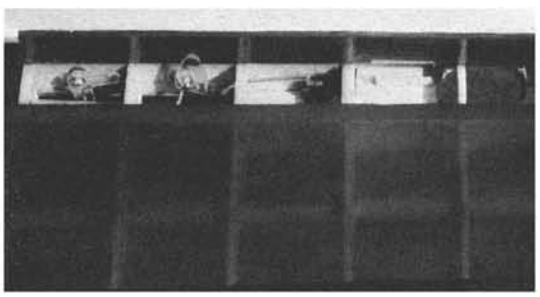
Spoiler pushrod from positionable servo hooks to 2" Top-Flite bellcrank, works nicely.

DuBro wire rod from topmost link on upper intermediate lever goes directly to Midwest bellcrank for coupled rudder-spoiler operation. Wire stud in each hole permits throw variation to spoiler.

The "Miskeet" is a thoroughbred to be treated with reasonable care. On the slope, stay down if the wind is over 30 knots. On the tow, if speed is variable just keep it going up gently, as it's conceivable that the wing tongue could bend at high speeds. The releasable two hook was placed where the ship should tow safely, but it may be well to place a fixed hook in front of the wheel for initial tows to avoid a mishap. Let's get a lot of "Miskeets" in the air and show those fellows on the continent that we can build fine original soarers here in the U.S., too! ●



The fin, within. Fibreglass, arrow shafts.



Spoilers "dirty" it up for loss of altitude on command, assist in turning when one is raised.