# DOUGLAS DC-3

## ELECTRIC ALMOST-READY-TO-FLY SPORT-SCALE MODEL

# INSTRUCTION MANUAL


**Wingspan:** 59-3/8 in [1,510mm]
**Wing Area:** 393 sq in [25.3 dm²]
**Weight:** 3 lb [1,360 g]
**Wing Loading:** 17.6 oz/sq ft [53.7 g/dm²]
**Length:** 36-7/8 in [940mm]
**Radio:** 4-Channel
**Motors:** (2) Speed 400 Electric motors supplied

## WARRANTY

**Great Planes® Model Manufacturing Co.** guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. **In no case shall Great Planes' liability exceed the original cost of the purchased kit.** Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

To make a warranty claim send the defective part or item to Hobby Services at the address below:

Hobby Services
3002 N. Apollo Dr. Suite 1
Champaign IL 61822
USA

**Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.**

**READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT WARNINGS AND INSTRUCTIONS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.**

GREAT PLANES® MODEL MANUFACTURING COMPANY
Champaign, Illinois
(217) 398-8970, Ext 5
airsupport@greatplanes.com

# TABLE OF CONTENTS



# INTRODUCTION

Congratulations and thank you for purchasing the **Great Planes DC-3 EP ARF**. The DC-3 EP ARF is a great flying, low-wing model that is about as simple-to-assemble as they get. In just a few evenings you can have your DC-3 ready to fly.

The DC-3 EP ARF is a sport scale model of the full size DC-3. It is relatively easy to fly and has no bad characteristics. However, if you have never flown an R/C model before, learning to fly the DC-3 EP ARF all by yourself is not recommended. As with any airplane, you should find an experienced modeler to help you with your first flights. Information about R/C clubs and instructors is provided later in this manual.

For the latest technical updates or manual corrections to the DC-3 EP ARF visit the Great Planes web site at www.greatplanes.com. Open the "Airplanes" link, then select the DC-3 EP ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

# PROTECT YOUR MODEL, YOURSELF & OTHERS...FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS


**Attention:** The product you have purchased is powered by a rechargeable battery. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste system. Check with your local solid waste officials for details in your area for recycling options or proper disposal. **This product contains a chemical known to the state of California to cause cancer and birth defects or other reproductive harm.**

1. Your Great Planes DC-3 EP ARF should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the Great Planes DC-3 EP ARF, if not assembled and operated correctly, could possibly cause injury to you or spectators and damage to property.

2. You must assemble the model **according to the instructions**. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.

3. You must take time to assemble **straight**, **true** and **strong**.

4. You must use an R/C radio system that is in first-class condition. This model requires mini or micro servos and a micro receiver.

5. You must properly install all R/C and other components so that the model operates properly on the ground and in the air.

6. You must test the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check all connectors often and replace them if they show signs of wear or fatigue.

7. If you are not already an experienced R/C pilot, you should fly the model only with the help of a competent, experienced R/C pilot.

8. **WARNING:** The fuselage included in this kit is made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part to remove fiberglass dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling and sanding fiberglass parts. Vacuum the parts and the work area thoroughly after working with fiberglass parts.

**Note:** We, as the kit manufacturer, provide you with a top quality kit and great instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model and no representations are expressed or implied as to the performance or safety of your completed model.

**Remember: Take your time and follow directions to end up with a well-built model that is straight and true.**

If you have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

In addition to joining an R/C club, we strongly recommend you join the AMA (Academy of Model Aeronautics). AMA membership is required to fly at AMA sanctioned clubs. There are over 2,500 AMA chartered clubs across the country. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the address or toll-free phone number below:

**Academy of Model Aeronautics**
5151 East Memorial Drive
Muncie, IN 47302-9252
Tele. (800) 435-9262
Fax (765) 741-0057

Or via the Internet at: *http://www.modelaircraft.org*

# DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the DC-3 EP ARF that may require planning or decision making before starting to build. Order numbers (in parentheses) are provided for your convenience.

## Radio Equipment

The DC-3 EP ARF requires a four-channel radio with a micro receiver and four mini or micro servos. You will also need (2) 12" servo extensions and a "Y" connector for the aileron servos.

***Suggested servos:***
- (HCAM0090) Hobbico® CS-5, 16.7 oz-in torque
- (HCAM0100) Hobbico CS-15, 15 oz-in torque
- (FUTM0037) Futaba® S3103, 16.6 oz-in torque
- (FUTM0025) Futaba S3107, 16.6 oz-in torque

***Suggested receivers:***
- (GPML0044) Great Planes 4-channel FM, low band
- (GPML0045) Great Planes 4-channel FM, high band
- (FUTL0442) Futaba 4-channel FM, low band
- (FUTL0443) Futaba 4-channel FM, high band
  Low band - channels 11-35
  High band - channels 36-60

***Receiver crystal:***
- (FUTL62**) for GPM low band
- (FUTL63**) for GPM high band
- (FUTL62**) for FUT low band
- (FUTL63**) for FUT high band
  ** desired channel

***Recommended battery:***
- (GPMA2431) Great Planes 8-cell 9.6 volt, 1800 mAh rechargeable NiMH

## Charger

The best type of charger to use is a peak charger, because it charges the batteries until they are fully charged, then automatically switches to a trickle charge mode. The Great Planes ElectriFly™ Peak Charger (GPMM3000) is suitable for nigh batteries, NiCds and transmitter battery packs. The Great Planes Triton™ charger (GPMM3150) is also suitable.

If you have another type of charger that is not a peak charger, you will have to calculate the length of time it takes to charge the batteries yourself, then turn the charger off when the batteries are fully charged. Overcharging the batteries may damage them. Before you can calculate the time it takes to charge a battery pack, you first have to know the charge rate you are going to use.

***Charge rate/time recommendations:***

- Charge a fully discharged 8-cell, 1100 mAh battery pack at 1 Amp for 1 hour 10 minutes.
- Charge a fully discharged 8-cell, 1800 mAh battery pack at 1.5 Amps for 1 hour 15 minutes.

**Note:** The period required to charge the batteries in the example above is for discharged batteries. If the battery you are going to charge is not discharged (and you are not using a peak charger), connect it to the motors on your model. Run them until the motors stop, thus discharging the battery.

**IMPORTANT:** Monitor the temperature of the battery frequently. If the battery becomes warm, disconnect it from the charger.

**CAUTION:** Do not attempt to use Deans® Ultra Plugs with the plug that is supplied on the electronic speed control. They are not compatible and may be damaged if used.

# ADDITIONAL ITEMS REQUIRED

## Adhesives and Building Supplies

In addition to the equipment listed in the **"Decisions You Must Make"** section, following is the "short list" of the most important items required to assemble the DC-3 EP ARF. *We recommend **Great Planes Pro**™ CA and Epoxy glue.*

❏ 1/2 oz. Thin Pro CA (GPMR6001)
❏ 1/2 oz. Medium Pro CA+ (GPMR6007)
❏ Pro 6-Minute Epoxy (GPMR6045)
❏ Pro 30-Minute Epoxy (GPMR6047)
❏ Hobby Knife (HCAR0105)
❏ #11 Blades (HCAR0211)
❏ Small Phillips and Flat Blade Screwdrivers
❏ Pliers with Wire Cutter (HCAR0630)
❏ Sealing Iron (TOPR2100)
❏ Velcro® Hook & Loop Material (GPMQ4480)
❏ Electric Drill and 1/16" [1.6mm] Drill Bit
❏ Rubbing Alcohol (for epoxy clean up)
❏ 220-Grit Sandpaper
❏ Pro Threadlocker (GPMR6060)

## Optional Items

Here is a list of optional tools mentioned in the manual that will help you assemble the DC-3 EP ARF.

❏ Great Planes CG Machine™ (GPMR2400)
❏ Top Flite® Hot Sock™ iron cover (TOPR2175)
❏ Straightedge with scale (HCAR0475)
❏ Masking Tape (TOPR8018)
❏ CA Debonder (GPMR6039)
❏ CA Applicator tips (GPMR6033)
❏ Curved-tip canopy scissors for trimming plastic (HCAR0667)

# IMPORTANT BUILDING NOTES

• When you see the term ***test fit*** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.

• Whenever the term ***glue*** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.

• Whenever just ***epoxy*** is specified you may use ***either*** 30-minute (or 45-minute) epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/or the additional strength.

• **Photos** and **sketches** are placed before the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.

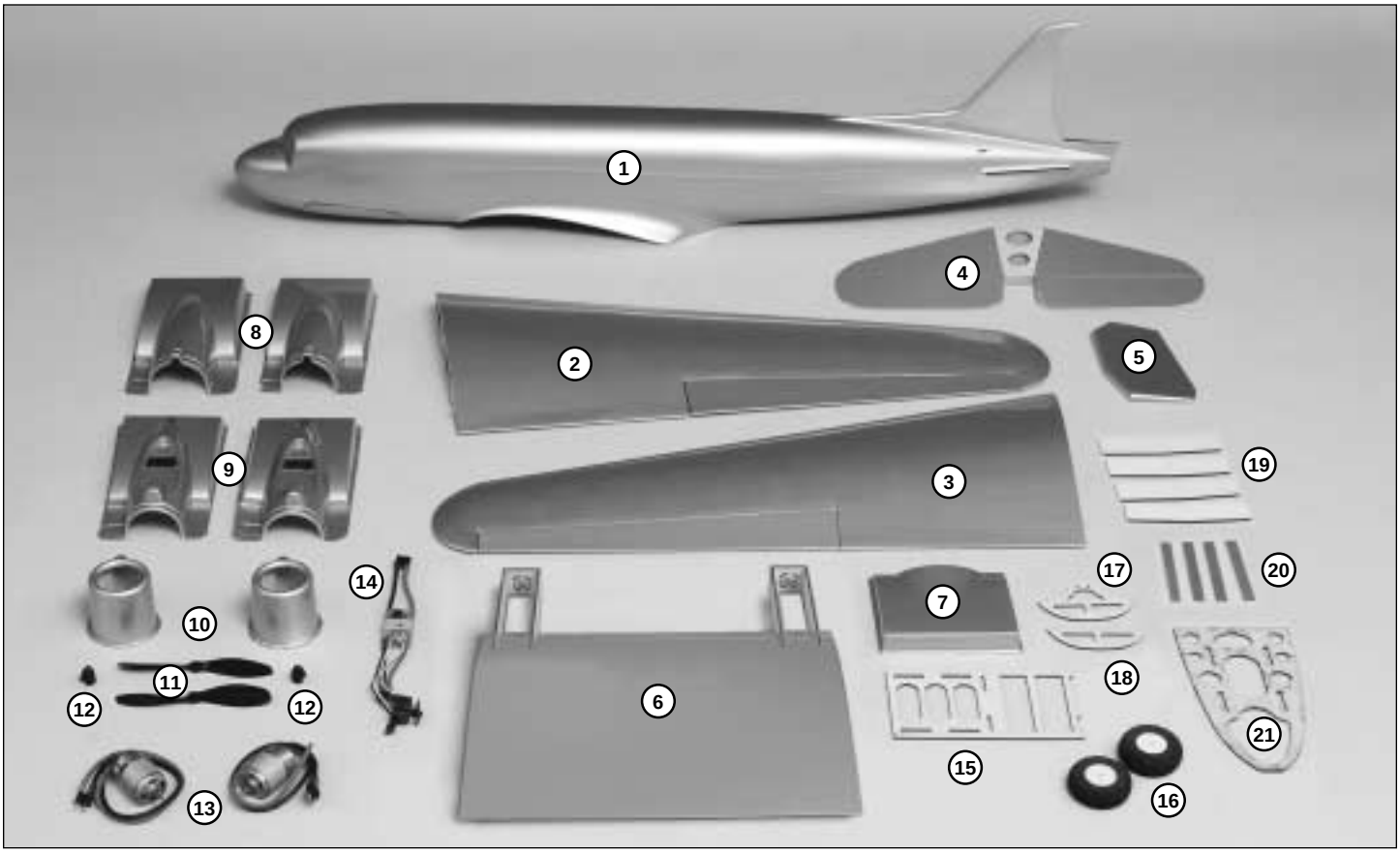
• The stabilizer and wing incidences and motor thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at ***www.greatplanes.com*** and click on "Technical Data." Due to manufacturing tolerances which will have little or no effect on the way your model will fly, please expect slight deviations between your model and the published values.

**NOTE: The hardware supplied with this product is metric; therefore the sizes and measurements in this manual will be stated as metric sizes.**

# KIT INSPECTION

Before starting to build, use the **Kit Contents** list to take an inventory of this kit to make sure it is complete and inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, contact **Great Planes Product Support**. When reporting defective or missing parts, use the part names exactly as they are written in the Kit Contents list on this page.

**3002 N. Apollo Drive, Suite 1, Champaign, IL 61822**
**Telephone: (217) 398-8970, Fax: (217) 398-7721**
**E-mail: airsupport@greatplanes.com**




**Kit Contents (Photographed)**

1. Fiberglass Fuselage
2. Right Wing Panel w/Aileron
3. Left Wing Panel w/Aileron
4. Horizontal Stabilizer w/Elevators
5. Rudder
6. Wing Center Section
7. Center Section Bottom Fairing
8. Cowl Top [2]
9. Cowl Bottom [2]
10. Cowl Front [2]
11. Propellers [2]
12. Propeller Adapters [2]
13. Speed 400 Motors [2]
14. Wiring Harness w/ ESC and Switch
15. 1/8" [3.2mm] Ply Servo Tray
16. 51.5mm Main Wheels [2]
17. 1/8" [3.2mm] Ply Mid Former (Servo Tray)
18. 1/8" [3.2mm] Ply Aft Former (Servo Tray)
19. 1/8" [3.2mm] Ply Wing Joiners [4]
20. Fiberglass Nose Hatch Strips [4]
21. 1/8" [3.2mm] Ply Forward Battery Tray

**Kit Contents (Not Photographed)**

5mm x 50mm Wooden Dowel
Velcro® Battery Straps [2]
2.0mm Elevator Joiner
1.7x99mm Aileron Pushrods [2]
2.5mm Washers (Motor Mount) [4]
2.5x11.5mm Flanged Phillips Screws (Landing Gear Straps) [4]
2.5x7.5mm Phillips Screws (Motor Mounts) [4]
Nylon Tie Strap
2.5x9.5mm Flanged Phillips Screws [6]
25mm Tail Wheel
75mm Main Landing Gear [4]
Decal
2mm Wheel Collar (Tailgear)
2x12mm Phillips Screws (Rudder/Elevator) [4]
2x16mm Phillips Screws (Ailerons) [4]
3mm Set Screws [18]
3x34mm Axles [2]
4mm Washers (Wing Bolts) [2]
4x22mm Wing Bolt [2]
600mm Pushrod Outer Tubes [2]
700mm Pushrods w/Z-Bends [2]
Propeller Shaft Extensions [2]
CA Hinges [4]
Hinge Points [2]
Wing Bolt Blind Nuts (Installed in Fuse)[2]
Large Nylon Clevis [2] w/Retainers
Main LG Adapters [4]
Nylon LG Straps [2]
Plastic Spacers for Landing Gear [4]
Screw-Lock Connectors
Nylon Retainers (Screw-Lock Connectors) (2)
Small Nylon Control Horns [4]
Tailgear Wire

# ORDERING REPLACEMENT PARTS

To order replacement parts for the Great Planes DC-3 EP ARF, use the order numbers in the **Replacement Parts List** that follows. Replacement parts are available only as listed. Not all parts are available separately (an aileron cannot be purchased separately, but is only available with the wing kit). Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. Hardware items (screws, nuts, bolts) are also available from these outlets. If you need assistance locating a dealer to purchase parts, visit **www.greatplanes.com** and click on "Where to Buy." If this kit is missing parts, contact **Product Support**.

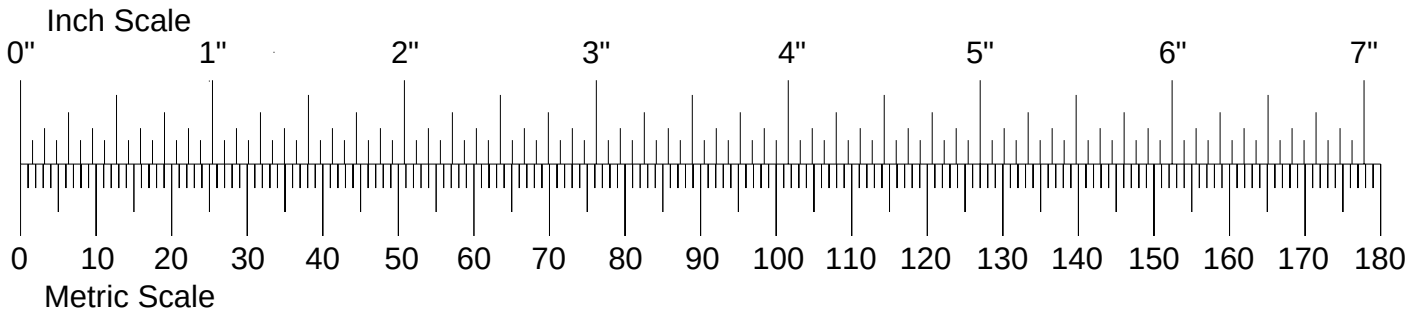
**Replacement Parts List**

| Order Number | Description | How to Purchase |
|---|---|---|
| | Missing pieces | Contact Product Support |
| | Instruction manual | Contact Product Support |
| | Full-size plans | Not available |
| **GPMA2590** | **Fuse Kit** | Contact your hobby supplier to purchase these items. |
| **GPMA2591** | **Wing Kit** | |
| **GPMA2592** | **Tail Set** | |
| **GPMA2593** | **Motors and Harness** | |
| **GPMA2594** | **ESC** | |
| **GPMA2595** | **Decal Sheet** | |
| **GPMA2596** | **Prop Set** | |
| **GPMA2597** | **Landing Gear** | |
| **GPMA2598** | **Cowls, Plastic Parts** | |

# METRIC CONVERSIONS

**To convert inches to millimeters, multiply inches by 25.4**

| | |
|---|---|
| 1/64" = .4mm | 1" = 25.4mm |
| 1/32" = .8mm | 2" = 50.8mm |
| 1/16" = 1.6mm | 3" = 76.2mm |
| 3/32" = 2.4mm | 6" = 152.4mm |
| 1/8" = 3.2mm | 12" = 304.8mm |
| 5/32" = 4mm | 15" = 381mm |
| 3/16" = 4.8mm | 18" = 457.2mm |
| 1/4" = 6.4mm | 21" = 533.4mm |
| 3/8" = 9.5mm | 24" = 609.6mm |
| 1/2" = 12.7mm | 30" = 762mm |
| 5/8" = 15.9mm | 36" = 914.4mm |
| 3/4" = 19mm | |



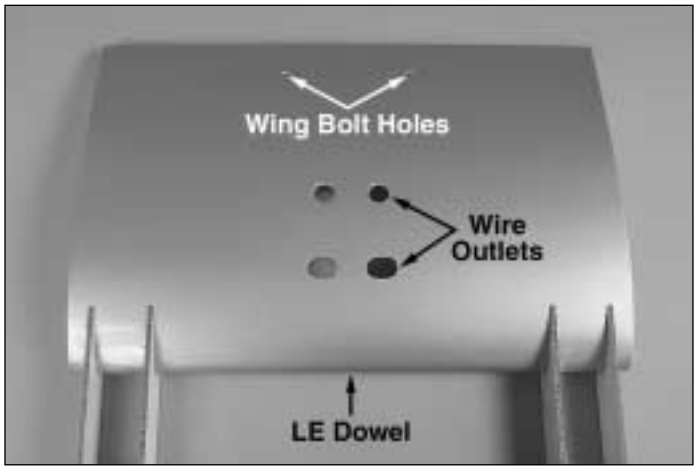
## PREPARATIONS

Remove the major parts of the kit from the box (wings, fuselage, tail parts, etc.) and inspect them for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in this manual.

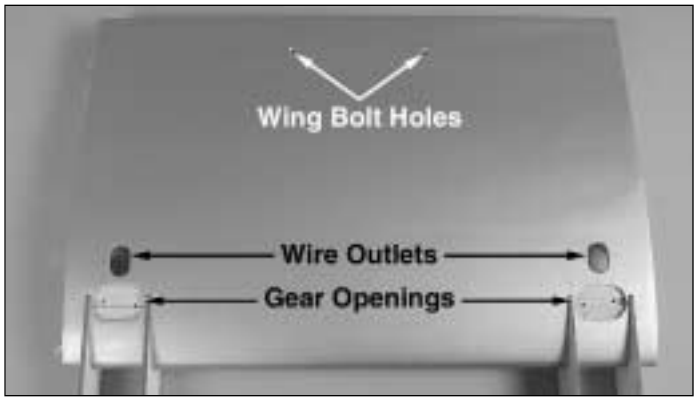
## BUILD THE WING

### Assemble the Wing

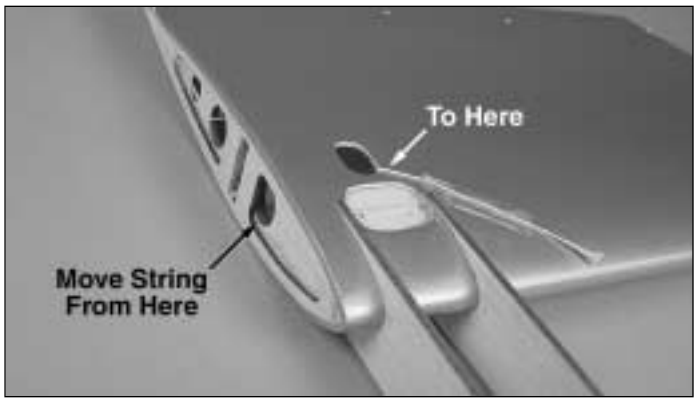
❑ 1. Where necessary, use a covering iron with a covering sock to tighten the covering that may have loosened during storage. Apply pressure over sheeted areas to thoroughly bond the covering to the wood.



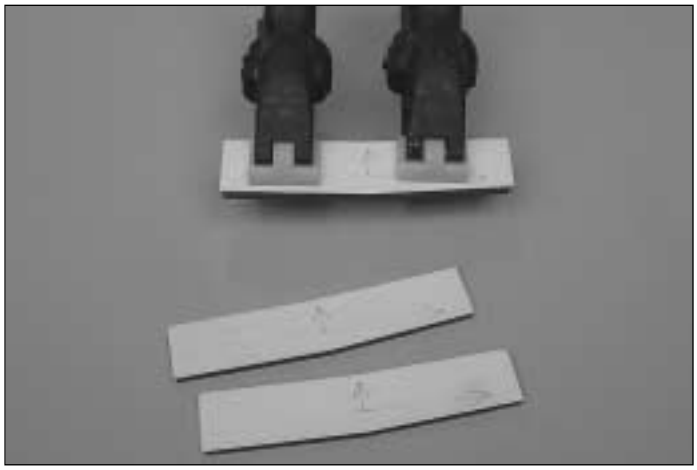

❑ 2. Using a sharp hobby knife, cut the covering away in the following areas on the top of the wing: wire outlets (4), L.E. dowel hole (1), wing bolt holes (2).




❑ 3. Using a sharp hobby knife, cut the covering away in the following areas on the bottom of the wing: wire outlets (2), gear openings (2), wing bolt holes (2), servo openings (2) (on left and right panels, not pictured).



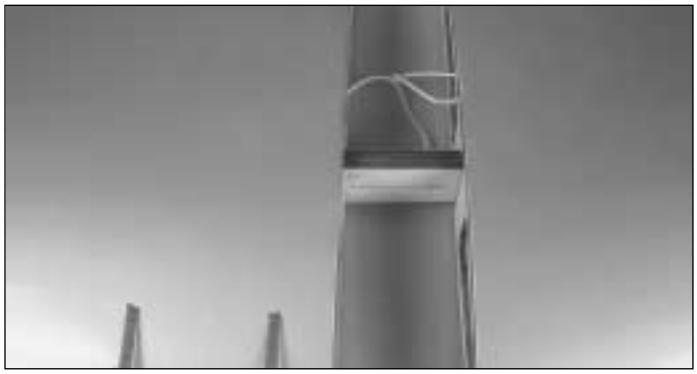

❑ 4. There are two strings inside the wing center section that have the ends taped to each root rib. Move the forward string from the root rib and put it through the hole in the bottom of the wing. Tape it to the wing as shown.



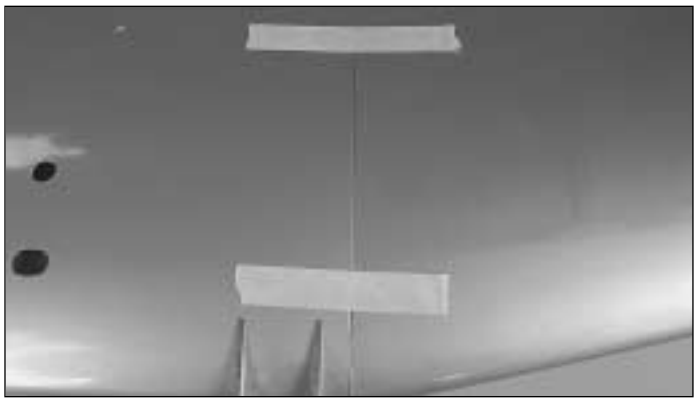
❑ 5. Use 6-minute epoxy to glue the four 3mm plywood **wing joiners** together, making two pairs as shown in the photo above. Use weights or clamps to hold the joiners in place until the epoxy cures. **Important:** The joiners may be marked with arrows to indicate which way is up and which end points towards the tip. Be sure to orient the pieces as shown in the photo. If your joiners are not marked with arrows, mark them with a pencil. The wing tip end is narrower (21mm) than the root end (23mm).

***For the following steps start with the left wing panel so your progress will match the photos.***

❏ ❏ 6. Test fit the assembled wing joiner into the wing panel, then the center section. Be certain the joiner is installed upright with the arrow pointed up. The tapered end with the horizontal arrow points toward the wing tip. Also make sure that the joiner slides in all the way, allowing a flush fit of the wing panel and the center section with no gaps. If necessary, sand the joiner for a good fit.



❏ ❏ 7. Securely tie the strings for the aileron extensions together as indicated in the above photo.



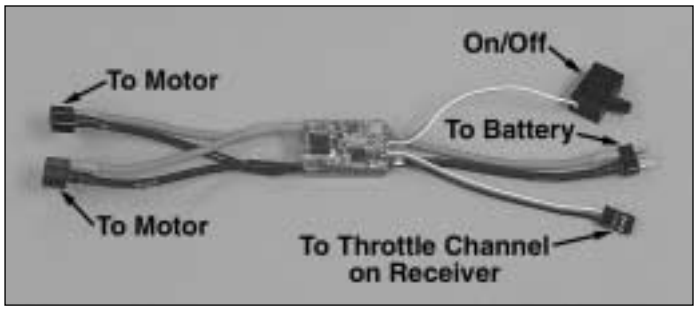
❏ ❏ 8. Remove the joiner. Using 30-minute epoxy, thoroughly coat the inside of both pockets where the joiner fits. Coat the joiner half that goes into the left wing panel. Then insert the joiner into the left wing panel. Coat the protruding end of the joiner, the root rib on the wing panel and the root rib of the center section with epoxy. Join the left wing panel and the center section together. Be sure to pull the strings through as you slide the wing panel together with the center section. Be careful not to get any epoxy on the strings.

❏ ❏ 9. Wipe away excess epoxy that squeezes out from between the joint with paper towels saturated with alcohol. Use masking tape on the top and bottom to hold the joint tight as shown. Be certain the root ribs align accurately. Do not disturb the wing until the epoxy has fully cured.

❏ 10. Repeat this process to glue the right wing panel in place in the same manner.

## *Mount the Motors*

❏ 1. Install the two motors onto the motor mount face plates using the four supplied 2.5mm x 7.5mm screws and 2.5mm washers.



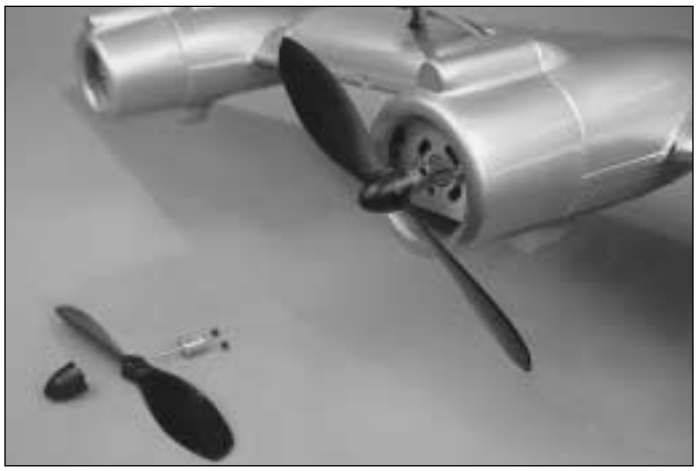

❏ 2. . This is a good time to test the motors. Do this before installing the propellers. First make sure the transmitter and ESC switches are turned OFF. Using the above picture, connect the wires from the ESC to all of the labeled components (motors, receiver, etc.). Switch on the transmitter and make sure the throttle stick is at idle. Turn on the ESC switch. Slowly advance the throttle stick to full throttle. Move the throttle stick back to the idle position. The system is now engaged and operational. Advance the throttle stick and verify that both motors are working.

❏ 3. Tie the strings already installed in the wing onto the connectors. Then place the wires into the center section

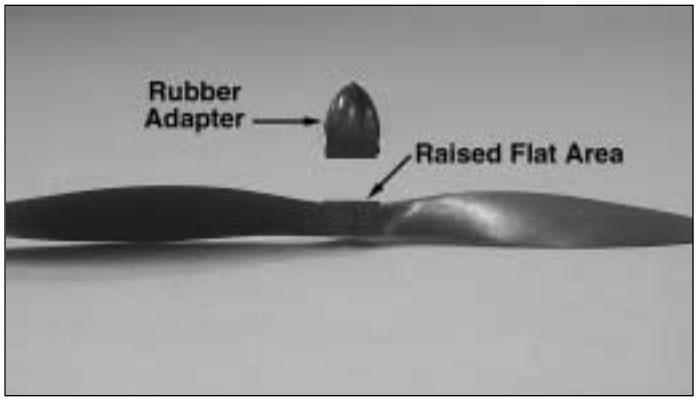
directly behind the leading edge of the wing. Pull the wires out of the center holes using the string as shown in the above photo. The strings will help you guide the connectors and wires through the holes in the wing ribs.

## *Install the Motor Cowls*

❑ ❑ 1. Trim the cowl parts along the cut lines and mount them into place. You have a number of options to complete this; the method shown in the photos is to tape the cowls into place using a clear tape. You can glue them if you wish, or you can glue one portion such as the bottom half and tape the remaining pieces. You could also mount them into place with double-sided tape such as a good quality carpet tape.

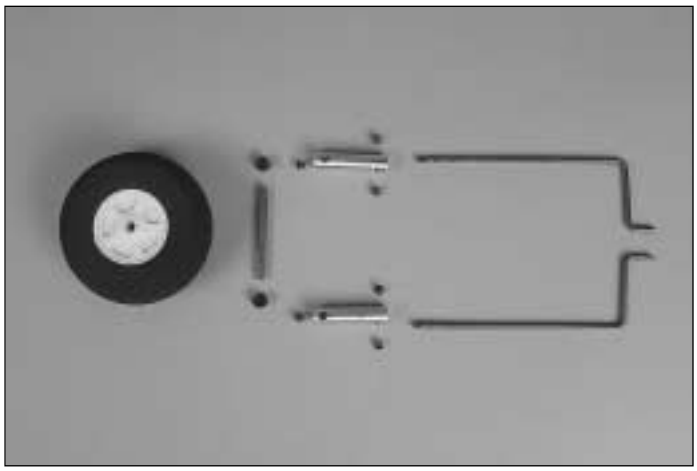


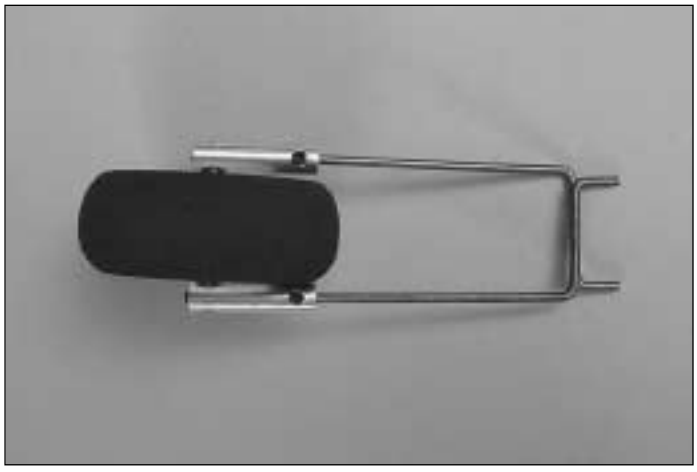
❑ ❑ 2. Assemble the propeller shaft extension, propeller and the propeller adapter as shown in the above photo. Place the rubber propeller adapter into the propeller and press it onto the shaft of the extension. Place the assembly onto the motor shaft and secure it with two set screws on each adapter.



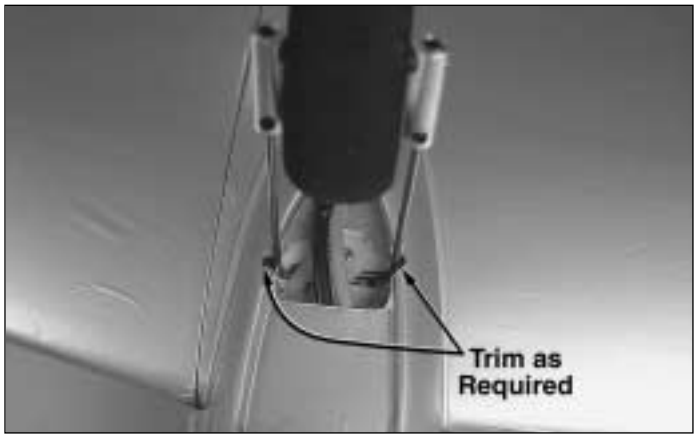

**Important:** The rubber adapter must be placed on the correct side of the prop. One side of the prop has a raised flat area as shown in the photo above. The rubber adapter must be inserted into this side.

## *Install the Landing Gear*





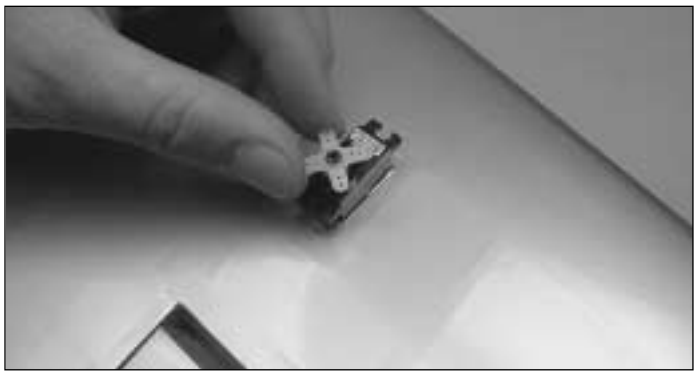
❑ ❑ 1. Assemble the landing gear using the above photos as a guide. Use (2) landing gear wires, (2) main LG adapters, (6) 3mm set screws, (1) 3mm x 32mm axle, (2) plastic spacers and (1) 51.5mm main wheel. Use threadlocker on all the set screws.




❏ ❏ 2. After this assembly is completed, install it as shown and secure it with a nylon landing gear strap and two 2.5mm x 11.5mm screws. Predrill holes for the screws. Trim the motor cowl as required.

❏ 3. Install the second landing gear in the same manner.

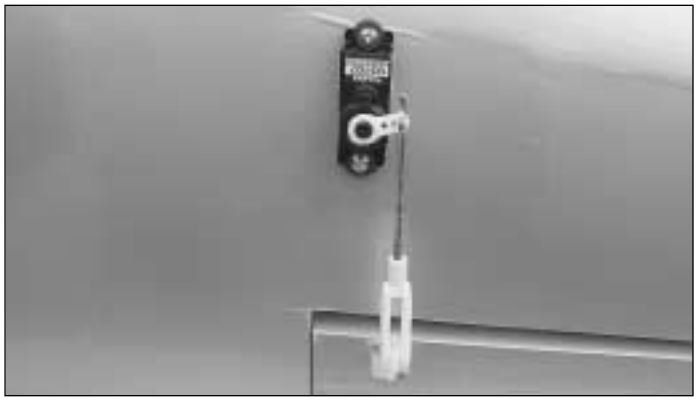
## *Install the Aileron Servos*



❏ ❏ 1. Test fit the aileron servos in the aileron servo opening. If necessary, trim the opening in the wing to accommodate the servo.

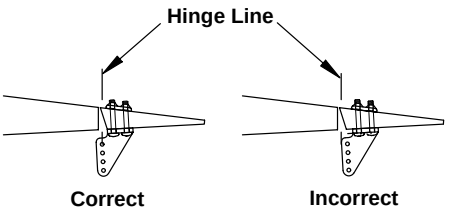

❏ ❏ 2. Connect a 12 inch extension to the servo lead wire and secure with heat shrink tubing or tape. Inside the servo bay you will find a string taped to the inside of the wing. Tie this string securely to the servo extension connector and use the other end of the string, in the wing center section, to pull it through.

***Use the following photo for the next 3 steps.***



❏ ❏ 3. Install the aileron servos using the grommets, brass eyelets and screws supplied with the servos. Drill 1/16" [1.6mm] holes for the screws; then screw them into place. Remove the screws and harden the holes with a few drops of thin CA. After the CA hardens, reinstall the servo and screws.

❏ ❏ 4. Mount the nylon **control horn** on the aileron with two 2mm x 16mm Phillips head **screws**. Drill 5/64" [2mm] holes for the screws.



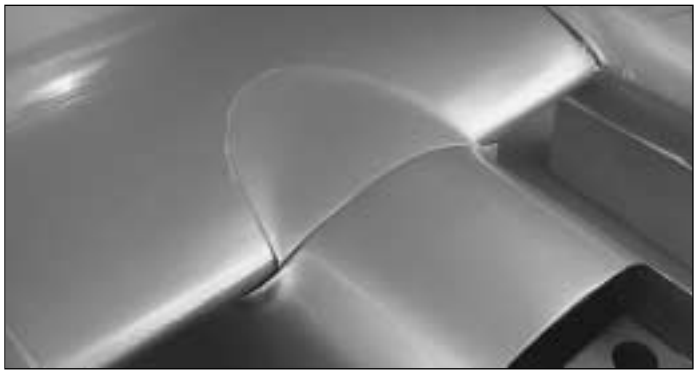

❏ ❏ 5. Screw the clevis 12 full turns onto the 1.7mm x 99mm aileron pushrod. Attach the clevis to the aileron horn. With the servo in the neutral position, use a felt-tip pen to mark the pushrod where it crosses the hole in the servo arm. Make a Z-bend in the pushrod at the mark. Cut the excess pushrod off and use this to drill the hole in the servo arm. Slide a silicone retainer over the clevis.

❏ 6. Return to step 1 and install the other aileron servo.

❏ 7. Join both aileron extensions into a “Y” connector.

## *Fit the Wing to the Fuselage*

❏ 1. Test fit the 5mm x 50mm **dowel** into the front of the wing. The dowel should protrude approximately 3/8" [9.5mm]. When you are satisfied with the fit, glue it into place as shown in the above photo.



❑ 2. Place the wing onto the fuselage and secure it in place with two 4mm x 22mm **wing bolts** and 4mm **flat washers**. Trial fit the **wing fairing** into place as shown. When satisfied with the fit, glue the fairing into place using thin CA.

***IMPORTANT NOTES ABOUT WORKING WITH FIBERGLASS***

If you have never worked with fiberglass there are a few basic things you should be aware of:

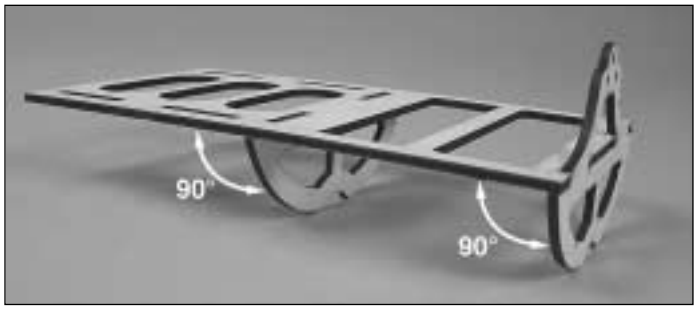
• When you are cutting into fiberglass, be sure you are cutting the correct place. Unlike wood, you are not able to go back and easily fix a mistake.

• Whenever you are gluing a part to the inside of fiberglass it is important to roughen the inside surface of the fiberglass with 220-grit sandpaper and then wipe the area with rubbing alcohol. The molding process leaves a waxy residue that can prevent a good bond between the glue and the parts being glued.

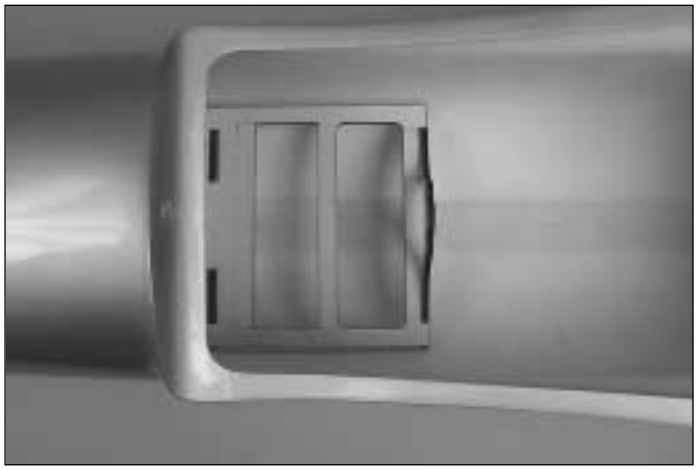
***Warning: The fuselage included in this kit is made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part to remove fiberglass dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling or sanding fiberglass parts. Vacuum the parts and the work area thoroughly after working with fiberglass.***

## ASSEMBLE THE FUSELAGE

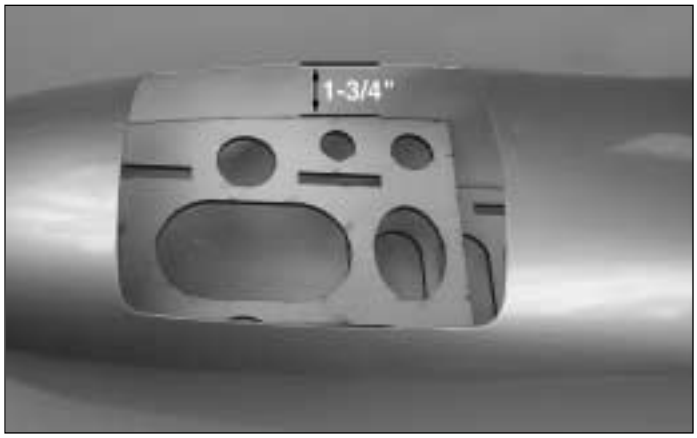
### Install the Formers

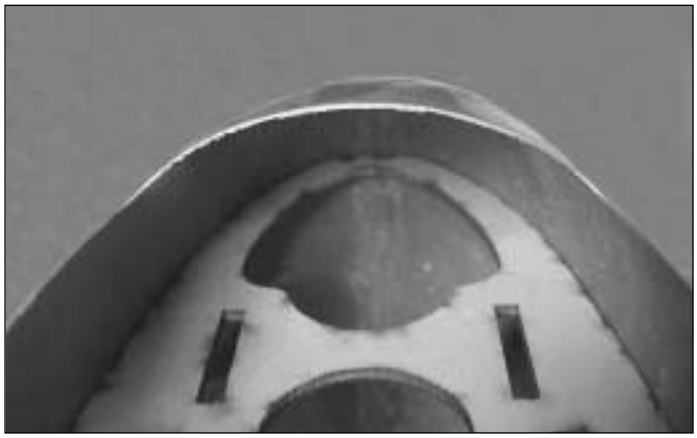



❑ 1. Locate the 1/8" [3.2mm] ply **servo tray**, **aft former** and **mid former**. Glue the aft and mid formers to the servo tray as shown above.



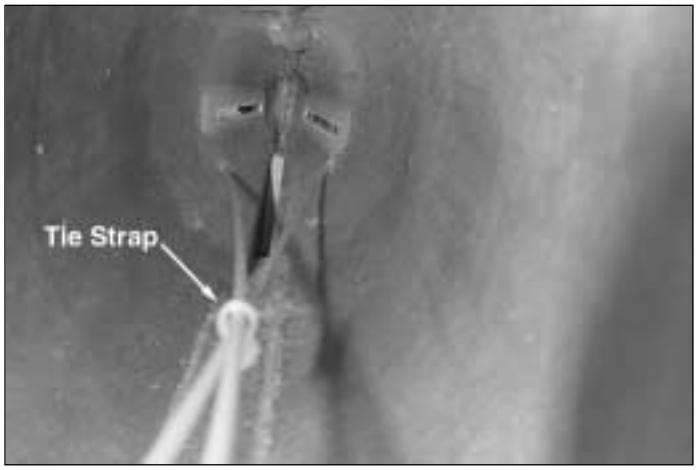
❑ 2. Locate the rear of the servo tray 12 inches from the nose of the fuselage as shown in the photo above. Mark the locations where the tray will be glued to the fuselage. Remove the tray and sand the locations with 220-grit sandpaper. Clean the area with a paper towel and rubbing alcohol. Glue the servo tray into position with epoxy or medium CA.



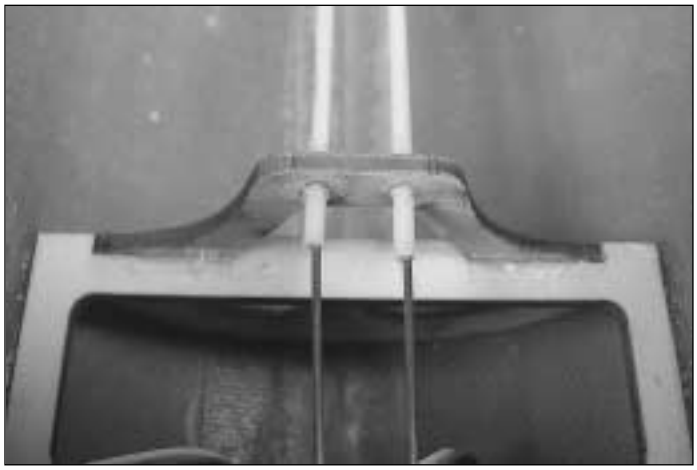
❑ 3. Trial fit the battery tray into place as far forward as possible in the nose of the fuselage. The tray should be 1-3/4" [44.5mm] below the hatch opening at the rear edge. When satisfied with the fit, glue the tray into place with epoxy. **Important:** The battery tray should fit into the fuselage without pushing the sides outwards. Carefully check that the battery tray does not cause the fuselage sides to flex outwards as it is inserted into place. Sand the sides of the tray if necessary. If the sides flex outwards, the battery hatch will not fit properly.

## Install the Servos



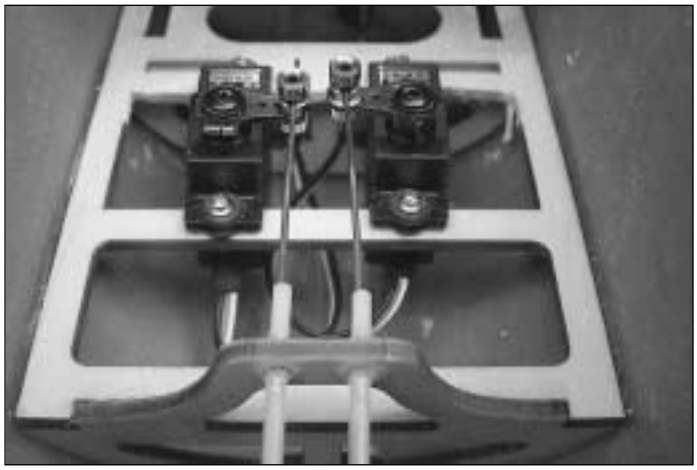

❏ 1. Using 220-grit sandpaper, sand or rough-up the outer portion of the two pushrod outer plastic tubes. Locate the nylon tie strap supplied in the parts bag and tie it approximately 1/2 the length of the two pushrod outer tubes. Insert the steel pushrods from the rear of the fuselage and run them inside the two outer tubes. Note that these tubes should be X'd at the nylon tie strap.

❏ 2. Work the outer tubes back and through the exit slots in the rear of the fuselage.



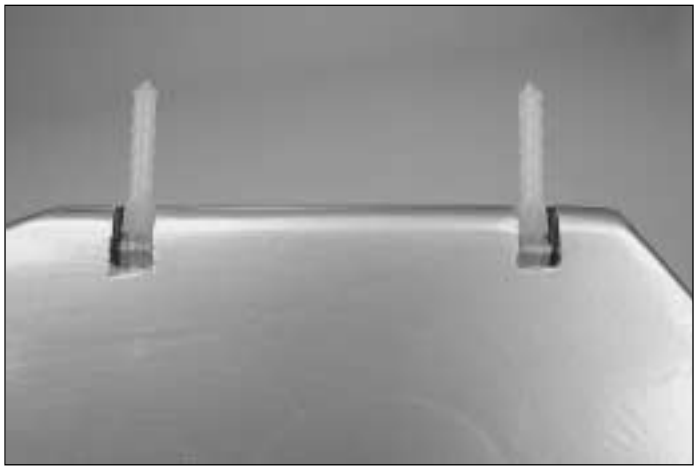
❏ 3. Place the forward end of the tubes into the holes in the servo tray as shown in the photo and glue them into place. Also glue the outer tubes at the exit points at the rear of the fuselage.

❏ 4. Assemble the elevator and rudder servos as shown in the above photo using the grommets, brass eyelets and screws supplied with the servos. Install a **screw lock connector** on each servo arm with a thumb nut with a drop of thread lock. Note that the servo arms have been modified so that only one arm remains.



❏ 5. Mount the two servos into the servo tray in the manner shown in the above photo. Temporarily place the push rods into the screw lock connectors and tighten the set screws on the top of the connectors.

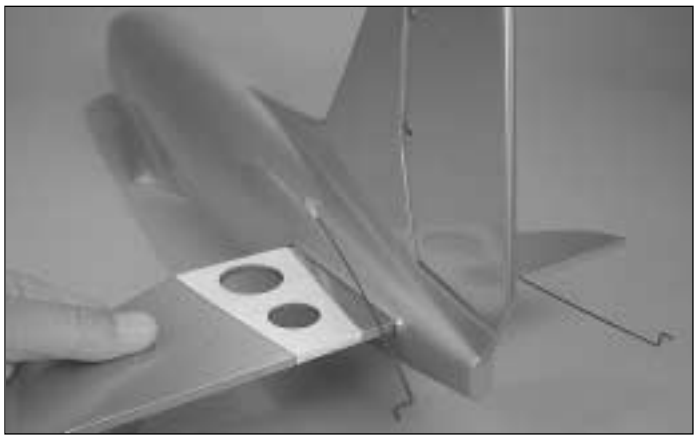
## Install the Tail Surfaces

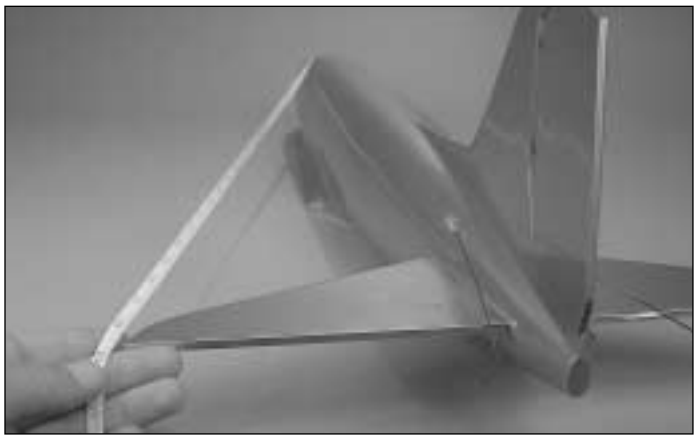


❏ 1. Using a sharp hobby knife, cut the covering away from both rudder hinge slots. Test fit the hinge points into the

rudder as illustrated in the above photo. When satisfied with the fit and placement, glue the hinge points into place with epoxy. Be careful not to get glue into the moving portion of the hinges.

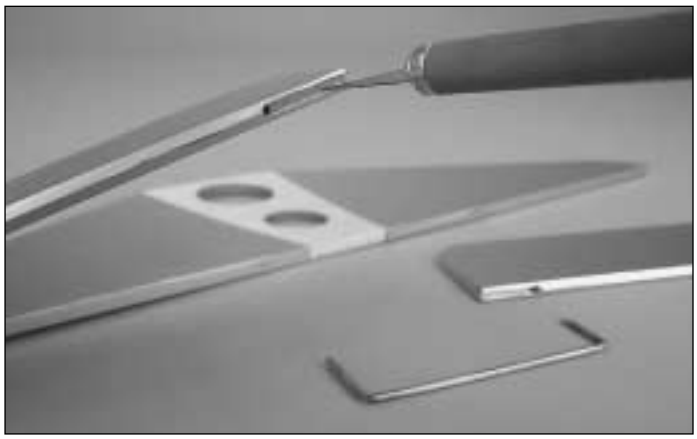
❑ 2. Trial fit the rudder into the fin. When satisfied with the fit, glue the hinge points into the fin with epoxy. Be careful not to get glue into the moving portion of the hinges.



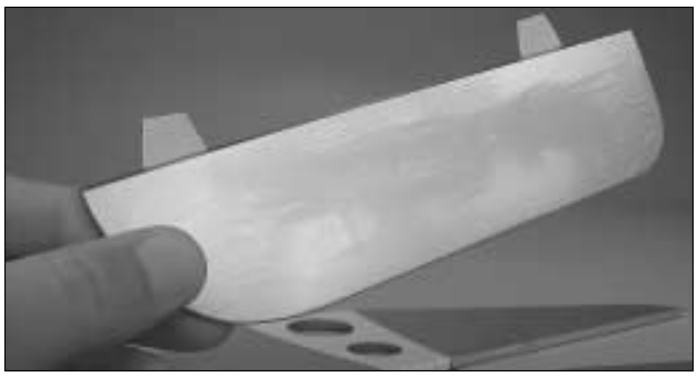


❑ 3. Notice that the horizontal stab already has the covering removed in the areas where it will be glued to the fuselage. Insert the stab into the slots molded into the fuselage sides. Use a tape measure or piece of string to verify that the stab is positioned squarely into the fuselage. Measure the distance from both ends of the stab to a marked location on the front of the fuselage, moving the stab slightly until both ends are the same distance. Mark the stab at the leading and trailing edges with a fine tip marking pen. Remove the stab from the fuselage. **Do not** glue the stab into place yet.

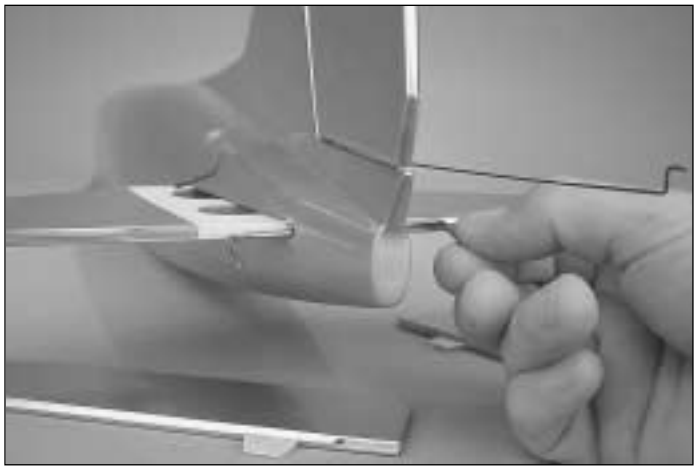
❑ 4. The two elevator halves are joined by the **elevator joiner**. In order to install this joiner you first have to make room for it by relieving a small portion of the fuselage directly behind the rear of the slot where the stab fits. To do this use a rotary tool or a round file as shown in the above photo.



❑ 5. Next cut away the covering on each elevator half as shown in the above photo. The elevators have been pre-drilled and pre-grooved to accept the joiner. Test fit the elevator joiner wire in both elevator halves. Lay the elevator halves on a flat surface and check that both are flat against the surface. If one elevator half does not lay flat, the elevator joiner wire may need to be twisted slightly.



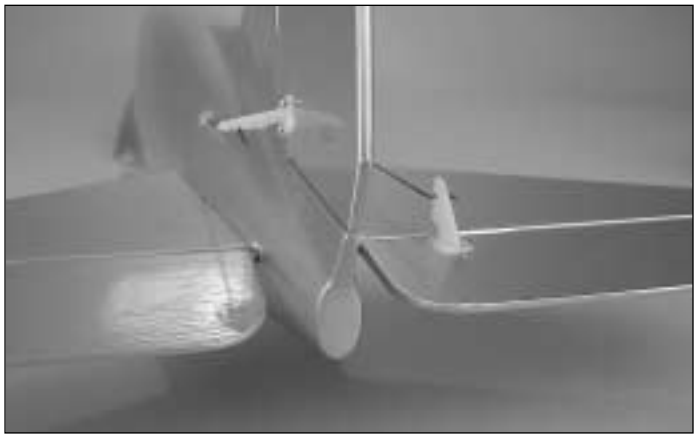
❑ 6. Locate the four **CA hinges** and insert them into the two elevator halves. **Do not** glue the hinges at this time.



❑ 7. Insert the elevator joiner into place and hold it there while sliding the stab into the slots. Do not glue anything into place yet. We are test fitting everything first to make sure that it fits correctly.

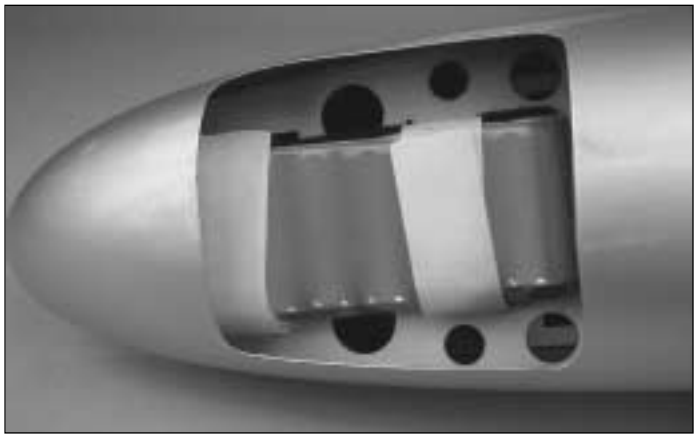
❑ 8. Slide the elevators into place using the joiner and hinges. Everything should fit, match-up properly and move freely. When you are satisfied with the alignments and fits, remove the elevators and double check that the alignment of the stab is correct. Glue the stab into place by wicking thin CA into the joint between the stab and fuselage. Fill any gaps with medium CA.

❑ 9. Use thick CA or epoxy to glue the joiner into the elevators, but be careful not to get any excess glue on the stab or on the fuselage. When you have the elevators in place with no gaps between the stab and elevators, place six drops of thin CA on both sides of each hinge and let it cure. Do not use any accelerator while gluing the hinges into place.



❑ 10. Mount a nylon **control horn** on the elevator and the rudder with two 2mm x 16mm Phillips head **screws**. Drill 5/64" [2mm] holes for the screws. Make sure the control horns are aligned with the pushrods.

## *Install the Radio*

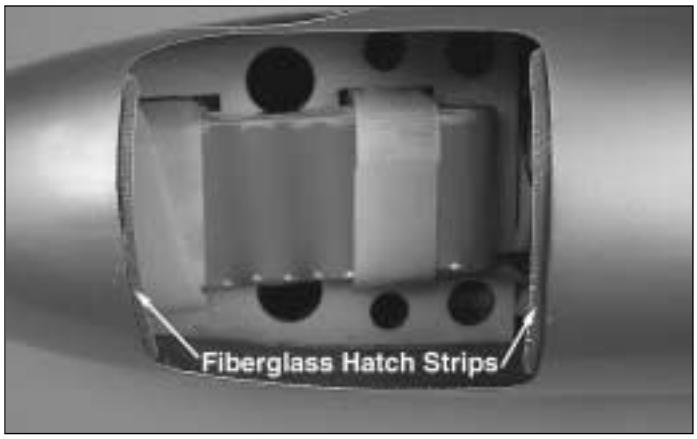


❑ 1. Place the two Velcro® **battery straps** into the forward battery tray and test-fit the battery as shown in the above photo.

***Review the next two steps before proceeding.***

❑ 2. Put the piece of hatch material inside the fuselage and trace the hatch opening on the hatch. Cut the **battery hatch** on the cut-lines you have drawn. Do this carefully to prevent the hatch from chipping. Curved tip scissors work well for this.

❏ 3. Using two fiberglass hatch strips and medium CA, glue two of the strips onto the **sides** of the hatch as shown in the photo. Note that the strips have been trimmed so that they are 1/4" from the edges of the hatch. Be sure to sand the areas to be glued and clean them with a paper towel and rubbing alcohol.

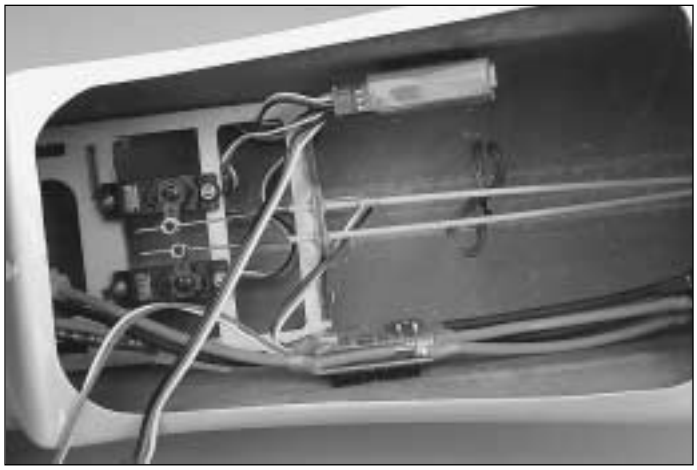



❏ 4. Using two fiberglass hatch strips and medium CA, glue two of the strips onto the fuselage as shown in the photo.

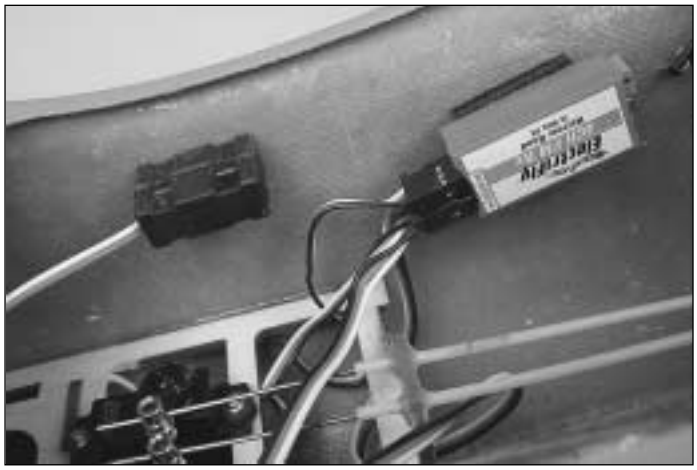
❏ 5. The hatch is installed in the fuselage by squeezing the sides and catching the side strips along the sides of the fuselage opening. The two strips glued onto the fuselage maintain the curvature of the hatch while the two pieces on the hatch hold it in the opening. When complete the hatch should fit evenly and securely. Small pieces of clear tape can also be used on the leading and trailing edge of the hatch to hold it more securely.

❏ 6. Install the tail gear wire onto the fuselage using two 2.5mm x 9.5mm flanged Phillips head screws as shown in the photo above. Drill 1/16" [1.6mm] pilot holes for the screws. Harden the holes with thin CA.

❏ 7. Mount the 25mm tail wheel with a 2mm wheel collar and set screw.



❏ 8. Finalize the installation of the radio system by mounting the speed control and the mini-receiver in the fuselage with hook and loop strips as shown in the photo above. Plug the servos and speed control into the receiver. Use a 6" [153mm] servo extension wire for the aileron servo.



❏ 9. Mount the switch through the fuselage side as shown

❏ 10. Route the receiver antenna through the fuselage side or bottom using a strain relief. Secure the antenna at the rear of the fuselage with a piece of clear tape.

## *Apply the Decals*

❏ 1. Use scissors or a sharp hobby knife to cut the decals from the sheet.

❏ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water–about one teaspoon of soap per gallon of water. Submerse the decal in the soap and water and peel off the paper backing. **Note:**

Even though the decals have a “sticky-back” and are not the water transfer type, submersing them in soap & water allows accurate positioning and reduces air bubbles underneath.

❑ 3. Position each decal on the model where desired. Holding the decal down, use a paper towel to wipe most of the water away.

❑ 4. Use a piece of soft balsa or something similar to squeegee any remaining water from under the decal. Apply the rest of the decals the same way.

❑ 5. Cut a piece of leftover clear decal material 1" x 1-1/2" [25.4 x 38mm]. Apply this to the bottom of the fuselage nose to protect it should the model nose-over on landing.

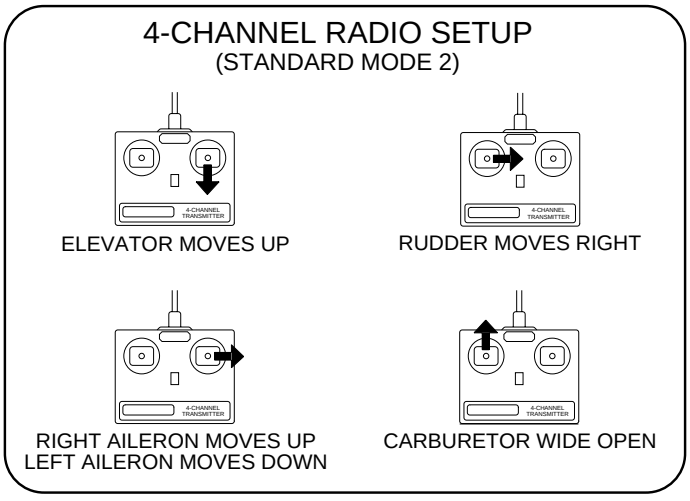
# GET THE MODEL READY TO FLY

## Check the Control Directions

***CAUTION: To prevent an accident, remove the props and prop adapters before connecting the motor battery.***

❑ 1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the servo arms and screws that hold on the servo arms.

❑ 2. While the transmitter and receiver are still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises or screw-lock connectors on the pushrods to center the control surfaces.




❑ 3. Make certain that the control surfaces respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered. Adjust if necessary.

## Set the Control Throws

Use a Great Planes AccuThrow™ (or a ruler) to accurately measure and set the control throw of each control surface as indicated in the chart that follows. If your radio does not have dual rates, we recommend setting the throws at the low rate setting. **NOTE:** The throws are measured at the widest part of the elevators, rudder and ailerons.

**These are the recommended control surface throws:**

| | High Rate | Low Rate |
|---|---|---|
| **ELEVATOR:** | 7/16" [11mm] up<br>3/8" [9.5mm] down | 5/16" [8mm] up<br>1/4" [6mm] down |
| **AILERONS:** | 7/16" [11mm] up<br>7/16" [11mm] down | 5/16" [8mm] up<br>5/16" [8mm] down |
| **RUDDER:** | 1" [25.4mm] right<br>1" [25.4mm] left | 1" [25.4mm] right<br>1" [25.4mm] left |

**IMPORTANT:** The Great Planes DC-3 EP ARF has been **extensively** flown and tested to arrive at the throws at which it flies best. Flying your model at these throws will provide you with the greatest chance for successful first flights. If, after you have become accustomed to the way the DC-3 EP ARF flies, you would like to change the throws to suit your taste that is fine. However, too much control throw could make the model difficult to control, so remember, “More is not always better.”

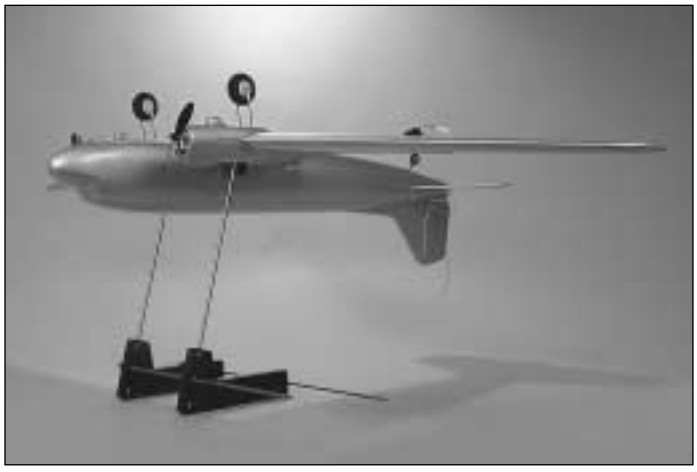
## Balance the Model (C.G.)

More than any other factor, the **C.G.** (balance point) can have the **greatest** effect on how a model flies and may determine whether or not your first flight will be successful. If you value this model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced will be unstable and possibly unflyable.

At this stage the model should be in ready-to-fly condition with all of the systems in place including the motors, landing gear, complete radio system, and 8-cell battery.

❏ 1. Use a felt-tip pen or 1/8"-wide tape to accurately mark the C.G. on the top of the wing on both sides of the fuselage. **The C.G. is located 2-7/16" [62mm] back from the leading edge of the wing**.

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to 2-5/16" [59mm] forward or 2-3/4" [70mm] back to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but the model may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult to control. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



❏ 2. With the wing attached to the fuselage, all parts of the model installed (ready to fly), place the model upside-down on a Great Planes CG Machine, or lift it upside down at the balance point you marked.

❏ 3. If the tail drops, the model is “tail heavy” and the battery pack and/or receiver must be shifted forward or weight must be added to the nose to balance. If the nose drops, the model is “nose heavy” and the battery pack and/or receiver must be shifted aft or weight must be added to the tail to balance. If possible, relocate the battery pack and receiver to minimize or eliminate any additional ballast required. If additional weight is required, nose weight may be easily added by using Great Planes (GPMQ4485) “stick on” lead. A good place to add stick-on nose weight is to the inside of the nose section of the fuselage. Begin by placing incrementally increasing amounts of weight on the bottom of the fuse over the nose until the model balances. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added and glued permanently inside the fuselage.

**Note:** Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Use #2 sheet metal screws, RTV silicone or epoxy to permanently hold the weight in place.

❏ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

## Balance the Model Laterally

❏ 1. With the wing level, have an assistant help you lift the model by the engine propeller shaft and the bottom of the fuse under the TE of the fin. Do this several times.

❏ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

# PREFLIGHT

## Identify Your Model

No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is required at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on the back cover and place it in your model.

## Charge the Batteries

Follow the battery charging instructions that came with your radio control system to charge the batteries. You should always charge your transmitter batteries the night before you go flying and at other times as recommended by the radio manufacturer.

## Ground Check

Before you fly you should perform one last overall inspection to make sure the model is truly ready to fly and that you haven't overlooked anything. If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to perform the inspection. Check to see that you have the radio installed correctly and that all the controls are connected properly. The motors must also be checked by confirming that the props are rotating in the correct direction and the motors sound like they are reaching full power. Make certain all control surfaces (elevators, rudder, ailerons) are secure, the pushrods are connected, the controls respond in the correct direction, radio components are securely mounted and the C.G. is correct.

## Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the motors running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.

# MOTOR SAFETY PRECAUTIONS

**Failure to follow these safety precautions may result in severe injury to yourself and others.**

• Get help from an experienced pilot when learning to operate motors.

• Use safety glasses when starting or running motors.

• Do not run the motors in an area of loose gravel or sand; the propellers may throw such material in your face or eyes.

• Keep your face and body as well as all spectators away from the plane of rotation of the propellers as you start and run the motors.

• Keep these items away from the props: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the props.

• The motors get hot! Do not touch them during or right after operation.

• The electric motors and battery used in your DC-3 EP ARF are very powerful and the spinning propellers have a lot of momentum; therefore, if you touch a propeller while it is spinning it may inflict severe injury. Respect the motors and propellers for the damage they are capable of and take whatever precautions are necessary to avoid injury. Always disconnect and remove the battery until you are ready to fly again and always make sure the switches are turned off before connecting the battery.

# AMA SAFETY CODE (EXCERPT)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

## General

1. I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously successfully flight tested.

2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full scale aircraft. Where necessary an observer shall be used to supervise flying to avoid having models fly in the proximity of full scale aircraft.

3. Where established, I will abide by the safety rules for the flying site I use and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

9. I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

## Radio Control

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit or spectator areas and I will not thereafter fly over pit or spectator areas, unless beyond my control.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

## CHECKLIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a checklist is provided to make sure these important areas are not overlooked. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items off as they are completed.

❏ 1. Check the C.G. according to the measurements provided in the manual.
❏ 2. Be certain the battery and receiver are securely mounted in the fuse.
❏ 3. Extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
❏ 4. Balance your model *laterally* as explained in the instructions.
❏ 5. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screw-lock pushrod connectors, etc.
❏ 6. Add a drop of oil to the axles so the wheels will turn freely.
❏ 7. Make sure all hinges are **securely** glued in place.
❏ 8. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).
❏ 9. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
❏ 10 Make sure that all servo arms are secured to the servos with the screws included with your radio.
❏ 11. Secure connections between servo wires and Y-connectors or servo extensions and the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.
❏ 12. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
❏ 13. Place your name, address, AMA number and telephone number on or inside your model.
❏ 14. If you wish to photograph your model, do so before your first flight.
❏ 15. Range check your radio when you get to the flying field.

## FLYING

The Great Planes DC-3 EP ARF is a great-flying model that flies smoothly and predictably. The Great Planes DC-3 EP ARF does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

If you are not used to using the rudder to coordinate turns, this is one model where you should start doing so. The DC-3 EP has a large wingspan with a relatively short fuselage. As a result, the adverse yaw produced when the ailerons alone are used to turn is much more pronounced than you may be accustomed to. In addition, the increased drag caused by the adverse yaw will slow the model and cause the nose to drop slightly. Using coordinated rudder (right rudder with right aileron) will give much cleaner and better looking turns. Of course, this is a good control technique for any model.

**CAUTION** (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice an alarming or unusual sound such as a low-pitched "buzz," this may indicate control surface flutter. Flutter occurs when a control surface (such as an aileron or elevator) or a flying surface (such as a wing or stab) rapidly vibrates up and down (thus causing the noise). In extreme cases, if not detected immediately, flutter can actually cause the control surface to detach or the flying surface to fail, thus causing loss of control followed by an impending crash. The best thing to do when flutter is detected is to slow the model **immediately** by reducing power, then land as soon as safely possible. Identify which surface fluttered (so the problem may be resolved) by checking all the servo grommets for deterioration or signs of vibration. Make certain all pushrod linkages are secure and free of play. If it fluttered once, under similar circumstances it will probably flutter again unless the problem is fixed. Some things which can cause flutter are; Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of wire pushrods caused by large bends; Excessive free play in servo gears; Insecure servo mounting; and one of the most prevalent causes of flutter; Flying an over-powered model at excessive speeds.

### Takeoff

Due to the small wheel size of the DC-3 EP, rise off ground (ROG) takeoffs are only possible from a smooth surface. If you are flying from a grass field, the DC-3 EP can be safely and easily hand-launched. Do not attempt to do so by yourself. Have an assistant launch the model in a level or slightly nose high attitude, with the wings level. It is not necessary to throw the model into the air. Simply take a few steps while gently pushing the model into the air. Allow the model to accelerate before climbing or turning. **Always launch the model into the wind.**

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice runs at low speeds on the runway. Hold "up" elevator to keep the tail wheel on the ground. If necessary, adjust the tail wheel so the model will roll straight down the runway.

Remember to takeoff into the wind. When you're ready, point the model straight down the runway, hold a bit of up elevator to keep the tail on the ground, then gradually advance the throttle. As the model gains speed decrease up elevator allowing the tail to come off the ground. One of the most important things to remember with a tail dragger is to always be ready to apply right rudder to counteract motor torque. Gain as much speed as your runway and flying site will practically allow before gently applying up elevator, lifting the model into the air. At this moment it is likely that you will need to apply more right rudder to counteract motor torque. Be smooth on the elevator stick, allowing the model to establish a **gentle** climb to a safe altitude before turning into the traffic pattern.

## *Flight*

For reassurance and to keep an eye on other traffic, it is a good idea to have an assistant on the flight line with you. Tell him to remind you to throttle back once the plane gets to a comfortable altitude. While full throttle is usually desirable for takeoff, most models fly more smoothly at reduced speeds.

Take it easy with the Great Planes DC-3 EP ARF for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. After flying around for a while and while still at a safe altitude with plenty of battery charge, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how she climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your battery charge level, but use this first flight to become familiar with your model before landing.

## *Landing*

If you are flying from a grass field you must use some care when landing. Attempt to land in the smoothest part of the field. You should also try to land at a slow flying speed, but not so slowly that the model stalls. This model does not slow rapidly on final approach, so a low "dragged-in" approach may be needed. **Always land into the wind.** Due to the small wheel size the model may start to nose over. Gradually applying up elevator after the model has landed will minimize this.

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind), using coordinated aileron and rudder control, keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and gently climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground.

One final note about flying your model. Have a goal or flight plan in mind for every flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve your skills (though it is never a bad idea!), but more importantly so you do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you've run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you're going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves. Remember to think.

***Have a ball!***
***But always stay in control and fly in a safe manner.***

**GOOD LUCK AND GREAT FLYING!**

This model belongs to:

Name

Address

City, State Zip

Phone number

AMA number