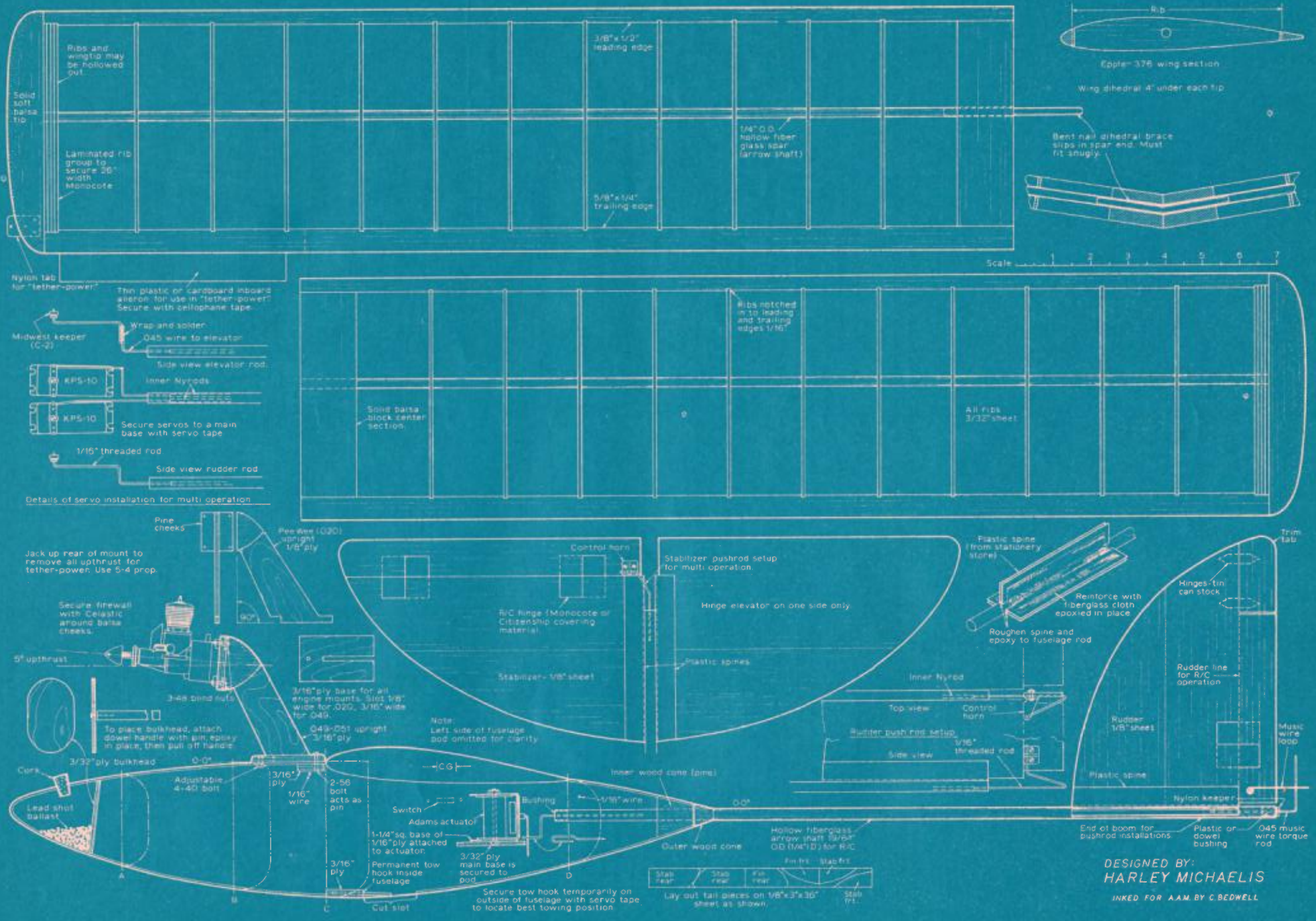
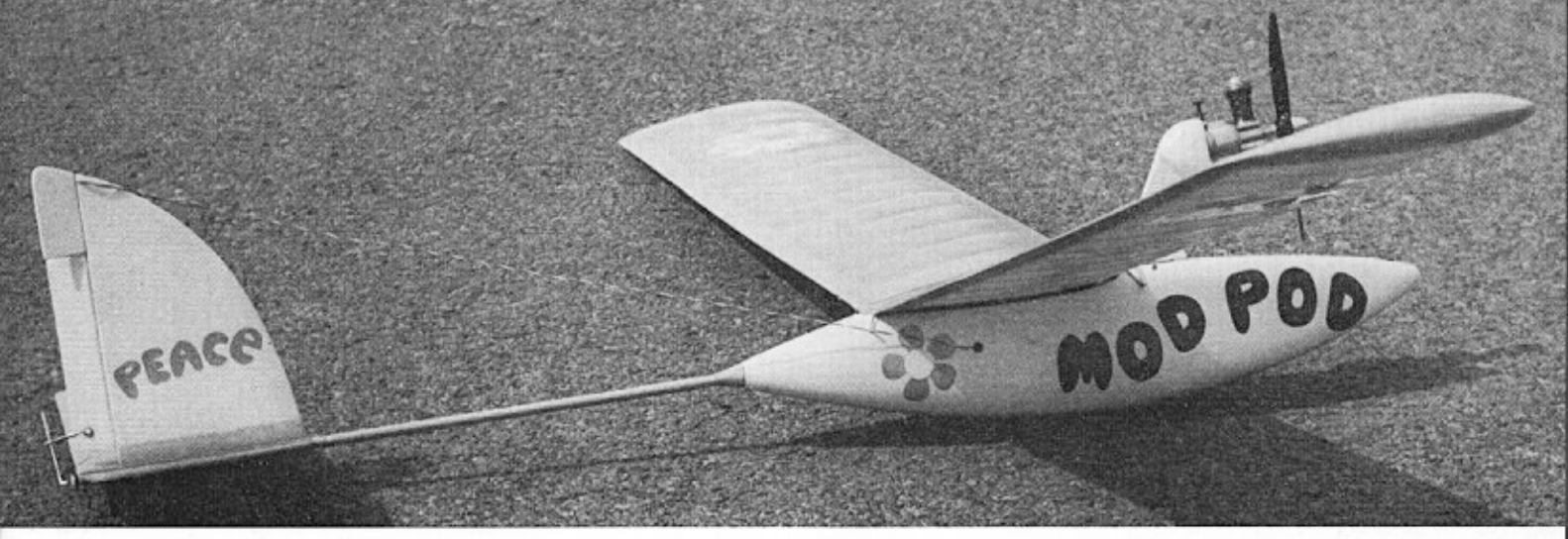


FULL SIZE PLANS AVAILABLE — SEE PAGE 70



Mod Pod

This versatile model may be flown in 8 different ways, with or without radio. Designed for durability, repairability, and club production as official trainer.

HARLEY MICHAELIS

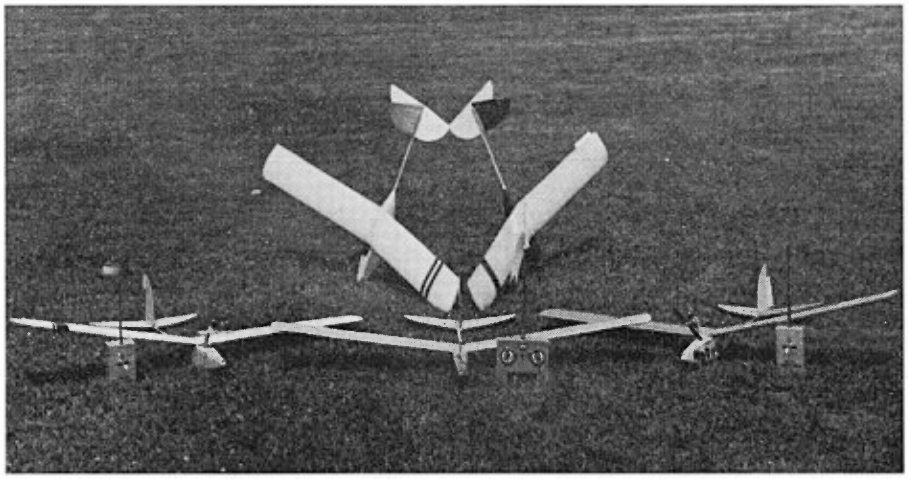
THE 54" Mod-Pod is a versatile, universal model that introduces revolutionary, exciting new concepts! It offers something for everybody, regardless of age or experience level. It is an ideal trainer — tough, stable, forgiving and a great teacher about flight in many forms. It expands and interchanges to fly in eight different ways, three without engine or radio.

It has a look that is love at first sight for most everyone. Trimmed up in either a "racing" decor with stripes and numbers, or "daisied up," it is instantly received by all young "Mods" as one of their own. One cannot be indifferent to Mod-Pod. Everybody wants to look at it, touch it, hold it, or fly it!

In its basic form, the Mod-Pod is a simple, highly capable soarer, readily run up by towline or hi-start catapult. It also lends itself to an interesting variety of hand games. Two or more flyers can toss it back and forth in a form of playing "catch," including variations called "Around the Barn," "Hot Pepper" and "Boomerang" — to be explained. Or, flyers can compete in distance, duration, racing and spot landing events, for hours of inexpensive pleasure.

With a detachable engine mount, it quickly becomes a sport free-flight with anything from a hot Pee-Wee through the McCoy and Cox 049's and Cox 051 engines. On the Pee-Wee, it is most docile — just right for small fry. On the more powerful engines, it is a real bomb and will quickly become a mere speck unless fuel is limited.

It further expands into R/C to become a sport ship or slope or thermal soarer. Its design makes it an ideal rudder-only ship. It quickly accepts the Ace R/C Commander outfits, for simple proportional with a minimum of fuss and expense. The pod is roomy enough for all current digital proportional gear and with just two servos for rudder and elevator, the Mod-Pod becomes an exciting performer. On a hot 049, it will climb almost out of sight on a full tank. Without engine, it will tow like a skyrocket on the electric winch. It's built to stand the strain. On the slope, it is a highly maneuverable, groovy little penetrator that will make a fine showing. A true soarer, it has a low sink rate and surprisingly long glide ratio, even with the load of engine and radio.



At last an all-purpose model. Start with it as an FF glider, try towline, then use a tether to fly in circles, later use power, and finally go radio. Modelers have always thought that pod and boom models are easiest to make and fly. This surely suits Mod Pod. Anyone can fly it — and we dare you to try. Text tells how to make fiberglass pod, but you can also order one. Write Editor AAM for source address.

Tether-Power — A New Ball Game.

Mod-Pod introduces Tether-Power, a fascinating, challenging and entirely new mode of flight, involving the use of a spin fishing outfit. Tether-Power is a sort of combination of control line, free flight and remote control, all at the same time. Here, a beginner can first fly his tethered Mod-Pod in close circular flight (30 to 50 ft. radius) and be successful. He will find it easier than U-control, since no control is needed. He just has to hang on! Then, as he gets the feel of the ship, he can raise or lower the rod to do some "touch and go's" or skim the ground at top speed. As confidence is gained, he can, at will, let line out to enlarge the circle and increase the altitude, to several hundred feet, if he wishes. And, at will, he can reel in line and bring his plane back in.

Circular flight is easy and safe since the Mod-Pod can be trimmed to assure stable flight and minimize the chance for calamity. If tension on the line is released so it can freely slip through the fingers, it will tend to go in a straight line. With practice, the Mod-Pod can be sent straight out 200 to 300 ft. at a time on the more powerful engines. It can then be made to gently turn, by gently applying the fingers to the line and returned to a circular path. Or, with firmer application of pressure, the turn may

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Mod Pod

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be made very tight, to be followed by a dive, a swoop on past the flyer and can be repeated as slack is taken up on the other side. As fuel gets low, the line can be retrieved and the Mod-Pod can be scooted in for a nearby spot landing as the glide ends.

With practice, both right and left turns can be made, square and triangular patterns (Goodyear Tether-Power?) can be flown and even a guarded figure-8. Circling high overhead in a state of stable equilibrium, the Mod-Pod can be ignored while the flyer relaxes. Tethered thermal flight during the glide is feasible. The exhausting chase of free-flight is gone. The "hairy" first flights of U-control and the problem of dizziness are eliminated. A taste of remote-control flight is inexpensively enjoyed, and as budget permits, the Mod-Pod can be readily expanded to true radio-control.

The molded pod: Most builders will find this easy and may want to make some extra pods for the small fry who can't. Four basic steps are involved: 1) A solid wood pod is carved in two halves; 2) Female molds are made over the plugs (pod halves); 3) Parts are made in the molds; 4) Parts are joined.

Sig, Ace and Hobbypoxy handle molding materials and your dealer can probably supply you. Sig's little fiberglassing kit contains what is needed, except for some heavier cloth — 4- to 6-oz. weight.

Step 1: Obtain a pair of wood blocks suitable for carving, measuring 1⅛ x 4 x 20". Join temporarily with a few spots of glue. Draw the pod profile on the block and cut out with a bandsaw. Note the area where engine sets, is an important reference line and must be left flat. Work to shape with a small plane and sanding block. Separate the halves and bevel the saddle to the dihedral angle. Fine sand and seal with a coat of epoxy glue. Gently scrape and fine sand. Mount plugs on a flat surface and coat with release agent.

Step 2: Reference to the Sky Mite article in the Dec. '68 AAM will help in this and following steps. Start female mold with a layer of light cloth such as the Sig, following with additional layers of heavier to build up rigidity. When cured, remove plugs. Fill and smooth any imperfections with Sig Epoxolite.

Step 3: Apply release agent. Again starting with lightweight cloth, form the pod halves in the molds. Add cloth layers to build up an overall thickness of about 3/64" and add additional cloth where wing retaining wires go. When cured, cut excess off flush with mold edges and pry out the pod halves from the molds.

Step 4: Fit together with masking tape. Seam with strips of cloth and resin. Put an extra layer of cloth where the engine sets. Place the 3/16" ply plate above where the front wing wire goes. Fill and smooth surface imperfections. Drill wing-wire holes and secure wires with Epoxolite. Hobbypoxy paint will finish beautifully.

The hollow fiberglass arrowshaft boom: If R/C is planned, the rod should have an inside diameter of ¼" which will commonly be 19/64" outside. This gives needed rigidity and space for linkages. Check arrowshafts or blanks at sporting goods and archery outlets. The common Nemo or Crawford pushrods are usually smaller in diameter. Note that rod is cut shorter for digital proportional pushrod installations.

Plastic spine tail piece supports: These are found at stationery stores, usually on glassine covers. Look for those with a ⅛" wide opening and flat sides to best fit the sheet-balsa surfaces. Rough up for better adhesion. Scrape off any finish on the boom. Lay Saran Wrap on a flat surface. Smear epoxy on spines and secure to boom, in plane with each other, parallel to the axis of the rod and with a bit of dihedral. Position for maximum contact with rod; five-minute epoxy is good here. When cured, lay a single piece of fiberglass cloth across spines and rod bottom and secure with epoxy. When cured, invert assembly and attach fin spine, reinforcing remaining spine surfaces with a single piece of cloth on either side.

Attaching boom to pod: Drill a 1" length block of pine to tightly accept the rod. Work into a cone to fit the interior end of the pod. Make another for the exterior end. Slip the rod through the pod end and slip on inner cone. Invert pod and weight down so the engine mount reference area makes contact with the work surface. Prepare blocks to support the boom *absolutely parallel* to work surface.

In this next step, only cone is to be secured, so avoid getting adhesive on the boom. Put a couple of small dabs of epoxy or epoxy putty on the cone, and reposition boom as above with blocks. Eyeball for alignment along the pod. When cured, recheck alignments and if good, glob in adhesive to secure cone thoroughly with rod out. Position outer cone on rod to give proper tail moment. Permanently secure rod to inner cone.

Tail pieces: Cut parts from ⅛" sheet balsa, join and sand. If engines are to be used, fuel-proof with MonoKote covering, or the Hobbypoxy "Easy Does It" treatment. The spines will gradually lose tension, so surfaces must be secured with strips of MonoKote (sticky) or Citizen-Ship covering, placed to overlap on either surface. For non-R/C use, a trim tab is on the fin. For R/C use, the trim tab is used also, and hinges are made with above covering items. No trim tab is used on the elevator. Hinge one side only.

Engine mounts: Bases and uprights are joined with epoxy which fuel-proofs the mounts; .020 mounts have no upthrust. Others have upthrust as shown, used for R/C and free flight. Upthrust is removed for Tether-Power — later discussed. The 020 engines are screw-mounted to cheeks (pine, etc.). Other mounts have a 3/16" ply firewall containing 3-48 blind nuts. Firewall is secured to balsa cheeks with Celastic or glass cloth wrapped around.

When mount is finished, drill 3/32" holes in base front, 3/16" from edge. Position mount on pod, its rear at front of wing saddle. Mark pod where hole in base is and carefully drill a 3/32" hole here in pod. Use small round file to make a 5/16"-long slot, working rearwards. Enlarge rear portion of slot so head of 4-40 bolt will just go in. Screw bolt in under base with a gap that will snugly fit the slot when jammed forward. Remove mount and drill a 1/16" hole in base rear, securing a small plywood plate behind the upright if necessary. Attach engine and place mount in position and point engine straight forward without any side-thrust. Drill 1/16" hole into pod and 3/16" ply plate above retaining wire. Screw a 2-56 bolt into the base hole and enlarge hole in pod and ply, so this bolt, acting as a keying pin, will just slip into the hole.

The rear end may be secured with rubber bands, permitting rapid attach and detach, but if desired, a 4-40 bolt may be used with nut, to more firmly secure the mount. On the prototypes, side-thrust was never needed, even when the ships were trimmed for a bit of left turn in the glide. The Pee-Wee mount was found to be suited for both free flight and Tether-Power, as is. How-

ever, with larger engines on Tether-Power, it was found necessary to remove *all* upthrust by blocking up the rear of the mount. For this purpose a wood block may be prepared, a hole in its top and a 2-56 pin in its bottom.

Wing: Fiberglass spars (¼" Crawford pushrod) joined with a dihedral brace made of a common nail, yield a wing that stands almost any flight stress, and weight with MonoKote is only about 6½ ozs. Ribs are easy to cut if a birch ply template is made first. Work a ¼" hole in it, and sharpen a bit of the rod as a cutter. Insert in the template hole, press and twist to cut holes in balsa.

The center section is 1" balsa block which supports the fiberglass spars. No sheeting, multiple bracing, etc. is needed. The hole in the block is marked with the template and must be cut with its axis parallel to the top and bottom. Sand in the bevels and then carve to airfoil shape. Find a nail to snugly fit the rods. Lay across an open vise and bang in the angle as you hold a sharp object, such as an old triangular file, in the center. Slip blocks on rods and insert the brace. Make sure blocks will properly align with each other, and then epoxy rods to the blocks. Slip ribs on rods, without adhesive.

Prepare and add leading and trailing edges and extreme tips. Secure the thin nylon tab (piece of hinge material) in the left tip for use with Tether-Power flight. Join panels with epoxy using the dihedral brace. The "inboard aileron" used in Tether-Power flight, is attached to the covered wing with Scotch Tape. That shown on the plans, bent at a 45-degree angle, was adequate to offset line drag, but in individual instances, a larger area may be required. These are easily made from thin plastic or cardboard.

Tow hooks: Optimum tow position is found by trial. A temporary, external tow hook, can be stuck to the pod with servo mounting tape and will hold a few times on hi-start. Start at 1" rearward of the leading edge. If plane stalls, move hook forward. If climb is too shallow, move rearwards. On the electric winch, due to additional airspeed, the hook position can be further back and it will climb at about a 70-degree angle. A permanent hook may be secured from inside to avoid damage in landings, and is accessible through a slot cut in the pod that permits the ring to drop off. A small split ring used for fishing ties easily to the monofilament line.

Hi-start catapult device: Join 200 ft. of 6- or 8-lb. test monofilament line to 50 ft. of ¼" flat rubber. Put a small split ring on the line end and make a loop in the rubber end. Tie a piece of colored cloth 2 ft. from the ring. Secure rubber to ground with a stake, large nail or screwdriver. This will catapult the bare airframe. For R/C applications, double or triple the lengths of line and rubber and use extra rubber, doubled up for increased power. The rubber can be made in a large loop.

R/C installation: Bases of $\frac{3}{32}$" ply are individually fitted to support servos or actuators in proper position. Secure to the pod sides with cloth and resin. Switches mount to the pod. Receiver and batteries are wrapped in foam and stuffed forward in the pod. The Mod-Pod is easily set up for rudder-only with the Commander outfits using a torque rod of 045 music wire, as indicated. A 1 ¼"-sq. base of $\frac{1}{16}$" ply is secured under the bolt head on the Adams actuator. This base is then attached to the main base with small screws.

The torque rod is supported on either end of the boom with a bushing of dowel or plastic. Make a little doughnut-shaped keeper from nylon to place on either end to keep the torque rod from shifting horizontally. Shape the forward end of the torque rod first, and slip through the boom. Then bend in the right angle to go into the wire loop on the rudder. Servos can be secured with servo mounting tape. The link to the elevator (which is hinged on one side only) may be a length of wire. The link to the rudder is the inner tube of Nyrod, using threaded rods on either end. Trim is adjusted by moving the tail pieces in the spines once the links have been attached. Note in photos and plans how the pushrods are routed and bent to tie servo to moving surfaces.

Flight Preparation

Balancing for optimum glide: The airfoil is stable over a wide range of CG positions and optimum glide is achieved solely through balance. With the engine mount off, add shot to balance at 50% of chord as a starter. Two or three ounces may be needed. Glide will be surprisingly flat and faster than you expect. You should get 80 to 100 ft. on the bare airframe in a hand glide. When you have achieved the best glide, remove the wing, invert the plane and balance on a straight edge. Mark the point of balance with a notch on the saddle edge. Add engine mount and remove shot to balance here. Keep this shot in a special container so you have it handy to switch from powered to non-powered flight. In all modes of flight, this single point of balance will assure optimum glide. Check frequently for warps, as well as at the outset, as this will effect performance.

Initial Flights

Hand-launch games without engine or radio: Almost everyone knows about playing "catch" with a ball. "Mod-Pod Catch" consists of tossing a Mod-Pod back and forth among two or more flyers. Surprising distances can be achieved in a straight line, especially with a little extra ballast and extra zip in the toss. Flyers at the bases on a baseball diamond will be able to get it from base to base. A skilled launcher at first can heave it in a steep bank toward second, and get it to a flyer at third, in a maneuver called "Around the Barn." At closer ranges, the Mod-Pod can be streaked from flyer to flyer in a form of "Hot Pepper" — ouch, that stings! A skilled launcher can put his Mod-Pod into a full circle and catch it himself while still airborne — boomerang! Somebody out there will think about it and come up with a new game — "Mod-Pod Baseball" — played with two teams of flyers on a baseball diamond. Two or more flyers, with one or more Mod-Pods, can compete for maximum distance, duration, precision spot landings, and in simultaneous tosses, can race to a given finish line at a given starting signal.

Towing by hand: Good results depend on proper tow-hook position and technique. Use a monofilament line setup, as for the hi-start. Have a friend hold the ship, pointing it slightly up. Run hard to get it going, and when altitude is achieved, gradually slow down so ship can assume a normal glide attitude. Trim for gentle turn. Fly in calm air.

Catapulting with the hi-start: The ship should be trimmed for a very gentle turn and launched in a direction slightly opposite to that of the turn. The line dimensions suggested will easily put the bare airframe to 150 to 200 ft., fully stretched out. For R/C, longer lines and stronger elastic will boost the ship to several hundred feet.

Free flight with the engine mounts: No side-thrust was needed on the prototypes, but it will be wise to take the usual precautions of first flying with the engine four-cycling (running very rich) and with small amounts of fuel. Should thrust changes be indicated, shim engine with washers. Trim ship for gentle left turn in the glide. On the Pee-Wee, 150 to 200 ft. will be attained, but on larger engines, it may be 1000 ft. or more on a full tank. Since there is no provision for dethermalizing, it will be wise to fly in dead air.

Tether-Power — The Brand New Ball Game: Reread the first part of this article. Use a spinning outfit that will hold 150 yards or more of 6- to 8-lb. test line. Balance the ship for glide with the inboard aileron off. Trim ship for straight glide. Attach the aileron. Secure the line to wing with a snap swivel. Remove all twist in line. *With larger engines, you must jack up the rear of the mount to remove all upthrust, or the plane will not be controllable.* Use a Cox 5-4 prop, such as the new gray plastic. When starting with larger engines, attach 20 ft. of 2"-wide crepe paper to the fin to slow it down until you gain experience, and remove it bit by bit. Use small amounts of fuel at first. Use about 40 ft. of line at first, and leave bail open on reel. Just hold line tightly in your hand. When launched, have your crewman put it in straight and level flight. When aileron and thrust are in proper adjustment, the ship will hold in a circle with no tendency to turn in, and no tendency to climb until airspeed builds way up, or line is freely let out. Learn by doing.

Radio controlled flight: This is easiest of all since the plane is controlled. Balance and hand glide. Without power, you can use hi-start, electric winch or slope wind to get airborne. With engines (049's, etc.), give it a mighty heave and fly. Make any indicated adjustments in balance, trim and thrust. Happiness is Mod-Podding.