

AEROFlyTE

Gemini Mk II

KIT No. 246

Gemini MK II is an ideal aileron sports model suitable for the popular 40-50 four stroke engines for quiet relaxed flying, or for high performance the 35-40 size two stroke engines. Gemini MK II has been designed for easy assembly with the kit containing rapid assembly foam core wings, die cut balsa and ply parts, full size detailed step by step plans showing radio installation.

ADDITIONAL ITEMS REQUIRED

- Epoxy, balsa cement and dope
- PVA glue or Clag spray adhesive
- Paint and covering materials
- Fibre glass cloth and resin
- Sanwa 4 channel 4 servo R/C
- OS 35-40 two stroke or OS 40-50 four stroke engine

GENERAL BUILDING NOTES

Before you begin building it is important to look at the plan carefully, **READING AND UNDERSTANDING THE INSTRUCTIONS BEFORE STARTING ASSEMBLY**. A good flat building board will enable you to build quickly and squarely. As needed remove each piece from its balsa wood sheet with the help of a sharp pointed hobby knife.

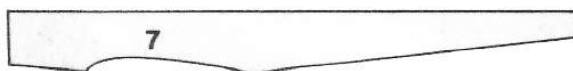
ADHESIVES

Be careful not to use too little or too much glue. Too little leaves the model weak, excessive use of adhesives and paints can make the model heavy. Because of the variety of glues available, we suggest the following as a guide in selecting proper adhesives.

Most of the model can be assembled using either C66 instant glue, epoxy or balsa cement. Instant glues make for rapid assembly, slower setting glues are recommended for parts requiring careful placement. For high stress joints such as formers use epoxy.

IMPORTANT. When gluing leading edge, sheeting etc to foam wings use only PVA, Bostic 825 contact adhesive, Clag spray adhesive or Polystick No 5 Acrylic Adhesive. **DO NOT USE BALSA CEMENT OR DOPE AS THEY WILL DISSOLVE THE FOAM. ALWAYS TEST ADHESIVES ON FOAM BEFORE USING.**

FUSELAGE ASSEMBLY

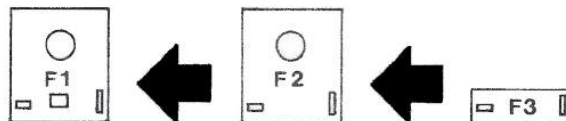


- Identification of parts — Fuselage Side 7

STAGE 1

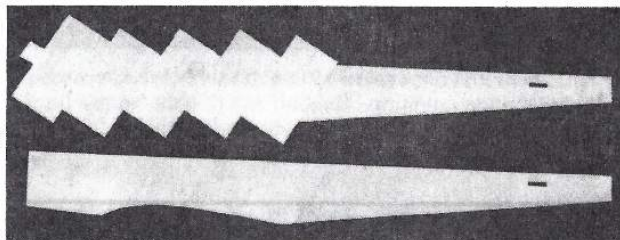
- Press out die cut square in F1 and die cut circle in F1 & F2. Use a hobby knife to cut out the slots die cut into F1, F2 & F3.

- To epoxy assembly F1, F2 & F3 together, Lay F1 flat down with the long slot on the right hand side. Place F2 on top of F1 and F3 on top of F2. Make sure the slots in F1, F2 & F3 line up.



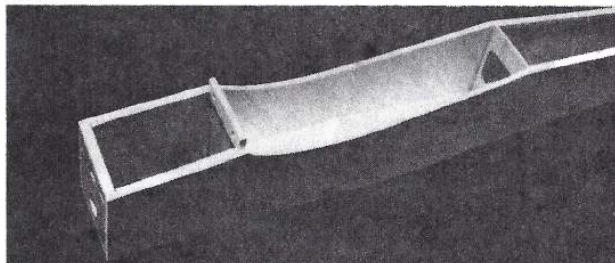
Epoxy assembly F4 & F5 together. (Make sure the pin marks in F4 & F5 line up.) Temporarily glue the drilling template to the front of F1/F2/F3 assembly and drill as shown. Drill two 6 mm holes in assembly F4/F5 where pin marked.

- Cut out the nyrod slots in each fuselage side 7.



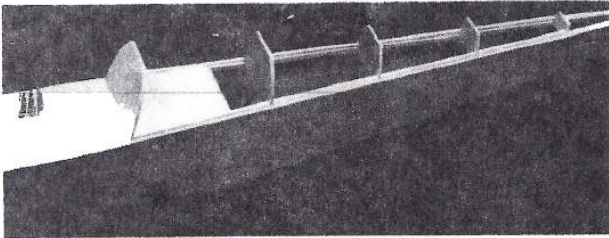
- Lay one fuselage side flat down, working forward from the line shown on the plan side view, glue the 1.5 mm doublers in position. Clamp or weight until dry. Then trim doublers to finish flush and square to fuselage sides.
- Cut and glue the 3 x 6 mm balsa strips to the fuselage side from a point behind F6 to the rear of the fuselage.
- Repeat for the opposite fuselage side **MAKING SURE YOU HAVE A COMPLETE LEFT AND RIGHT FUSELAGE SIDE, WITH BOTH DOUBLERS ON THE INSIDES.**

STAGE 2

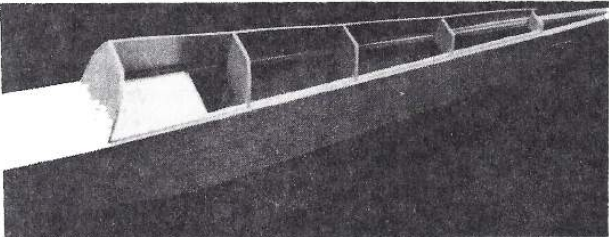


- Place the two fuselage sides on edge and upside down over the fuselage top plan view and epoxy ply formers F1/F2/F3 and F4/F5 and balsa parts 8 and 9 into place. Use masking tape to hold assembly until dry.
- IT IS IMPORTANT THAT FORMERS BE KEPT SQUARE AND STRAIGHT WHILST DRYING.**
- Chamfer off the inside of the fuselage sides at the tail so they fit neatly together. Epoxy F6 in position, pull the fuselage sides together at the tail, glue and hold with tape.
- Place the fuselage assembly over the plan top view using the centre line to check alignment.

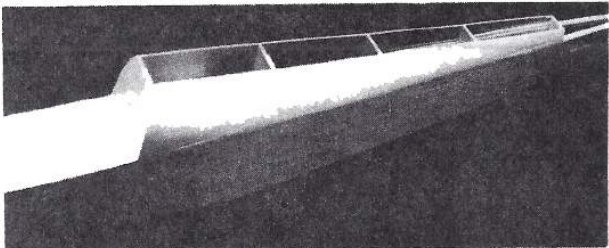
STAGE 3



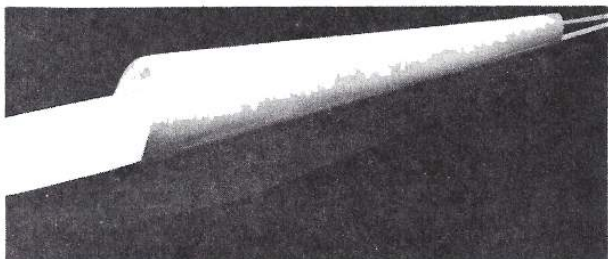
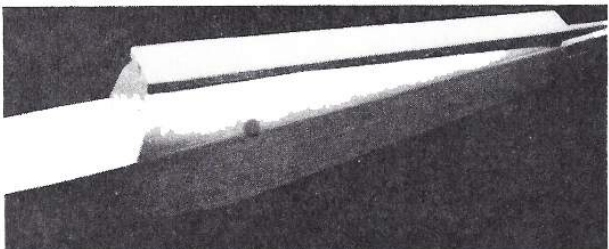
- Remove assembly from building board and glue parts 10, 11, 12, 13 and 14 in position. Cut out template T from the plan and use to obtain the correct angle for 10.
- Cut the 3 mm sq strip to length, fit and glue between 10 and 11, 11 and 12, 12 and 13, 13 and 14 flush with the INSIDE of the fuselage sides.



- Glue the turtle deck sides 15 to each side of the assembly, hold with tape until dry. Section A-A (If balsa is too hard, simply steam or wet parts to achieve bend)



- When dry use a long sanding block, carefully sand parts 15 flush with tops of 10 to 14.



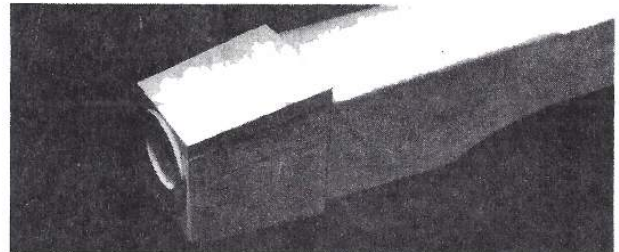
- Glue the tapered turtle deck block in position. When dry use a razor plane or sharp knife to carve and sand turtle deck block to finish flush with 15 (section A-A). Sand turtle deck block flush with 10 and 14 at each end.

STAGE 4

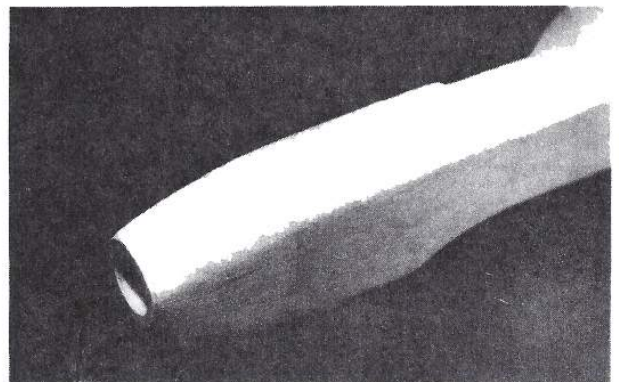
- Fit and glue wing saddles 16 and epoxy wing hold down block 9 x 23 x 63 mm in position.
- Glue moulded top block in position shown on plan. Sand flush with fuselage sides and F1/F2/F3.
- Gemini MK II has been designed around inverted four stroke or two stroke engines. If you wish to use a side mounted or upright engine you will need to alter the position of pushrods. To side mount your engine you will need to redrill the engine mount to allow for nose leg.
- Drill and tap radial mount to suit your engine. Bolt radial mount and nose leg assembly to formers F1/F2/F3. Epoxy glue nuts and washers in place. (Coat bolt threads with oil so they can be removed at a later stage) Section B-B
- Glue gussets between F1/F2/F3 and F4/F5 as shown.
- Remove the nose leg leaving the radial mount and alloy block attached to the former.

STAGE 5

- To construct the front cowling glue the nose block, side blocks and front block using masking tape to hold assembly. (It is easier to construct the cowling separately from the fuselage assembly.)
- The nose block and side blocks have been angle cut to simplify construction.
- Fit and glue the triangular gussets to the inside of the cowling.



- The cowling may be either glued permanently to the fuselage or made to be removable. If you wish to make it removable then only tack glue it in position at this stage. Line up the cowling with the plan side and top views and tack or glue it to the fuselage.
- The ply nose ring 17 is glued to the front of the cowling, 6 mm down from the top of the nose block. (See plan side view).
- Carve out balsa from centre of nose ring.
- As each model may vary slightly from the plan you may wish to temporarily fit your engine, spinner and prop to ensure the nose ring etc will line up. Make changes now if necessary.
- Tack glue the hatch block in position.



- Using a razor plane or sharp knife and coarse sanding block shape the cowl blocks and fuselage to fair into the nose ring 17. See section C-C.
- Carve and sand the cooling vent in the front of cowling.
NOTE: Take your time and carve and sand the cowling carefully.

STAGE 6

- Construct the tailplane over the plan from parts 18,19 and the 6 x 77 x 438 balsa supplied.
- The elevators 20 are also placed over the plan and joined with the 4.5 x 6 x 80 cypress joiner supplied.
- Glue fin parts 21, 22 together.
- Radius the leading edges of both tailplane and fin assemblies.
- Using a sanding block sand the front edge of rudder 23 and elevators 20 to match plan view.
- Taper elevators and rudder to match plan view.

STAGE 7

- Temporarily fit the tailplane to the fuselage marking it for centre. Measure from tailplane tips to the fuselage nose and make sure they are equal. Glue tailplane firmly in place and leave to dry. Make sure the tailplane is square to the fuselage sides.
- Temporarily fit fin to TP. Check fin to be 90° to TP surface. View model from front and carefully align fin so it points exactly straight ahead. Mark position. Glue firmly in place square with TP and leave to dry.
- The elevator and rudder can now be temporarily fitted to the fin and the tailplane with the nylon hinges provided. Cut thin slots in the tailplane elevator, fin and rudder. Push hinges into slots and check for free movement.
- DO NOT CEMENT HINGES** until after the model has been covered. **NOTE** when gluing hinges in place and when drying, carefully wipe out any excess glue from hinge pins.
- Shape fin blocks 15 sq x 140 mm and glue in position.

STAGE 8

- At this stage it is advisable to fit your R/C equipment. The installation of the R/C equipment will depend on the type or brand that you are using, however, the installation shown on the plan will serve as a guide.
- Cut to length the 9 mm square servo mounts and epoxy in position. Aim to have your servo tray as high in the model as possible.
- Cut the nyrods to length and install in the model as shown.
- The receiver and battery pack must be loosely packed in foam rubber and all linkages must move freely.
- Fit the control horns and push rods, making sure once again that all linkages move freely.
- Fit the cross grain bottom sheeting 24-29 and trim to shape.

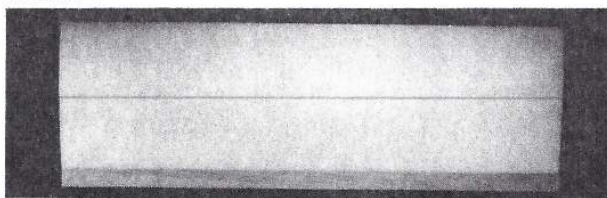
WING ASSEMBLY

NOTE: Red dot indicates left hand foam core.

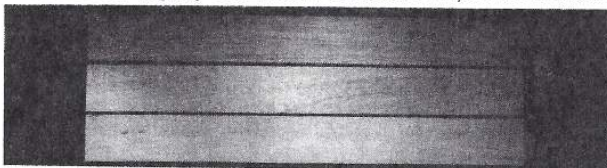
Green dot indicates right hand foam core.

NOTE: ALWAYS TEST ADHESIVES ON SCRAP FOAM BEFORE USING. DO NOT USE Balsa CEMENT OR DOPE ON FOAM

STAGE 1



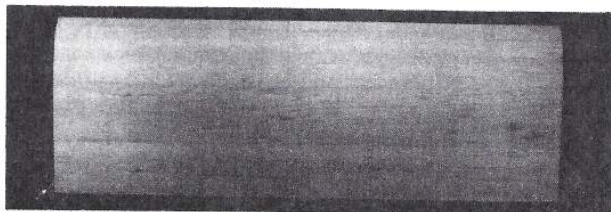
- Glue the two trailing edges (TE) to each foam core using PVA (C30) or epoxy, hold with masking tape.
- When dry make sure that the foam core and TE form a smooth curve over the wing. Sand TE until this curve is achieved. Lightly sand foam cores and wipe free of dust.



- 4 sets of 3 sheets of 1 mm balsa must be joined for wing sheeting. Lay 3 sheets flat side by side. Run masking tape the full length of each join. Bend each sheet away from the tape and lay a small bead of balsa cement along the join. Lay sheets flat again and hold with weights until dry. Repeat until you have 4 sets of sheeting. Lightly sand completed sheets.

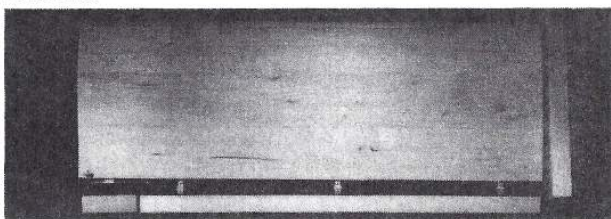
STAGE 2

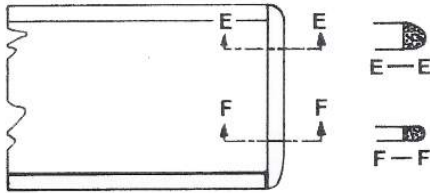
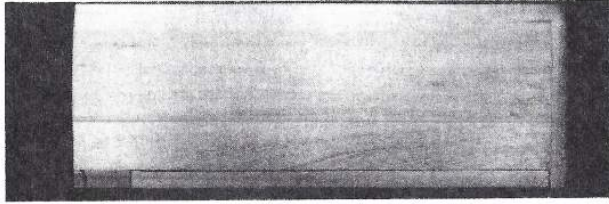
- Using either:
PVA (white wood working glue, C30)
Bostic 825 contact adhesive
Clag spray adhesive
Polystick No 5 **Acrylic Adhesive**



- Lightly** coat balsa sheeting and foam cores and allow to dry as per manufacturers instructions.
- Place balsa sheeting carefully on foam cores, press down firmly. Place sheeted cores back in their covers and place on a flat surface. Place board on top of wings and weight with approximately 20 kg evenly and allow to dry for 24 hours.
- Sand leading edge (LE) of wing carefully and attach balsa LE to foam core with either C30 or epoxy, hold until dry with tape.
- Carefully trim and sand sheeting flush with each end of core. The foam cores have been production cut to provide correct lengths and dihedral angle. Do not change when sanding back sheeting.

STAGE 3





- Glue one wing tip block to each foam core tip, sand and shape
- Assemble as shown the fixed aileron centre blocks and aileron horns for left and right wings. Note that the aileron horns must be bent at 90° to fit the ailerons at a later stage.
- Epoxy the fixed trailing edge centre block in place over the aileron horn linkage. Ensure that excess cement does not effect movement of the aileron horn a little grease on the linkage will ensure this.
- Before fitting the ailerons it is necessary to chamfer off the leading edge of aileron as shown and groove out LE of aileron where the aileron horn is placed. Fit the ailerons in place with the nylon hinges supplied but do not cement hinges until the wings and ailerons have been covered.

STAGE 4

- Make up the undercarriage (U/C) block assembly by gluing the top U/C block on top of the bottom block. Note that the top block is cross grain and you must end up with a complete left and right assembly. Drill a 6 mm dia hole through top U/C block.
- From the plan side and top views measure and mark position for undercarriage blocks. Carefully cut and peel out the balsa sheeting on the inside bottom of each wing for the U/C blocks. Hot wire or carve foam out until the blocks fit flush with the wing surface. Epoxy U/C blocks in position. (Slot outwards and hole near the angle cut end of wing.) Trim the U/C blocks flush with the inside of wings.

STAGE 5

- Epoxy glue left and right wings at the centre at the pre-determined dihedral angle. Block up 38 mm under each tip and let dry.
- Fibre glass the centre section of the wing top and bottom with a 100 mm wide strip of fibre glass cloth (not supplied). NOTE use only epoxy resin.
- When dry mark out and cut out the section of wing needed to fit your aileron servo making sure not to cut into the bottom surface of the wing.
- Epoxy your servo mounts (scrap ply) in position and fit your servo.

STAGE 6

- Temporarily place the wing under the fuselage. Mark through the holes in F4/F5 onto the LE of the wing. Drill two 6 mm holes into the LE. Cut 6 mm dia dowel to length and epoxy into LE.

- With the wing under the fuselage drill two 6 mm dia holes through the trailing edge and wing hold down block for the nylon bolts. Remove wing and epoxy nylon nuts in position.

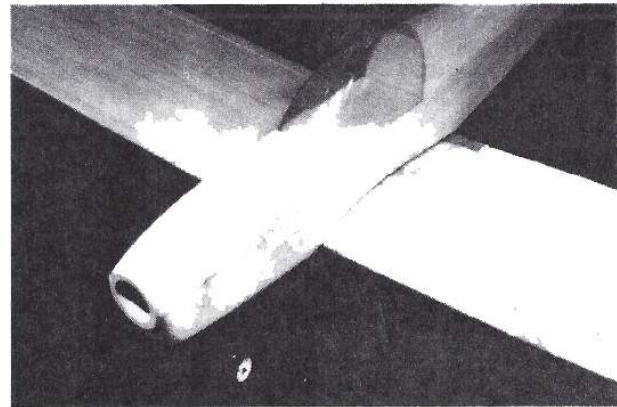
WING COVERING

- Cut a piece of Aerokote or similar film slightly larger than one wing panel. Strip backing sheet away.
- Position film to bottom of wing. Tack film across centre using an iron set at the correct temperature (experiment using scrap film).
- Working outward, tacking the outer edges of the panel, pull out main wrinkles as you go. Trim and seal edges.
- Seal edges of panel, then glide heat gun over the interior area to tighten covering. If joining two pieces of film, make sure you have at least 3 mm overlap.
- In the same manner cover the entire bottom and then the top.

WING TRUENESS

- Set a wing panel on a flat surface to detect any warps. If warps are present, twist the panel slightly in opposite direction and hold while gliding gun over the surface to retention.

FINISHING



- If you have chosen to make your front cowling removable you will need to purchase 3 or 4 long PK screws, then position and glue small hardwood blocks inside the cowling against F1. PK through the cowling and into the blocks to hold cowling in position.
- Assemble and fit fuel tank as per diagram.
- Fit the undercarriage legs using plastic clamps and PK screws provided.
- To fit the air wheels to the undercarriage and nose leg solder 3/16 x 7/16 washers as per plan.
- Fit and bend the wire pushrods to the nose gear and throttle using the two pushrod adjusters (supplied) to connect the servo arms.
Note F5 has been die cut with notches in each side to allow throttle and steering pushrods to pass through.
- The hatch block is retained by 4 PK screws in each corner. It may be necessary to carve away part of the hatch to clear the nose leg spring.
- Remove all radio equipment, undercarriage, engine, engine mount and nose gear. Sand all surfaces to a smooth finish.

- Apply one coat of dope to the fuselage only. It is advisable to paint the inside of the fuel tank and engine compartments with epoxy resin to prevent fuel soaking into the balsa structure.
- The method of applying the final finish depends on your own choice. One method is to cover fuselage, fin, rudder and tailplane with Aerokote or similar film.
- If you wish to paint the model, cover the fuselage with light weight tissue which is doped to the balsa surfaces and finally apply two coats of enamel paint.
- Re-assemble the model and re-check all working parts.
- Carefully trim clear canopy and glue in position on model.
- Fit the radio gear, packing the receiver and battery pack in foam and plastic bags for fuel proofing.
- Check the servos for correct movement and centring, connect the myrods at each end.
- Adjust for neutral and equal movement either side of neutral for rudder, elevator and ailerons.
- Fit the wing using nylon bolts supplied.
- Check the model for balance as per plan. Adjust the position of battery pack and weights to ensure the balance point is met.
- Check balance in the other axis. Add small nailweights to the light wing tip.
- With the model standing on the ground, the centre line of the LE should be 6 mm lower than the centre line of the TE. This prevents the model flying off after a fast landing.
- Set the main U/C wheels with a small amount of toe in and check the model tracks straight along the ground.
- WHEN READY TO FLY WE SUGGEST YOU OBTAIN THE HELP OF AN EXPERIENCED FLYER.**

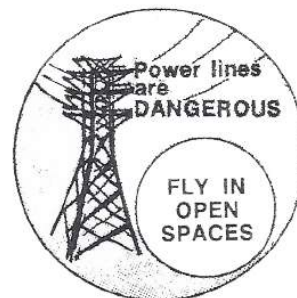
Allow the plane to climb gently straight ahead until well above all obstructions and make a gentle left turn to get it pointed back toward the field. Level the airplane and trim it using the trim levers on the transmitter. If the plane was built accurately and the CG thrustline are correct, very little trim should be required. If electronic trim is insufficient and you have to hold some stick in to maintain level flight, bring the plane around, reduce power and land into the wind as quickly and safely as possible.

Note the position of the trim levers and re-set the clevises on the pushrods to put the same amount of trim into the control surfaces as you put in with electronic trim. Neutralize transmitter trim levers and try another flight. Keep retrimming mechanically until the plane will fly straight and level with all transmitter trim levers centred. Now you are ready to learn to fly.

FLYING YOUR MODEL

Check list:

- Check all plugs properly plugged in and secure.
- Check batteries are fully charged.
- Check all control surfaces for security and freedom from binding.
- Check for proper alignment and no warps in wings. Make sure wing is held securely in position.
- Check nobody is operating on your channel.
- Check radio range and proper functioning of all controls.
- Check fuel system and fill fuel tank.
- Check engine, throttle and propellor for proper security and operation.
- Check engine at high throttle holding the nose high to make sure the engine isn't too lean. Check control operation with the engine running at high throttle.
- Check transmitter antenna fully extended and check out meter.
- Taxi test model.
- Check the wind, then apply power smoothly, taking off into the wind.



WARNING – Because of possible dangers in the operation of radio controlled model aircraft, great caution should be exercised to prevent personal injury or property damage. Observe the potential hazard of the turning propeller and the flammable fuel. Fly only in areas considered safe for R/C.