

An "Escapade"



Fine proportions for Pattern work. It carries through each maneuver with speed to spare. Gene smokes pipe at field as dope fumes blow it out at home. Ship is a good windy weather machine.

Photos by Don McGovern

It can cut the mustard! Goldberg Retracts in a fully cowled tail-dragger. Super Tigre .60, Kraft system. Fast, fully aerobatic, smooth on the sticks.

by Gene Rogers

If you are a strictly calm weather flier, then the "Escapade" won't mean anything very special to you, however, if you're the type who just won't be grounded under turbulent conditions, then you might appreciate this aircraft's capabilities. With the retractable landing gear and the fully cowled in engine, drag is cut to the absolute practical minimum.

Flying in windy weather requires a fast airplane. If you're a beginner at R/C flying, then this design should come at a later day. At this writing the ship's wind penetration still amazes its designer. Taking off

into a strong headwind at full power gives me the impression the wing has been left behind or maybe that I've taken off downwind! Since the ship is not small in size and has a distinctive profile, following it without becoming disoriented is not difficult.

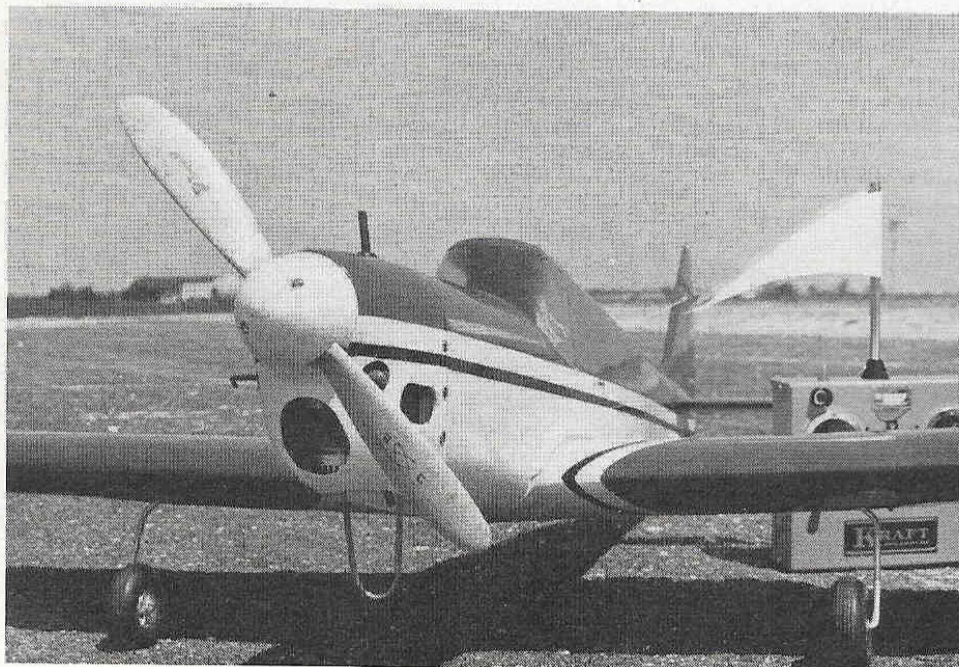
The "Escapade" has fine stunt capabilities for all F.A.I. and A.M.A. pattern aerobatic maneuvers. If you happen to be competing with this design at a contest event, with the wind making things a bit dicy over those concrete runways, then you will be at a decided advantage with your entry.

For reasons of simplicity and light weight, the design utilizes a two-wheel Goldberg Retract system. If this is your first experience with retracts, it will make things much easier for you, as it did me. The absence of the nose gear cleans up the nose area considerably by allowing a large and unrestricted cooling air passage behind the inverted engine. This also leaves more room for the fuel tank installation. The cowled, inverted engine incidentally runs cooler than a fully exposed engine, just as in most full scale aircraft. The stock glow plug with a Super Tigre ran too cool, necessitating a change to a hotter plug!

The Goldberg Retract Gears offers an easy to install system, at a moderate cost. The two-wheel gear arrangement on the aircraft functions very well. This set-up has been reliably operated on a standard 90 degree servo, using an extended rotating arm to give more travel. A 180 degree servo is presently on the "Escapade," but this is not a necessity.

The original prototype used a brand new Kraft 6-channel Series '72 radio system, with their tiny KPS-12 servos. The smallest servos were chosen for their compactness on a later water-tight seaplane design installation to come. There is ample room

A balloon molded cowling, via the Hobbypoxy method. Smooth surfaced inside and out, improves the cooling air flow. Air exits to rear, beneath. Kraft system awaits the coming test flight.



in the design for the use of the largest variety of servos. The Kraft system functions, as now almost taken for granted, flawlessly.

A Super Tigre .60 engine was chosen for its reputation and my own personal experience as a reliable engine, with a very linear speed range, offering exceptional fuel drawing ability. Not only does this fine engine possess these qualities, but I never anticipated its outstanding power. Tach readings were taken with various props and then compared with two other popular, but more expensive engines using similar props. The still new and unbroken-in Super Tigre out turned them both!

Ground handling with the two-wheel gear presents no problems with the gear location as on the "Escapade" design. Take-offs from rough or grassy surfaces is actually easier than with the now common tricycle gear set-ups. The nose gear on an airplane causes a great deal of drag on rough surfaces, just as it does with a full sized airplane. This is one of the principle reasons why the conventional geared Cessna 180 remains ever-popular with the bush pilots, flying in and out of remote fields hacked out of the timber. It is recognized however that a bad landing on a hard surfaced runway could cause damage to the underside of the nose of this type airplane. For this reason I installed a formed piece of 1/8" diameter music wire, similar in appearance to a racing car's roll bar, to the underside of the airplane. The bar is fastened to the lower mounting holes of the Tatone engine mount. Heavy duty soldering lugs do the job nicely, without the need for bending loops in the music wire. This "nose skid" can be seen in the photos.

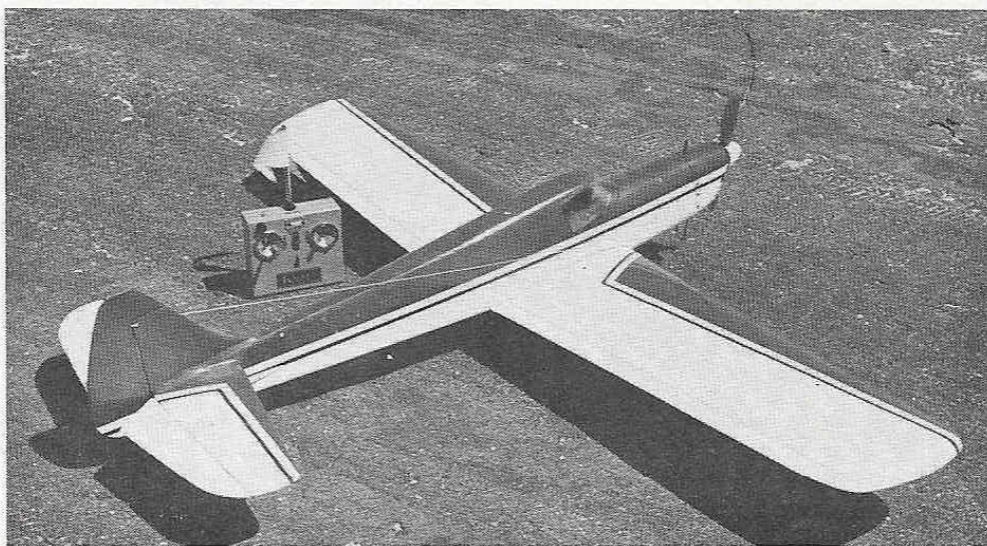
Construction Technique

The construction of the design is conventional throughout, therefore only the techniques and methods I used in constructing the prototype will be mentioned, in hopes that they will serve as an aide to your building a good ship, with a minimum amount of time, money and effort expended. In this matter, I am assuming that you are not a beginner at building R/C aircraft.

Start my making a bill of materials of at minimum, all the wood that will be required to build the ship. Try to make a careful selection of balsa of the required hardness to do the job. Select all straight-grained pieces, without warps. The wood for this ship, at current prices should run approximately \$20. This may sound expensive, until you consider what a kit of a similar type plane would cost! You will also have more useable scrap pieces left over, than you would have with a kit. These left-overs will be used for your next plane and not for crash repairs on this one, I can assure you! Try to build up a complete kit of your own, by cutting out all the wood parts for the plane at one time. This process, aides greatly in shortening the total number of building hours required to complete the ship.

Wing Assembly

Construct the wing in one piece over the plan, using a wing jig, or a hinged building board. Block up the leading and trailing edges, using the same rib centerline



Ample in span, good nose and tail moment, enough tail area for solid control. Ship is pussycat in the air, responsive, tuned to fly. The original is white, black and green trimmed.

height above the plans. The spruce leading edge is highly recommended for obvious reasons. Construct as much of the wing as possible while it is "jigged" in position. Use epoxy to hold the sheet covering to the spars. Epoxy does not shrink when curing as cellulose cements do. Shrinking cement can create some lovely warps or bows, which can be seen when sighting along the leading and trailing edges!

Before you epoxy the leading edge sheeting in place, the retractable landing gear pushrods should be installed. This will require notching the ribs. Allow ample clearance here. It's advisable to temporarily install the gear and servo at this time. Make sure the mechanism functions perfectly with the gear locking freely in both the up and down positions. A good test of the counter balance spring adjustment is that the gear should operate when the wing is also held in the inverted position. As mentioned earlier, both standard

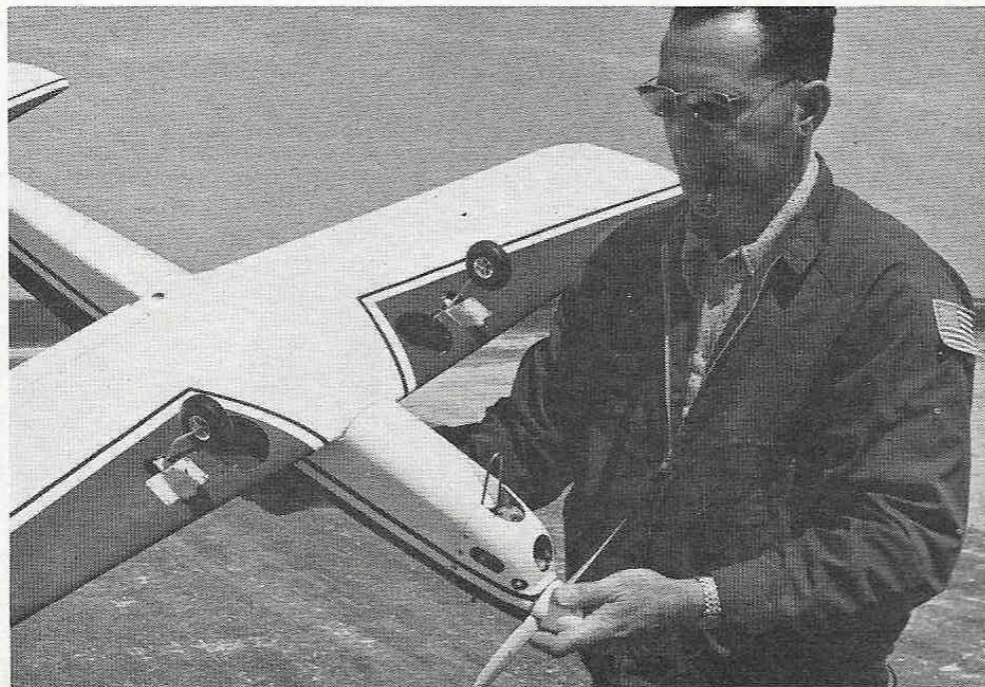
and 180 degree servos have been used with equal success on this two-wheel gear installation.

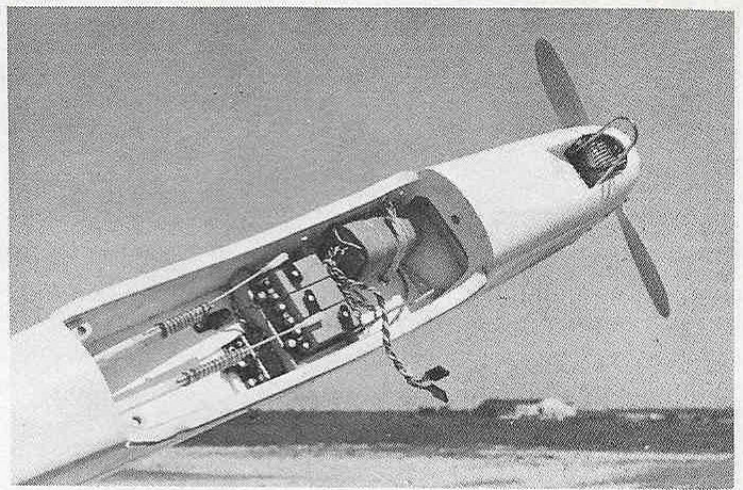
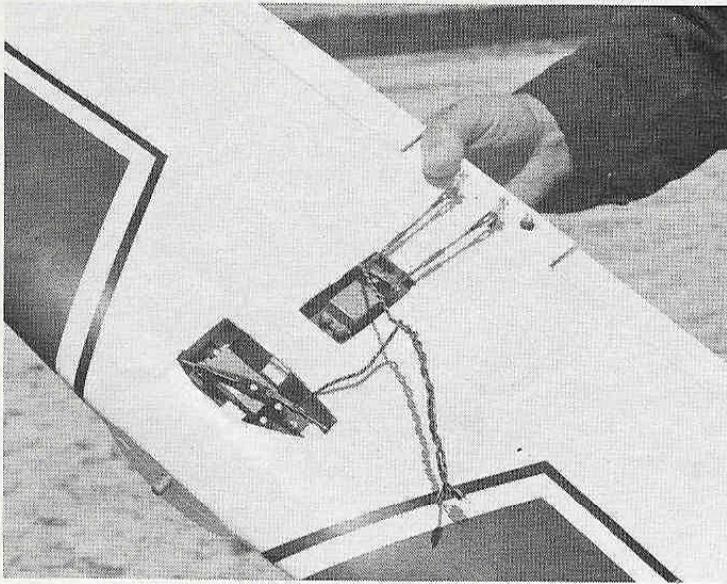
The Fuselage

Select full length side sheets for the fuselage. These should be balsa of equal density to permit the uniform bending of each side. Be certain to use the plywood doublers running from the firewall to aft of the wing. These should be epoxied to the inside surfaces of the balsa siding sheets. Pre-drill the holes in the firewall for the Tatone engine mount and the holes in the plywood bulkhead for the Tatone wing hold-down, before installing these parts. Select soft balsa for the 1/2" thick top plank. Use epoxy for cementing all of the plywood bulkheads in place. Use 1/2" long brads through the laminated side sheets and into the plywood firewall. Also epoxy the triangular strips at this joint.

After all assembly has been completed

Below: Two wheels to retract, a simple installation. Gene tends toward the practical designs, figures there are enough problems in flight. Structure follows accepted and simple methods.





A Kraft R/C system packs in neatly, positioned to achieve C.G. balance. Note the music wire skid guard to protect cylinder head from "nose-ins." Left: Wing houses Kraft 180 degree servo to muscle power the Goldberg Retracts, it works perfectly, while other servo actuates the ailerons.

on the fuselage structure, carve and sand liberal radii, where the sides join the tops and bottom planks. A small modeling block plane works well here and is a lot of fun to use. Don't get carried away and overdue it however!

Empenage

The stabilizer is of built-up construction, having a symmetrical airfoil for greater efficiency. The contour of the airfoil can be seen on the side view of the fuselage. The framework of the stabilizer is built over the plan with the leading and trailing edges blocked up. The airfoil counter of the top side is cut using a long sanding block while holding the stabilizer framework down on a flat surface. The top is then sheet covered. The bottom side of the structure is contoured and sheet covered in the same manner. Clear dope the inside of the covering sheets before cementing them in place. This will prevent surface waves on the final finish.

The fin is made from solid sheet balsa, 3/8" thick. Run the grain as shown to prevent warps. The leading edge of the fin should be rounded and contoured to effect a symmetrical airfoil, as on the stabilizer.

The rudder and elevators are made from solid soft sheet balsa and should be tapered to about 1/16" thickness at the trail-

ing edges. When joining the elevator halves with music wire, be certain they are in true alignment with each other.

A careful selection of wood quality for the empenage is required to achieve the proper balance of the finished plane. A heavy tail section will require the addition of nose weight to achieve the required C.G. location. The prototype "Escapade" balanced out without the addition of any ballast.

Miscellaneous Parts

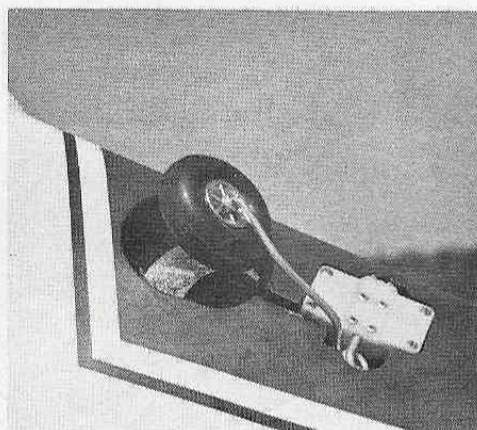
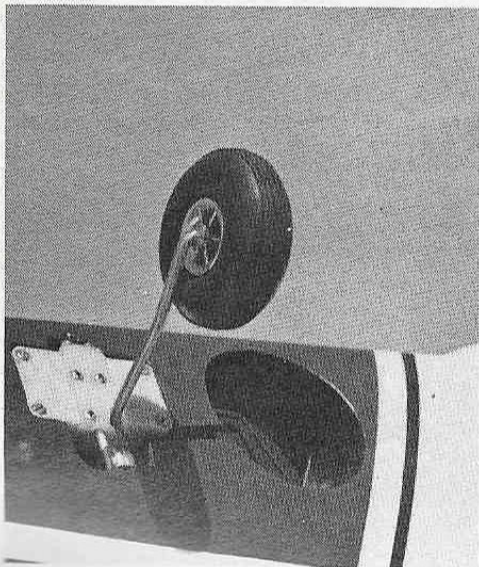
The engine cowl was made using the Hobbyoxy balloon method. If you are not familiar with this technique, write to Hobbyoxy Division of the Pettit Paint Co., and get their complete instructions on this process. Try using their polyester resin as a bonding agent for the cloth, it should produce a harder surface than the Formula II epoxy resin as they originally recommended. I haven't tried their polyester yet, but I have used other brands of polyester and they work well. Bear in mind however, that a styrofoam form block for a cowl can't be used with polyesters. Even the fumes from the resin will attack the foam!

Tatone brass hinges were used for all control surfaces. These hinges are easily installed by just cutting a slit in the balsa

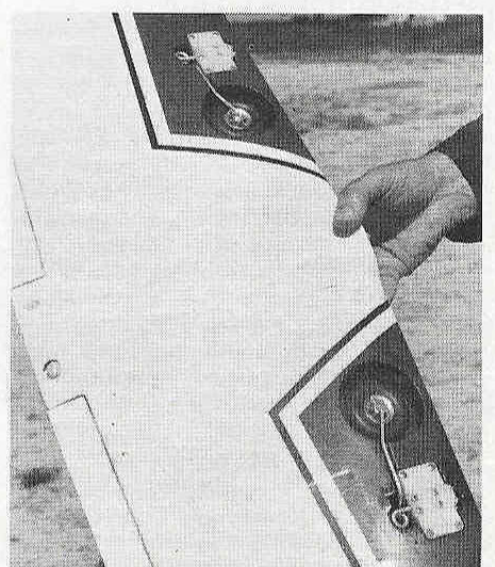
with a tapered X-Acto blade. (Gad, he has not heard about Tatone's new "Hinge-It" ... Ed.) On very hard balsa the slit can be enlarged by running a tapered saw blade through the slit. A simple way to secure the hinge pin in the hinge halves is to center the pin in the hinge, then gently squeeze each protruding end in a vise. Secure the hinge itself in the balsa with Hobbyoxy Formula II. I have used Tatone Hinges on more than twenty R/C aircraft and I have never had a breakage failure or an occurrence of the much feared electrical "noise" problem. Actually, the fit between the hinge leaves and the pin is very close, and since the hinge pin passes through four hinge lobes, there is always a metal to metal contact between the two hinge halves.

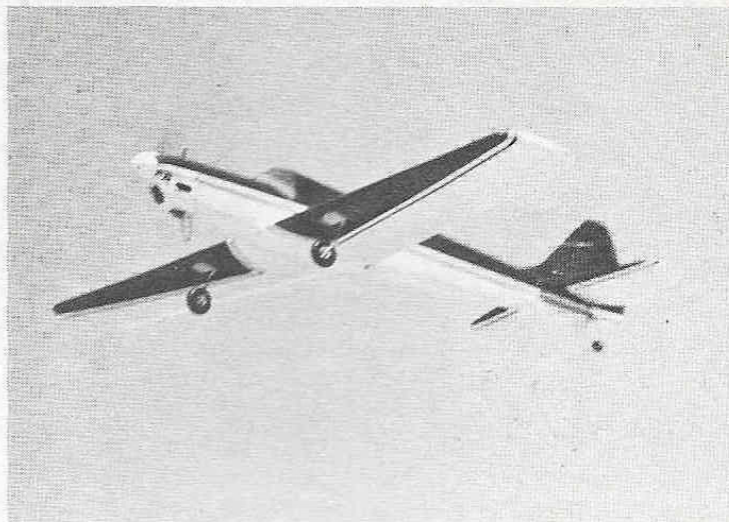
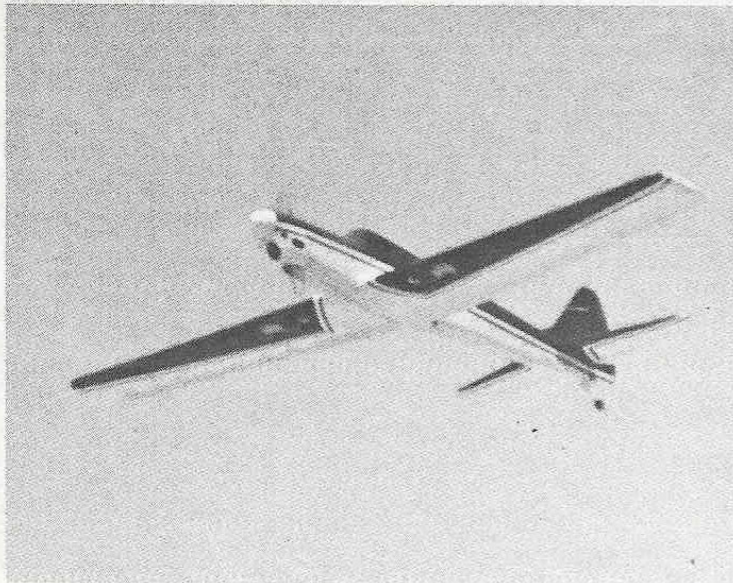
The steerable tailwheel is self-explanatory. The Top Flite nylon bracket is fastened to the bottom of the fuselage, with self-taping screws. The music wire steering horn runs through a piece of plastic or rubber fuel line tubing, which is held to the lower portion of the rudder with fiberglass tape and epoxy.

The center-section of the wing should be reinforced with fiberglass tape, wrapped around the complete dihedral joint. The fiberglass edges can be neatly faired evenly with the sheet wing covering, by scrap-



Above: Half in, half out. Our camera catches a Goldberg Retracts as it closes into wheel well. At left: Down and locked. Note the accessible flush mounting. Note gear leg is bent forward. Right: The Goldberg Retracts tucked into wells.





The tank gets down to fumes as Goldberg Retracts cycle down for landing. At left: Wheels retracted, "Escapade" bores in for a pass at the camera.

ing the edges of the tape with a razor blade held vertically. Be careful not to gouge the balsa.

Before installing the windscreen, the exterior of the cockpit can be painted black and a dummy pilot installed if you choose. For a flair of realism, I installed a set of 1/2" diameter Tatone flight instruments on the panel bulkhead. The windscreen should be epoxied in place. Sand the edges of the celluloid to assure good adhesion. After installation, fair the edges of the celluloid into the fuselage with Hobby-poxy "Stuff."

On Finishing

The original aircraft was covered with medium weight Silkspan and painted with colored dope. This method produces a tough, smooth and lightweight finish. The open areas of the wing received two layers of paper, cross-grained to each other. This technique produces a stronger, less expensive covering than silk and requires less filling and dope to achieve a professional-like smooth finish. Such a finish is much more durable and easier to keep clean incidentally.

Prior to covering, all wood surfaces were clear doped and then received a coat of talcum powder/dope mixture to fill in the

grain. This application was lightly sanded and clear doped before the Silkspan was applied. The entire model was then covered with Silkspan. Covering adds greatly to the structural strength of the model and requires less filling than finishing base wood.

The colored dope was sprayed on. Over the colored dope, two coats of clear dope were applied. After curing, the finish was rubbed down and waxed.

The total weight of the finished model was exactly 6 lbs. This light weight is attributed mainly to the finishing technique used. The only lighter covering would have been MonoKote, which with its many obvious merits, does not reinforce the structure with the covering material, because its adhesive qualities are much less than dope.

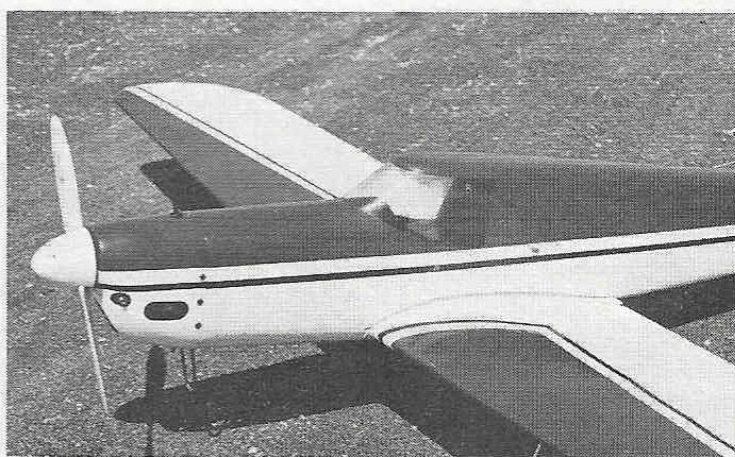
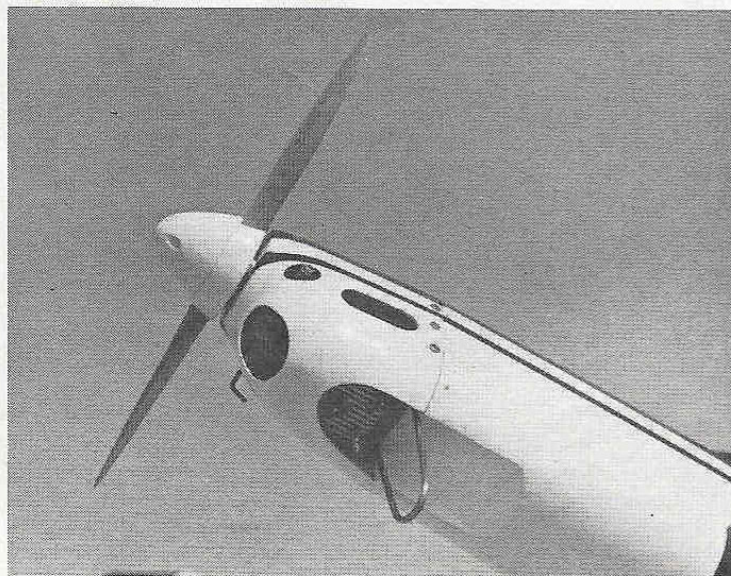
Flying Time

If you are an experienced R/C flyer, you won't have to wait for a calm day to test fly this aircraft. As mentioned earlier, the ship's wind penetrating abilities are outstanding. Be certain however, not to overlook some of your pre-flight checking before you take the ship to the field. In this day of reliable radio systems, I believe we all tend to overlook the more

obvious things. My personal failing was in not test running the new engine in its installation, before taking the ship to the flying site. Aside from a cold operating glow plug as mentioned earlier, I had the fuel and vent lines mixed up like a can of worms. This carelessness was the cause of much pre-test flight anxieties!

As the "Escapade" is a tail-dragger, it will require a little more right rudder on the take-off ground roll than a trike geared ship would. Once airborne, retract the main gear and watch her bore out. If the ship balances as it should, has no warps and all control surfaces are set in the neutral position, you will find that no in-flight trimming will be necessary. You will be giving the ship a full aerobic workout, before you make your first landing or touch and go. If you're powering your ship with a good healthy running .60 sized powerplant and the ship is not overweight, I doubt very much if there will be a faster plane on the field!

I would be interested in hearing any comments you might have on building and flying this design. They don't necessarily have to be compliments either! I can always vent my hurt feelings on editor, "Down McGovern," or better yet, "Crash Caplan." ☞



Cowled and clean, gearless in flight. It makes the most of the situation. Reduced drag enlivens the response and spirit of the aircraft in flight. At left: A Super Tigre .60 cools itself in this ventilated cowl design. Aircraft may be inverted on field box for ease of upright engine starts.