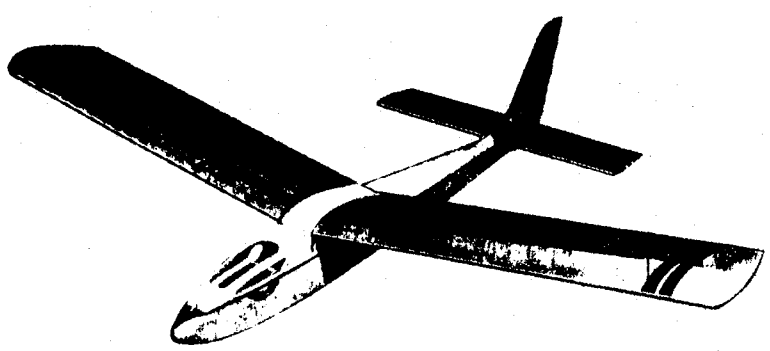
# Veron

# 52" IMPALA

## *Introductory and Sport Hillside Soaring Glider For 2 Channel Radio !*



**BUILDING INSTRUCTIONS**

The "IMPALA" has been designed to fulfil the demand for an efficient, stable and dependably tough Hillside Soaring Glider for 2 Channel Radio Control on two essential surfaces, Rudder and Elevator only.

Introduced as a functional and tough Primary Hillside Soarer, the design has proved itself to be an admirable "first" introduction to this facet of the hobby and at the same time an aircraft well able to cope with all the vicissitudes of the weather to become a versatile sport model. The "IMPALA is a balanced design capable of stable flights in all conditions. It has a flat undercambered section to give stable penetration and this coupled with a lifting section tailplane obviates "ballooning" in up or downwind situations. Also balanced side areas to move diagonally along a soaring ridge without "weather-cocking" into wind and without the constant need for repeated corrective signals. Ample dihedral gives a high degree of inherent and self-corrective stability.

There is spacious internal capacity for Deac or Batteries in the nose, Radio Receiver in the under-canopy area, with Servos under the wing-seat area.

3 Channel control utilizing ailerons is not called for in this design as the model is proportioned aerodynamically to be fully responsive and controllable on Rudder and Elevator only.

Dependant upon whether Batteries or Deacs are fitted in the nose, ballast may be necessary to correct the centre of gravity balance position.

Simple tools are needed. Use balsa cement or white P.V.A. adhesive, with clear shrinking dopes and coloured dopes or enamels for finish. It is thoroughly recommended that for extra durability, the model be wholly covered with nylon.

Balsa knife, modelling pliers, 3/16" (4.8) drill with brace, modelling pins, grease-proof paper to protect plan, also tissue paste and garnet paper, medium and fine, and a good building board completes your requirements.

The simple sequence of assembly is pictorially laid out in a diagrammatic sequence which, if followed carefully with the corresponding paragraphs in thse instructions, will greatly facilitate building. Figures in brackets are metric measurements.

1. FORMERS

The two basic formers 'A' and 'B' are constructed from 3/16" x 1/2" (4.8 x 13) directly over the plan. Note doubled top edges of Formers 'A' and angled top edges of side members on Former 'B'. Double coat all joints-in all stages of construction-with adhesive.

2. FUSELAGE SIDES

3/32" (2.5) sheet sides supplied are joined (double coating) at centre. Lay over plan and mark all former, longerons and upright locations in pairs, left and right hand sides.

3. FUSELAGE SIDES - ASSEMBLY

PLEASE NOTE disposition of 3/16" x 3/16" (4.8) longeron lengths supplied. Four 18" (45cm) lengths are used-2 for top rear fuselage, 2 for front of centre longerons. Remaining six 26" (65cm) are for rear centre, lower front and lower rear longerons. Offcuts are for uprights and crosspieces etc. Remaining five 26" lengths are for four main spars and one for tail-spar. SELECT GRADES ACCORDINGLY.

Cement in place centre and lower 3/16" x 3/16" (4.8 x 4.8) longerons with 3/16" x 1/2" (4.8 x 13) uprights at nose and tail-bay. Ensure centre longerons are dead straight - check by eye along length. Locate 1/16" (1.5) die-cut ply wing mount. This will set the wing incidence in relation to tail and must be accurate. Fit rear top longerons with tapered piece of 3/16£ x 3/16" (4.8 x 4.8) in location indicated in front of tail-bay. Trim away surplus top edge of 3/32" (2.5) sides and tail-bay cut out (Diag.2). Now cut and fit (except front 2) 1/16" x 3" (1.5 x 77) vertical grained laminates. Drill 3/16" (4.8) holes for wing securing dowels.

4. COMPLETE NOSE ASSEMBLY

Add curved front top longerons, steaming or notching to create top curve over cockpit. Trim balsa sides to match top surface of ply mount, cut at slight angle to seat the wing dihedral. Adhere formers A and B in place to one side and allow to set, checking for square-ness.

5. JOINING FUSELAGE SIDES

Cement two sides squarely to basic formers. Cut and insert front 3/16" x 1/2" (4.8 x 13) crosspiece. Pin to secure whilst setting. Insert remaining inside laminations to nose, then lower 1/16" (1.5) ply undersheet from nose to former 'B'. Draw sides together at tail-bay, chamfer long scarf joint between longerons then join, checking for squareness and align-ment over plan. Add crossgrained top and bottom sheet cut from 3" (77) wide 1/16" (1.5) balsa - aft of former 'B'. Add top cockpit sheeting. Finally nose-block, trimming and sanding to streamline when set.

6. COCKPIT

Sand off edges of front cockpit area to reduce squareness, continuing over nose-block. Carefully and with very sharp balsa knife, separate cockpit area. Insert location crosspieces of 3/16" x 3/16" (4.8 x 4.8).

7. FUSELAGE DETAIL

Celluloid is supplied to fit optional clear cockpit, or paint in detail after covering. 3/16" (4.8) dowels are checked for tight sliding fit, also tail securing 1/8" (3) dowels. Add 1/16" (1.5) ply tail-skid with scrap balsa gussets. Finally, hardwood nose-runner, taper first from 1/4" x 1/4" (6 x 6) obechi, steam and pin in place whilst drying.

8. WINGS

Build each wing panel, left and right, separately over building board to ensure alignment. Pin in place trailing edge, also lower selected 3/16" x 3/16" (4.8 x 4.8) spar p;ins either side-not through. Add ribs, noting that one only inner die cut rib with top edge reduced to permit sheeting is set in place. Next, leading edge and top spar3/16" x 3/16" (4.8 x 4.8). Then add tips, chamfering lower edge to fit against end rib and between leading and trailing edges - see section on plan. DO NOT ADD leading edge sheeting until after making and joining two wing halves.

9. CENTRE SECTION OF WINGS

Cement and pin die-cut ply gussets to one wing; at leading edge, one at main spar, also trailing edge. When set, join opposite wing and final main spar gusset. Angle of gussets will determine dihedral (4" under each end rib) (10cm) but with one panel flat, support opposite end rib on 8" block (20.3 cm) whilst setting. Laminate two centre ribs. Trim and fit all centre-section ribs to accurately butt-joint between gussets, level with bottom of leading and trailing edge to allow for top sheeting.

## 10 TAILPLANE AND ELEVATORS

Diagram 10 shows sequence - pin down 3/4" (19) trailing edge-laminate 1/8" x 1/8" (3 x 6) to rear of 1/4" (6) shaped leading edge. Cement in place all ribs - add top spar of 3/16" x 3/16" (4.8 x 4.8) - then 2" (51) leading ede sheeting (trimmed to fit). Finally tip blocks 3/8" x 1/2"(9 x 13) which, when set, are sanded to streamline - see plan.

Having now constructed the tailplane as a unit, the elevator portions may now be separated by cutting neatly through the ribs with a very sharp balsa knife - after having marked the ribs with rule and pencil as per the plan.

Two lengths of 3/16" x 3/8" (4.8 x 9.5) now form the spar and leading edge of the elevator portions, and are butt-jointed on very firmly. Note that rear ends of central laminated ribs are moved to new location either side of central gap between each elevator half.

Bend 14 s.w.g. wire torque-link flatten ends and epoxy glue into holes in elevator blocked-in ends. Mark location of control horn (added after covering). Hinges are nylon tape inserted into slots made with a balsa knife blade, secured with epoxy-glue and pinned with hardwood pins (cocktail sticks etc). Check elevators for level and freedom of movement. Tailplane and elevator are covered before tailplane is permanently glued in place over stern-bay. If using iron-on film, remove film in spots to ensure good bond of tailplane to fuselage with epoxy glue.

## 11 WINGS

Trim top edge of sheet tips on mainplane to level of rib camber. With each side in turn pinned flat to building board to prevent twisting, add top 1/16" x 2" (1.5 x 51) sheeting from spar to leading edge - the 4" (102) wide sheet supplied is cut in two lengthwise, 4" offcut supplied permits sheeting of centre-section - for 2 bays over top surface on top of ribs, and 1 ply bay only on underside level with ribs. Add ply to centre-section trailing edge top. Inset strips of 1/16" (1.5) sheet between lower edge of ribs in centre bays of tailplane for platform on fuselage. Do not erect fin until after covering, cementing through slot cut between centre ribs through tissue behind leading edge sheeting - See Diag. 11.

## COVERING AND FINISHING

Four sheets of Modelspan are supplied - sufficient for covering complete model including fuselage; Nylon is recommended as a more durable covering. Adhere covering with tissue paste or photo-mounting paste. Water shrink and when dry, apply as many coats of clear shrinking dope as may be found necessary to impart a gloss. Coloured dope or enamel must be very lightly applied. Weight of prototype model, nylon covered and with all radio gear is 30 ozs. After covering, fit nylon control horns to Rudder and Elevator. 4BA nuts are screwed onto spigots of horns. Use epoxy glue as well.

## 12 RUDDER AND ELEVATOR CONTROLS

Top and side view of fuselage shows Servo locations. These are mounted, with rubber grommets (usually supplied with Radios) on hardwood crossbeams, these are trimmed to provide tight fit between sides and are epoxy-glued in place. Servo's must be checked for direction of rotation for control to surfaces at rear and spaced accordingly. If needs be, one may be staggered out of line with the other to provide clearance for 2 actuator rods.

These rods are hard 1/4" x 1/4" (6.4) balsa. Connectors to ends are optional and may be as shown on plan, made of 16 s.w.g. wire with 20 s.w.g. wire retaining clips bound on with fuse-wire and touch soldered. These are then bound with thread to balsa actuator rods and coated with glue. Other ends at nylon control horns may be similar or commercial K-links. Note that at stern-bay, links pass through neat slots cut in sides through fill-in sheet. Rudder movement need be no more than 1/2" (12.7) each side of neutral and elevators rarely more than 3/8" up and 3/16" down(9.5 and 4.8).

## RADIO INSTALLATION

Fill complete nose compartment with shaped block of foam rubber (NOT plastic) with cut-outs to fit radio receiver and batteries in nose. Battery weight provides most of the ballast necessary for correct C.G. location. Have easily accessible "on-off" switch on fuselage side coupled to radio and battery. Secure all wiring to fuselage sides and structure with suitable adhesive. Cockpit is secured by small hardwood fairing cemented to nose under which the front of cockpit is trapped (see photo on box) the rear being secured best by a strip of Sellotape, colour to match model - or by a rubber band, or simple wire clips. Lateral movement is prevented by projecting cross-pieces.

## FLYING

It must be stressed at the outset that the technique of hillside soaring presents circumstances which require very careful appreciation of the wind speed and form of lift derived from the terrain over which one is flying, also correct incidence setting the balance for high or medium wind speeds preserving a degree of penetration AND longitudinal stability at all times.

Accurate initial balancing is essential. Model should hang slightly nose-down in gliding attitude when supported under the wing tips at the C.G. location shown (1" to rear of main spar). Use plasticine mixed with lead shot behind nose block. Prototype required 3 1/2 ozs. to balance INCLUSIVE of Supercells.

Glide test over long grass and in clam conditions. Test until there is no tendency whatever towards stalling ADJUSTING BY BALANCE ONLY. Incidences are pre-set in the design (assuming there are no warps). Do not secure wing with too tight rubber bands, but ensure enough of them for safety.

UNDER NO CIRCUMSTANCES should wing packing be used to de-elevate the model (under wing trailing edge) for high wind conditions. Care must therefore be taken with a forward balance point when circling but the correctly maintained longitudinal dehedral should prevent any tendency for a down wind dive, even with controls and trim-lever all at neutral.

For first hillside flights, choose a situation where a good breeze flows square-on to a reasonably inclined obstruction-free hillside slope. Check radio range and positive servo operation. Launch model straight into wind preferably a little lower down than the crest of the hill. Areas of lift in relation to breeze and terrain can only be judged at the time-but do not fly too close to the hill. Keep the nose at all times into the wind, moving the model left or right by 'crabbing' sideways. UNDER NO CIRCUMSTANCES turn the model downwind, unless well out to the forward extremities of the left area and/or higher than the hill crest, then deep the model in a FLAT and WIDE gradual circular turn.

If flight trim is not correct with all controls neutral and model tends to stall, do not alter incidences but adjust balance. If incidences are alterred to provide penetration (packing under wing trailing edge) then model may not have enough longitudinal dihedral to keep the nose up when moving on the down wind leg of circling flight - and a high speed dive will result.

The secret of successful hillside soaring is to maintain a consistent forward flying speed to make the controls fully responsive. Do not attempt to "hang" the model on the breeze, though the stall will inevitably be a gentle forward "mush" due to the action of the lifting section tail. Controls with proportional Radio Gear will be entirely instinctive and the only adjustment really needed are a little nose-down trim in very high winds or occassionally rudder trim to counteract a bias or slight wing warp.

Veron do factor an "EXTENDED WING KIT" for the "IMPALA", and extra two bays each side extending the span from 52" to 62". Available from VERON or your Dealer. This wing willpermit flying in lighter airs than normal.

Whenever possible, do choose a soaring site where there is a large flat obstruction-free area on the hill-top on which to land. The greatest problem with this soarer is not to get the model airborn - but safely down!

Always ensure that you have insurance and that your frequency pennant is used, and that your frequency channel does not clash with other Hillside Soarers.

Hillside soaring presents many new and fascinating challenges into silent flight. Eperience will be your best teacher!

HAPPY LANDINGS