

# P-47D THUNDERBOLT



**GOLD  
GIANT SCALE  
EDITION**

**GOLD  
AIR  
EDITION™**

Top Flite Models Champaign, IL  
Telephone (217) 398-8970, Ext. 5  
airsupport@top-flite.com

**TF TOP FLITE®**

## WARRANTY

Top Flite Models 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 Top Flite's liability exceed the original cost of the purchased kit.** Further, Top Flite reserves the right to change or modify this warranty without notice.

In that Top Flite 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 this address:

**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.

## SPECIFICATIONS

<b>Wingspan:</b>	85 in [2160mm]
<b>Wing Area:</b>	1329 sq in [85.7 dm <sup>2</sup> ]
<b>Weight:</b>	19.5–21.5 lb [8842–9749 g]
<b>Wing Loading:</b>	34–37 oz/sq ft [104–113 g/dm <sup>2</sup> ]
<b>Length:</b>	75 in [1905mm]
<b>Radio:</b>	5-7 channel
<b>Engine:</b>	2.6–4.0 cu in [43–65cc] spark ignition gas

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

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## INTRODUCTION

The P-47D has been recognized as an excellent modeling subject. The large wing and tail area and long tail moment make an ideal flying airplane – especially for a warbird! The Top Flite Giant P-47 Kit is a very successful model. Now, Top Flite has developed the Giant P-47D ARF following the same design as the kit. The Giant P-47D ARF will get you in the air quickly with a great looking model, without the sanding and covering required to build a kit.

For the latest technical updates or manual corrections to the Giant P-47D ARF visit the Top Flite web site at [www.top-flite.com](http://www.top-flite.com). Open the “Airplanes” link, then select the Giant P-47D 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.

### AMA

If you are not already a member of the AMA, please join! The AMA is the governing body of model aviation and membership provides liability insurance coverage, protects modelers’ rights and interests and is required to fly at most R/C sites.

### Academy of Model Aeronautics

5151 East Memorial Drive  
Muncie, IN 47302-9252



Ph. (800) 435-9262

Fax (765) 741-0057

**Or via the Internet at:**

<http://www.modelaircraft.org>

**IMPORTANT!!!** Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

### IMAA

The Top Flite Giant P-47D ARF is an excellent sport-scale model and is eligible to fly in IMAA events. The IMAA (International Miniature Aircraft Association) is an organization that promotes non-competitive flying

of giant-scale models. If you plan to attend an IMAA event, obtain a copy of the **IMAA Safety Code** by contacting the IMAA at the address or telephone number below.

**IMAA**  
205 S. Hilldale Road  
Salina, KS 67401



Ph. (913) 823-5569

**Or via the Internet at:**  
[www.fly-ima.org/ima/sanction.html](http://www.fly-ima.org/ima/sanction.html)

## SCALE COMPETITION

Though the Top Flite Giant P-47D is an ARF and may not have the same level of detail as an “all-out” scratch-built competition model, it is a scale model nonetheless and is therefore eligible to compete in the *Fun Scale* class in AMA competition (we receive many favorable reports of Top Flite ARFs in scale competition!). In Fun Scale, the “builder of the model” rule does not apply. To receive the five points for scale documentation, the only proof required that a full size aircraft of this type in this paint/markings scheme did exist is a single sheet such as a kit box cover from a plastic model, a photo, or a profile painting, etc. If the photo is in black and white, other written documentation of color must be provided. Contact the AMA for a rule book with full details.

If you would like photos of the full-size Tarheel Hal P-47D for scale documentation, or if you would like to study the photos to add more scale details, photo packs are available from:

**Bob's Aircraft Documentation**  
3114 Yukon Ave  
Costa Mesa, CA 92626

Ph: (714) 979-8058  
Fax: (714) 979-7279

**Or via the Internet at:**  
[www.bobsairdoc.com](http://www.bobsairdoc.com)

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

1. Your Giant P-47D 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 Giant P-47D ARF, if not assembled and operated correctly, could possibly cause injury to yourself 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 **build straight, true and strong**.
4. You must use an R/C radio system that is in good condition, a correctly sized engine, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground and in the air. You must check the operation of the model and all components before **every** flight.
5. If you are not an experienced pilot or 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.
6. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

7. **WARNING:** The cowl and landing gear covers included in this kit are 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.

We, as the kit manufacturer, provide you with a top quality, thoroughly tested kit and 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 the instructions to end up with a well-built model that is straight and true.

## DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the Giant P-47D ARF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

## ENGINE RECOMMENDATIONS

When considering engines for this model, refer to the engine size recommendations on the cover of the manual. Spark-ignition “gas” engines are most popular with large-scale warbirds such as this. One advantage of a gas engine is economy – gas engines tend to consume less fuel than a glow engine as well. Additionally, gas engines deposit little exhaust residue on the model. Among other engines, this model was test flown with a **Fuji-Imvac BT-43EI-2** engine. The Fuji-Imvac BT-43EI-2 provides more than adequate power and flies the Giant P-47D ARF in a scale-like manner.

**NOTE:** Instructions for mounting every possible engine cannot be incorporated into this manual. Modelers using another engine may refer to the instructions as a guide for mounting their engine in a similar way. If using the BT-43EI-2 engine an optional muffler is recommended.

Bisson Inverted Muffler (BISG6543)

Per the IMAA Safety Code, magneto spark-ignition engines must have a coil-grounding switch on the aircraft to stop the engine and prevent accidental starting. The switch must be operated manually (without the use of the transmitter) and accessible by the pilot and assistant. If using a spark-ignition engine, refer to ***Install the Cowl*** on page 25 for details.

## RADIO EQUIPMENT

The radio equipment and number of channels required to fly the Top Flite Giant P-47D ARF depends on the capabilities of your transmitter and how the servos will be connected.

The Giant P-47D ARF requires a servo to operate the air control valve if using retracts, a throttle servo, two flap servos, two aileron servos, two elevator servos and a rudder servo. Servos with a minimum of 50 oz-in [3.9kg-cm] of torque are required for operating the elevators, rudder, ailerons and flaps. We recommend that metal geared servos also be used. Standard servos may be used for the throttle and choke (the servo operated choke is optional). A micro servo is required to operate the retract air valve. An optional servo operated kill switch may also be used (this is in addition to the IMAA-required, manually operated engine kill switch. A servo operated kill switch is only really necessary for engines that do not reliably shut off by closing the carburetor, but could also serve as a backup.

Function	Qty.	Type Required
Elevators	2	<b>Futaba S3305</b> (FUTM0045) min. 50 oz-in torque
Rudder	1	<b>Futaba S3305</b> (FUTM0045) min. 50 oz-in torque
Ailerons	2	<b>Futaba S3305</b> (FUTM0045) min. 50 oz-in torque
Flaps	2	<b>Futaba S3305</b> (FUTM0045) min. 50 oz-in torque
Tail Steering	1	<b>Futaba S3305</b> (FUTM0045) min. 50 oz-in torque
Throttle	1	<b>Futaba S3004</b> (FUTM0027) standard
Retract	1	<b>Futaba S3102</b> (FUTM0034) micro
Optional Choke	1	<b>Futaba S3004</b> (FUTM0027) standard
<b>10-11</b>		<b>Total</b>

A receiver battery with a minimum of 1,000mAh is recommended for flying the Giant P-47D ARF. The battery voltage should be checked before every flight to be certain it has enough "charge".

In addition to the servos, the following items (or similar items) are also required. The order numbers shown in parentheses are for Futaba servos.

Qty.	Items Required
4	<b>6" Y-harness</b> for elevator, rudder/steering, ailerons & flaps (FUTM4130)
4	<b>6" Servo Extension</b> for throttle, optional choke, ailerons & flaps (HCAM2701)
3	<b>12" [305mm] Servo Extension</b> for flaps & receiver switch (HCAM2711)
2	<b>24" [610mm] Servo Extension</b> for ailerons (HCAM27021)
2	<b>Heavy Duty Switch Harness</b> (FUTM4385)
1	<b>Ernst Charge Receptacle 124</b> (ERNM3001)

Note: The length and quantity of servo extensions and Y-connectors may vary depending on the brand of radio you are using and the radio installation.

## RETRACTABLE LANDING GEAR

The Top Flite Giant P-47D ARF may be assembled with either the included fixed landing gear or optional retractable landing gear. If fixed landing gear is used no other items will need to be purchased to install the gear. If you wish to install retractable landing gear, this model is designed for Robart pneumatic retracts. Following is the complete list of items required to install the Robart retracts:

Qty.	Items Required
1	<b>Robart #622P47</b> Top Flite Giant P-47 Pneumatic Retractable Main Landing Gear (ROBQ1637)
1	<b>Robart #160LWC</b> Retractable Tail Gear Assembly (ROBQ2225)
1	<b>Robart #157VRX</b> Large-Scale Deluxe Air Control Kit – includes pressure tank, air line tubing, variable-rate air valve, T-fittings (ROBQ2305)
1	<b>Robart #169</b> 10' [3048mm] Red & Purple Pressure Tubing (ROBQ2369)
1 pkg.	<b>Robart #190</b> Air Line Quick Disconnects (ROBQ2395)

**Note:** An air pump will also be required to pressurize the air tank. The Robart hand pump could be used, but is not practical because of the large capacity of the air tank in this model. A small, 12V electric pump is recommended and can be purchased at an automotive or hardware store.

## ADDITIONAL ITEMS REQUIRED

### REQUIRED HARDWARE AND ACCESSORIES

In addition to the items listed in the “**Decisions You Must Make**” section, following is the list of hardware and accessories required to finish the Top Flite Giant P-47D ARF. Order numbers are provided in parentheses.

- (2) Dubro #813 1/8" Fuel Line Barb (DUBQ0670)
- (1) Dubro #554 X-large Tygon Fuel Line (DUBQ0427)
- (1) R/C foam rubber (1/4" [6mm] (HCAQ1000) or 1/2" [13mm] (HCAQ1050)
- Optional Black paint for the plywood radial engine frame
- Propeller and spare propellers suitable for your engine.
- Painted Pilot (GPMA2807)

### ADHESIVES AND BUILDING SUPPLIES

This is the list of Adhesives and Building Supplies that are required to finish the Giant P-47D ARF.

- 1/2 oz. [15g] Thin Pro™ CA (GPMR6001)
- 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)
- Pro 30-minute epoxy (GPMR6047)
- Pro 6-minute epoxy (GPMR6045)
- Threadlocker thread locking cement (GPMR6060)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)
- Epoxy brushes (6, GPMR8060)
- Denatured alcohol (for epoxy clean up)
- R/C-56 canopy glue (JOZR5007)
- Milled fiberglass (GPMR6165)
- Masking tape (TOPR8018)
- Plan protector (GPMR6167) or wax paper

- Drill bits: 1/16" [1.6mm], 5/64" [2mm], 3/32" [2.4mm], 7/64" [2.8mm], 1/8" [3.2mm], 3/16" [4.8mm], 1/4" [6.4mm]
- Small metal file
- Stick-on segmented lead weights (GPMQ4485)
- Silver solder w/flux (STAR2000)
- Hobby Heat™ micro torch (HCAR0755)#1 Hobby knife (HCAR0105)
- #11 blades (5-pack, HCAR0211)
- #11 blades (100-pack, HCAR0311)
- Sanding tools and sandpaper assortment (see Easy-Touch™ Bar Sander section)
- Curved-tip canopy scissors for trimming plastic parts (HCAR0667)

### Covering tools

- Top Flite MonoKote® sealing iron (TOPR2100)
- Top Flite Hot Sock™ iron cover (TOPR2175)
- Top Flite MonoKote trim seal iron (TOPR2200)
- Top Flite MonoKote heat gun (TOPR2000)

### OPTIONAL SUPPLIES AND TOOLS

Here is a list of optional tools mentioned in the manual that will help you build the Giant P-47D ARF.

- 2 oz. [57g] spray CA activator (GPMR6035)
- CA applicator tips (HCAR3780)
- CA debonder (GPMR6039)
- Builder's Triangle Set (HCAR0480)
- Scale Warbird Template (TOPQ2187)
- 36" metal ruler (HCAR0475)
- Hobbico® High Precision Diagonal Cutter 5" (HCAR0630)
- Pliers with wire cutter (HCAR0625)
- Robart Super Stand II (ROBP1402)
- Switch & Charge Jack Mounting Set (GPMM1000)

- Panel Line Pen (TOPQ2510)
- Rotary tool such as Dremel
- Rotary tool reinforced cut-off wheel (GPMR8200)
- Servo horn drill (HCAR0698)
- AccuThrow™ Deflection Gauge (GPMR2405)
- CG Machine™ (GPMR2400)
- Laser incidence meter (GPMR4020)
- 36" bar for incidence meter (GPMR4021)
- Precision Magnetic Prop Balancer (TOPQ5700)

## IMPORTANT BUILDING NOTES

● Anytime a sheet metal screw is installed in wood, first install the screw, remove the screw and apply a couple of drops of thin CA in the hole to harden the threads. After the CA has cured, reinstall the screw.

● **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 Giant P-47D ARF is factory-covered with Top Flite MonoKote film. Should repairs ever be required, MonoKote can be patched with additional MonoKote purchased separately. MonoKote is packaged in six-foot rolls, but some hobby shops also sell it by the foot. If only a small piece of MonoKote is needed for a minor patch, perhaps a fellow modeler would give you some. MonoKote is applied with a model airplane covering iron, but in an emergency a regular iron could be used. A roll of MonoKote includes full instructions for application. Following are the colors used on this model and order numbers for six foot rolls.

Aluminum	(TOPQ0205)
Orange	(TOPQ0202)
White	(TOPQ0204)
Black	(TOPQ0208)
Sapphire Blue	(TOPQ0226)
Missile Red	(TOPQ0201)

● The stabilizer and wing incidences and engine 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](http://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.

## KIT INSPECTION

Before starting to build, 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 **Product Support**. When reporting defective or missing parts, use the part names exactly as they are written in the Kit Contents list.

**Top Flite Product Support**  
3002 N Apollo Drive, Suite 1  
Champaign, IL 61822

Ph: (217) 398-8970, ext. 5  
Fax: (217) 398-7721  
E-mail: [airsupport@top-flite.com](mailto:airsupport@top-flite.com)

## ORDERING REPLACEMENT PARTS

Replacement parts for the Top Flite Giant P-47DARF are available using the order numbers in the **Replacement Parts List** that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company. 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.

To locate a hobby dealer, visit [www.top-flite.com](http://www.top-flite.com) and click on "Where to Buy". Follow the instructions provided on the page to locate a U.S., Canadian or International dealer.

Parts may also be ordered directly from Hobby Services by calling (217) 398-0007, or via facsimile at (217) 398-7721, but full retail prices and shipping and handling charges will apply. Illinois and Nevada residents will also be charged sales tax. If ordering via fax, include a Visa or MasterCard number and expiration date for payment.

Mail parts orders and payments by personal check to: **Hobby Services**  
3002 N Apollo Drive, Suite 1  
Champaign IL 61822

Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

If additional assistance is required for any reason contact Product Support by e-mail at [productsupport@top-flite.com](mailto:productsupport@top-flite.com), or by telephone at (217) 398-8970.

REPLACEMENT PARTS LIST		
Order Number	Description	How to purchase
	Missing pieces	Contact Product Support
	Instruction manual	
	Full-size plans	Not available
TOPA1810	Fuselage	Contact your hobby supplier to purchase these items
TOPA1811	Wing Set	
TOPA1812	Stab/Elevators	
TOPA1813	Rudder	
TOPA1814	Cowl	
TOPA1815	Canopy	
TOPA1816	Landing Gear Wires	

Order Number	Description	How to purchase
TOPA1817	Gear Covers	Contact your hobby supplier to purchase these items
TOPA1818	Dummy Engine	
TOPA1819	Tailwheel Assy.	
TOPA1820	Spinner Hub	
TOPA1821	Decals	
TOPA1822	Stab Tubes	

## COMMON ABBREVIATIONS

Stab = Horizontal Stabilizer

Fin = Vertical Stabilizer

LE = Leading Edge

TE = Trailing Edge

" = Inches

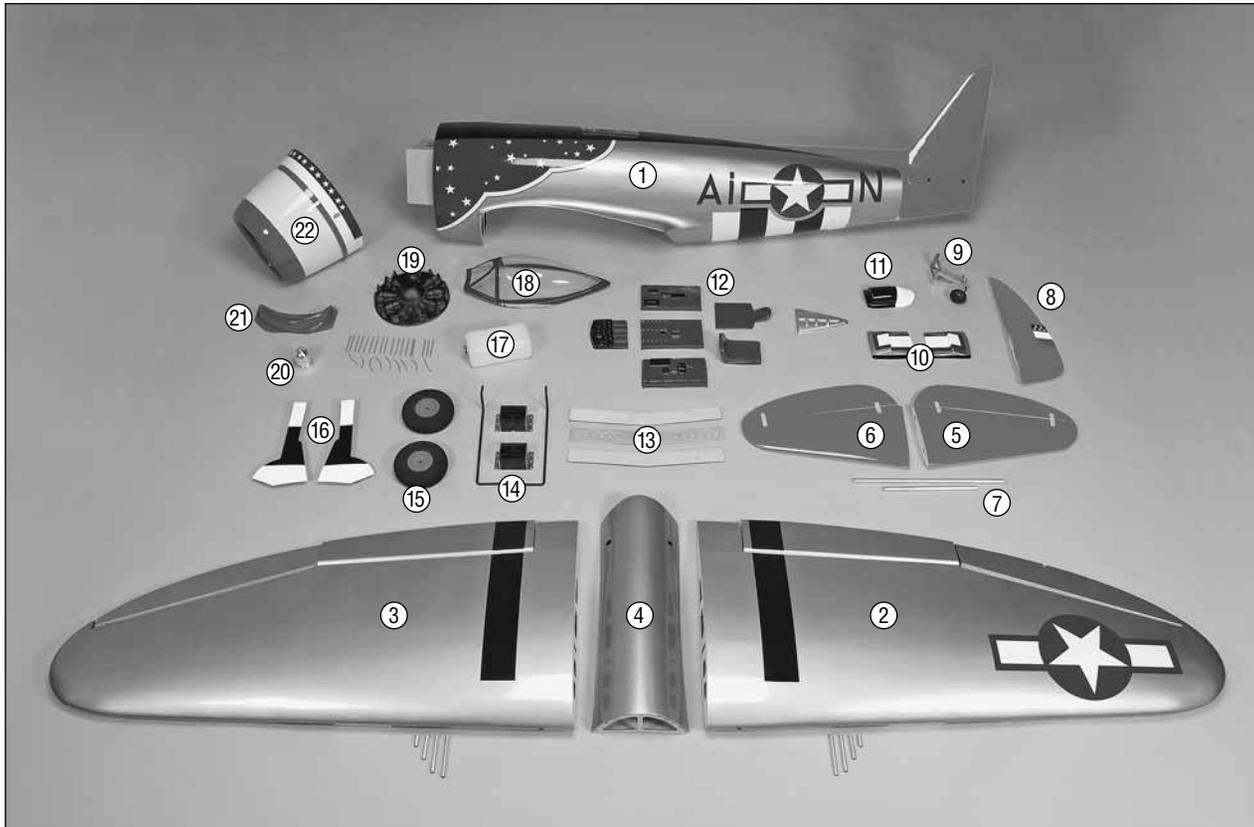
mm = Millimeters

SHCS = Socket Head Cap Screw

mAh = Milliamp Hours (refers to the usable capacity of a battery)

To convert inches to millimeters, multiply inches by 25.4 (25.4mm = 1")

## KIT CONTENTS

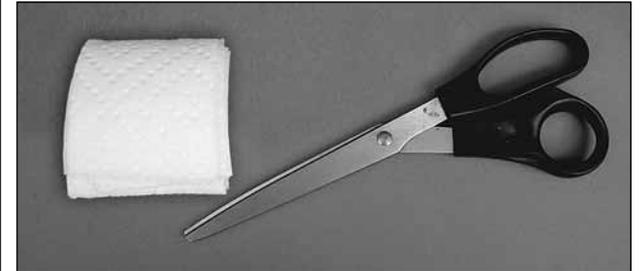


- |                             |                            |                    |
|-----------------------------|----------------------------|--------------------|
| 1 - Fuselage                | 9 - Fixed Tail Gear        | 17 - Fuel Tank     |
| 2 - Left wing               | 10 - Innercooler Exhausts  | 18 - Canopy        |
| 3 - Right wing              | 11 - Turbo Charger Exhaust | 19 - Dummy Engine  |
| 4 - Belly pan               | 12 - Cockpit Parts         | 20 - Spinner Nut   |
| 5 - Left Stabilizer         | 13 - Wing Joiner Parts     | 21 - Cooler Intake |
| 6 - Right Stabilizer        | 14 - Fixed Main Gear       | 22 - Cowl          |
| 7 - Stabilizer Joiner Tubes | 15 - Wheels                |                    |
| 8 - Rudder                  | 16 - Landing Gear Doors    |                    |

## ASSEMBLE THE WINGS

### HINGE THE AILERONS

Start with the left wing so the assembly matches the photos the first time through.



1. Lay a few paper towels on top of each other and cut them into small squares. These paper towel squares will come in handy for wiping away excess epoxy throughout the assembly process (and will save you from wasting whole paper towels).

2. Separate the aileron and flap from the wing by carefully peeling off the masking tape holding them together. Use a paper towel square dampened with naphtha lighter fluid or similar solvent to remove any glue left behind from the tape.



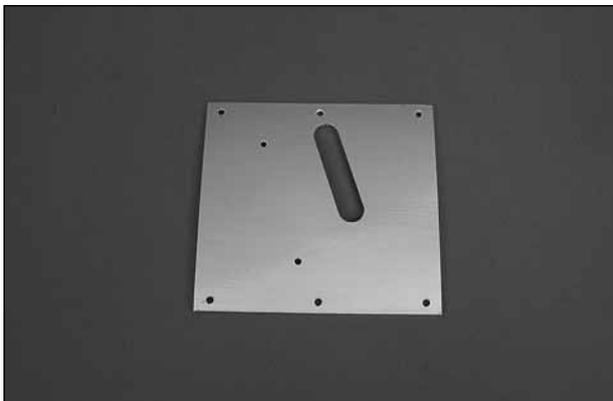
3. If necessary, use a covering iron with a covering sock to go over the wing, flap and aileron to remove any wrinkles. The best method to remove the wrinkles is to glide the iron over the covering until

the wrinkles disappear, then go over the area again, pushing down on the iron to bond the covering to the wood. If the wrinkles don't disappear, the balsa in that area might be flexing inward. If this is happening, don't press down. Simply let the heat of the iron shrink the covering. If the wrinkles momentarily disappear, then immediately reappear, the iron may be too hot, thus causing air bubbles. Lower the temperature of the iron or use a sharp #11 blade to puncture several holes in the covering, then reheat. The suggested iron temperature is around 360 degrees F.

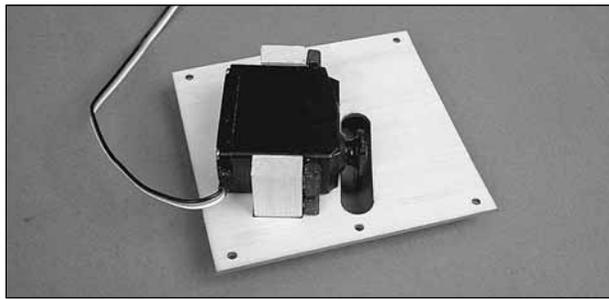


The P-47 had many attributes that led to its reputation. One of the most important was its durability in combat. Oftentimes the P-47 would bring pilots home with missing cylinders, blown-off wing tips and large portions of tail surfaces missing. The P-47's internal systems were also durable and well protected.

## MOUNT THE AILERON SERVOS

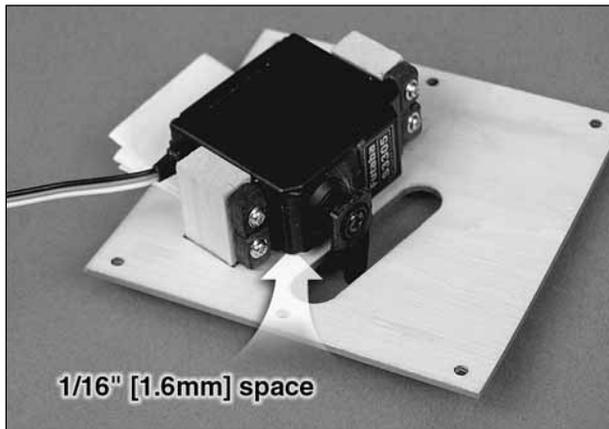


1. Use a sharp hobby knife to trim the opening from over the left aileron servo hatch and the eight screw holes.



2. Install a servo arm on the aileron servo. Position the aileron servo on the aileron servo hatch cover as shown with the servo arm centered in the opening. Set the two 5/16" x 5/8" x 13/16" [7.9 x 15.8 x 20.6mm] hardwood blocks in the embossed servo block locations, checking that they are correct. If not, mark the new location.

3. Use 6-minute epoxy to glue the two blocks to the bottom of the servo hatch over the embossed servo block locations. Thoroughly coat the end of the blocks and allow them to set for a few seconds while the blocks absorb the epoxy. Then, recoat the blocks. Use clamps to hold the blocks to the servo hatch tray.



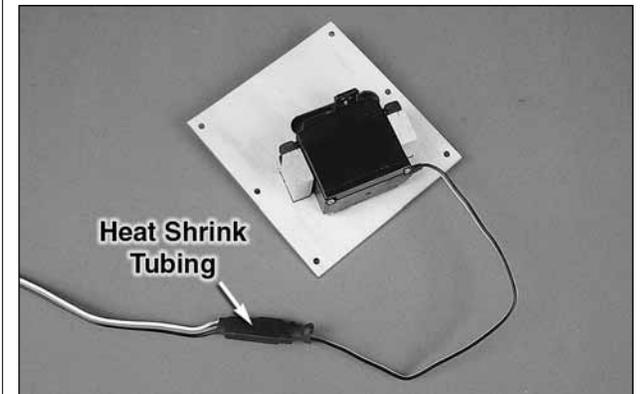
4. Once the epoxy has cured, remove the clamps. Place a 1/16" [1.6mm] spacer, such as a piece of cardstock or a piece of paper folded several times, under the servo and between each mounting block.

After the servo is installed the spacer will be removed, providing adequate spacing for vibration isolation.

5. Drill 1/16" [1.6mm] holes through the blocks for the servo mounting screws. Mount the servo to the blocks with the screws that came with the servo. Remove the servo mounting screws and apply a couple of drops of thin CA in each hole to harden the threads. Allow the CA to fully harden. Then, reinstall the servos and remove the spacer.



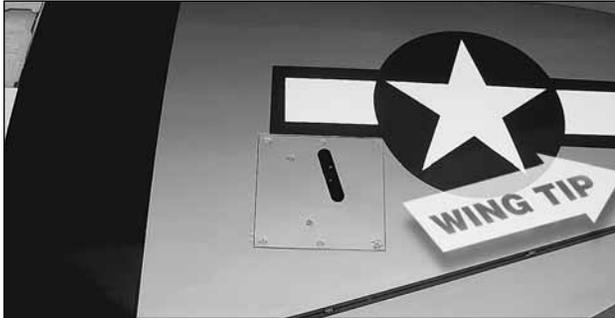
6. Drill 1/16" [1.6mm] holes through the blocks at the two hole locations on the top of the aileron servo hatch. Install two #2 x 3/8" [9.5mm] flat head sheet metal screws to secure the servo mounting blocks to the aileron servo hatch. Use thin CA to harden the screw threads.



7. Connect a 24" [610mm] servo extension wire to the aileron servo. Cut a piece of heat shrink tubing

in half and slide it over the servo connections. Shrink the tubing by applying heat to the tubing.

- ❑❑ 8. Use the string in the wing to pull the aileron wire through the wing.



- ❑❑ 9. Place the aileron servo hatch with the servo in the wing. Be certain that the hatch is positioned correctly as shown. Secure the hatches using six #2 x 3/8" [9.5mm] flat head sheet metal screws. Use thin CA to harden the screw threads.

- ❑❑ 10. Go back to step 1 and install the right aileron servo following the same procedure.

## MOUNT THE RETRACTS

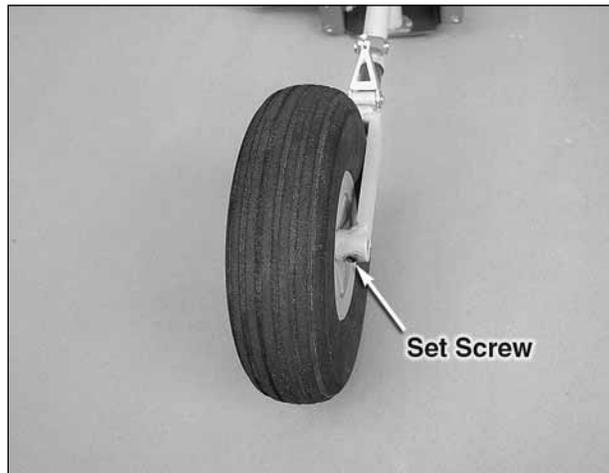
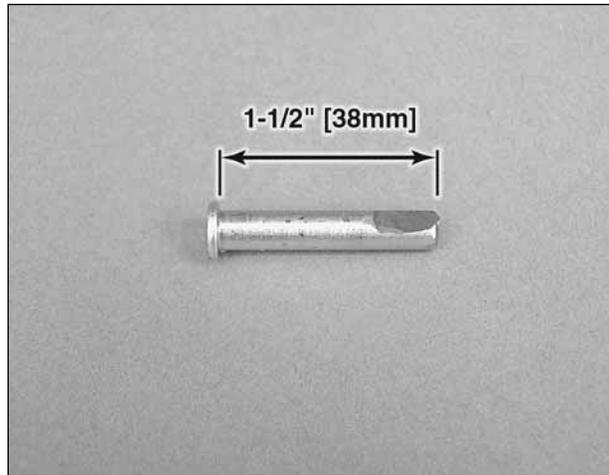
**Note:** The fixed main landing gear will not be installed until after the two wing halves have been joined. If using the fixed main landing gear, proceed to "Install the Flap Servos" on page 13.

Install the left retract first.

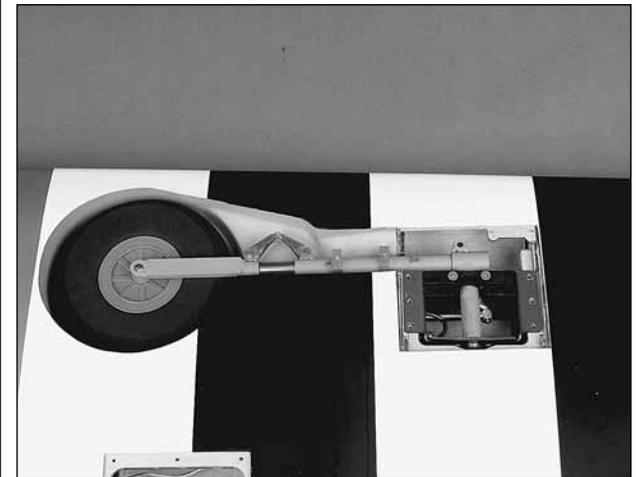
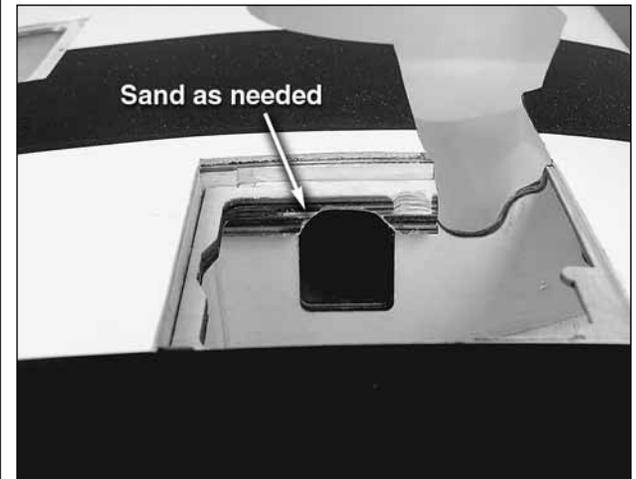


- ❑❑ 1. Use a hex wrench to loosen the strut mounting bolt and remove the strut. Slide two

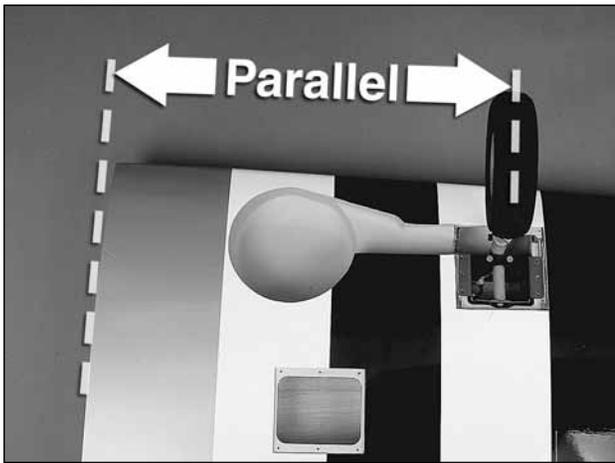
aluminum landing gear door mounts onto the strut and reinstall the strut in the strut mount.



- ❑❑ 2. Trim the axle that is included with the Robart retracts to 1-1/2" [38mm] long. File a flat spot at the end of the axle. Insert the axle through the included 5" [127mm] wheel and into the retract. Apply a drop of threadlocker to the 10-32 x 3/16" [4.8mm] set screw, included with the retract, and tighten the set screw onto the flat of the axle. Make sure that the wheel rotates freely.

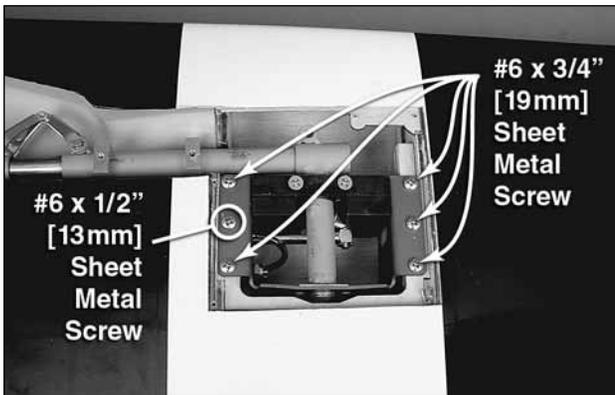


- ❑❑ 3. Test fit the retract unit with the wheel into the wing. Position the retract so the wheel is centered in the wheel well. Adjust the strut position in the retract body as necessary to achieve the correct spacing all the way around the wheel. You may need to sand the top of the opening in the rib slightly to allow the retract to fit. Remove as little wood as possible.



❑❑ 4. Extend the retract. View the wheel from directly above. Adjust the strut so that the wheel is parallel to the root of the wing. Lock the strut in position by applying a drop of threadlocker to the threads and securely tightening the bolt at the top of the strut.

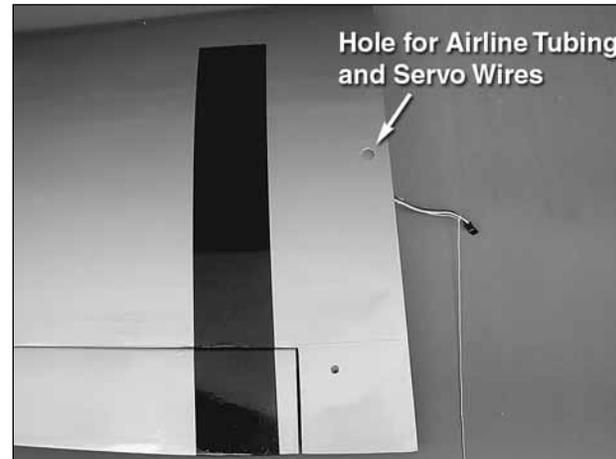
❑❑ 5. Double check that the wheel will fully retract into the wing. Extend the retract to make sure it does not interfere with any part of the wing and that the retract is operating smoothly.



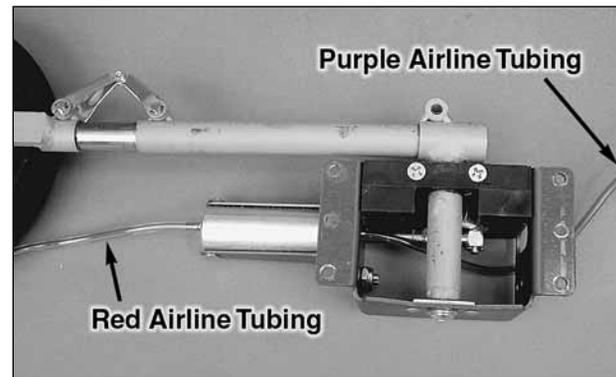
❑❑ 6. Hold the retract in the wing. Using the mounting holes as a guide, drill 7/64" [2.8mm] pilot holes into the retract rails. **Caution:** Do not inadvertently drill into the air cylinder when you get to the middle hole. Mount

the retracts with five #6 x 3/4" [19.1mm] sheet metal screws, one in each corner and one in the middle as shown. Use one #6 x 1/2" [12.7mm] sheet metal screw in the hole over the air cylinder.

❑❑ 7. Remove the six screws and retract and apply a couple of drops of thin CA in the holes.

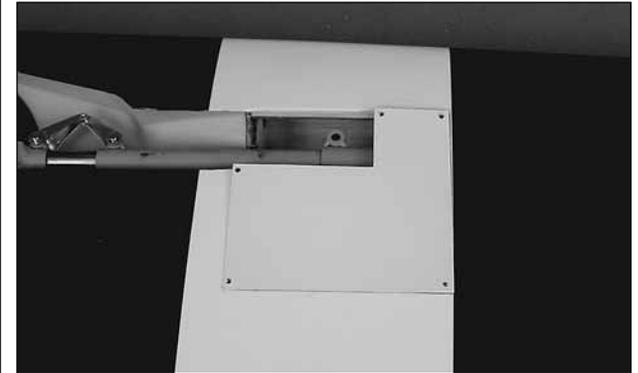


❑❑ 8. Cut the covering from the holes in the top of the wing for the servo wires and the airline tubing.



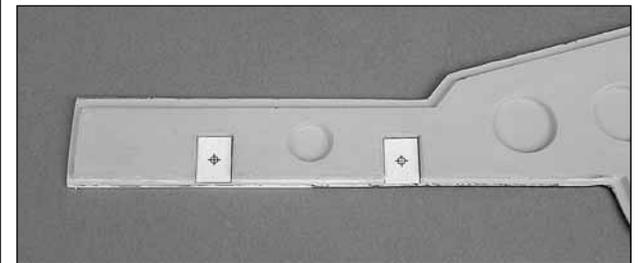
❑❑ 9. Cut a 21" [533mm] piece of red air line tubing and a 23" [584mm] piece of purple air line tubing from the tubing included with the Robart Air Control Kit (not included). Connect the red line to the front of the air cylinder and the purple to the back of the air cylinder.

❑❑ 10. Connect the two pieces of air line tubing to the string in the retract bay. Guide the airline tubing through the front of the retract bay, through the flap bay and out the hole in the top of the wing. Also pull the aileron servo lead out the hole. Tape the airline and aileron servo lead to the top of the wing. Remount the retract in the wing.



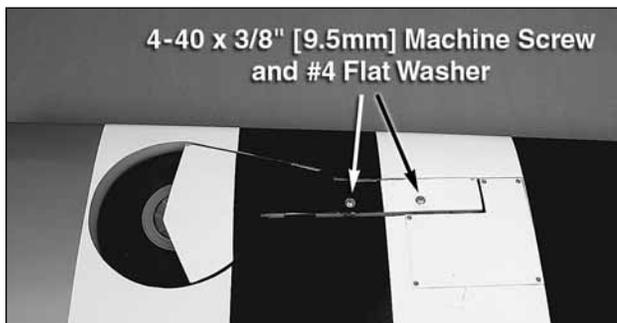
❑❑ 11. Use a sharp hobby knife to remove the covering from over the five mounting holes in the plywood retract cover. Set the retract cover over the retract and drill a 1/16" [1.6mm] pilot hole using the holes in the cover as a guide.

❑❑ 12. Mount the retract cover to the wing with five #2 x 3/8" [9.5mm] flat head sheet metal screws.



❑❑ 13. Cut two of the landing gear door drill guides from the back of the manual. Place the drill guides in the rectangle recesses of the landing gear door. Place the landing gear door on a piece of scrap wood and drill a 1/8" [3.2mm] hole through the door at the marked hole location.

- 14. Adjust the position of the two landing gear door mounts so that they align with the flats on the landing gear door when the door is positioned in the landing gear opening.



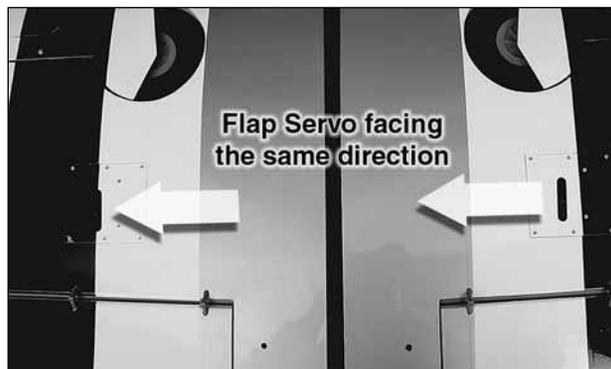
- 15. Install a #4 flat washer on 4-40 x 3/8" [9.5mm] machine screw. Insert the machine screw through one of the holes in the gear door and thread it into the landing gear door mount. Note that it tightens against the landing gear strut before it tightens against the gear door. Install the second machine screw to hold the gear door in position. Check to make sure that the gear door is flush with the bottom of the wing. 1.5mm thick rectangular plywood spacers have been included to space the gear doors out if needed. Both screws will need to be shortened, a little at a time, so that they tighten against both the landing gear strut and the gear door. Be sure to use threadlocker on the screws.

- 16. Return to step 1 and mount the right retract in the right wing.



The P-47 was manufactured by Republic Aircraft Corporation, which at one time was named Seversky Aircraft Corporation, started by two fellow Russians, Alexander De Seversky and Alexander Kartveli.

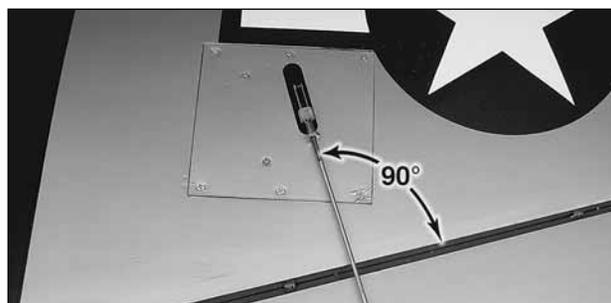
## INSTALL THE FLAP SERVOS



- 1. Install the flap servos following the same procedure used to install the aileron servos. Note that the flap servos face the same direction.
- 2. Connect a 12" [305mm] servo extension wire to the flap servo. Secure the extension to the servo with a piece of heat shrink or electrical tape.
- 3. Route the flap servo leads to the root of the wing and out the hole in the top of the wing.

## INSTALL THE AILERON AND FLAP PUSHRODS

Do the left aileron first.

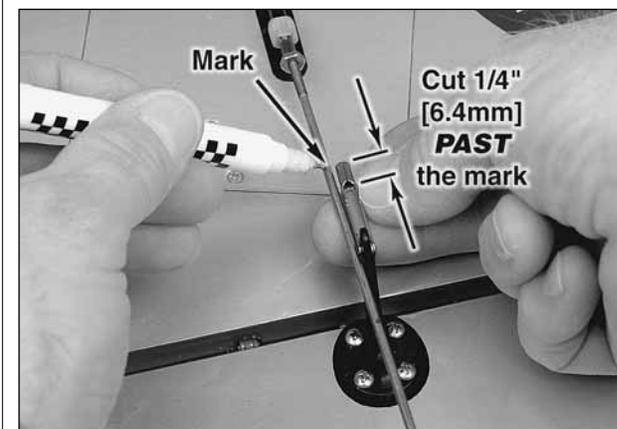


- 1. Slide a silicone clevis retainer over a 4-40 threaded metal clevis. Thread a 4-40 nut followed by the 4-40 metal clevis, threaded 12 turns onto a 4-40 x 12" [305mm] metal pushrod. Attach the clevis to the

aileron servo arm 5/8" [15.9mm] from the center of the arm.



- 2. Position the control horn so that it is inline with the pushrod and over the plywood mounting plate. The pushrod holes in the control horn should be aligned with the hinge line of the aileron. On the aileron, mark the four mounting holes. Remove the control horn and drill a 5/64" [2mm] pilot hole at each mark. Do not drill completely through the aileron. Attach the control horn using four #4 x 1/2" [12.7mm] sheet metal screws. Use thin CA to harden the holes.



- 3. Install the metal solder clevis in the second hole from the end of the control horn. Center the aileron servo and aileron. Mark the pushrod where it meets the solder clevis. Remove the pushrod and the solder clevis and cut the pushrod 1/4" [6.4mm] **past** the mark. Solder the solder clevis to the pushrod using the techniques described in the following **Hot Tip**.

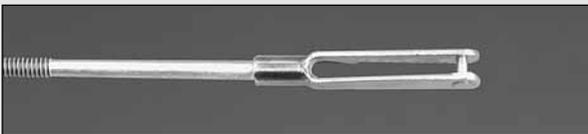
## HOW TO SOLDER

1. Use denatured alcohol or other solvent to thoroughly clean the pushrod. Roughen the end of the pushrod with coarse sandpaper where it is to be soldered.

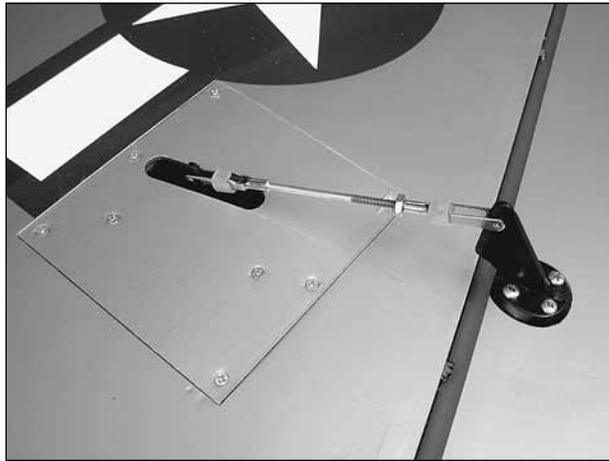
2. Apply a few drops of soldering flux to the end of the pushrod, then use a soldering iron or a torch to heat it. "Tin" the heated area with silver solder by applying the solder to the end. The heat of the pushrod should melt the solder – not the flame of the torch or soldering iron – thus allowing the solder to flow. The end of the wire should be coated with solder all the way around.

3. Place the clevis on the end of the pushrod. Add another drop of flux, then heat and add solder. The same as before, the heat of the parts being soldered should melt the solder, thus allowing it to flow. Allow the joint to cool naturally without disturbing. Avoid excess blobs, but make certain the joint is thoroughly soldered. The solder should be shiny, not rough. If necessary, reheat the joint and allow to cool.

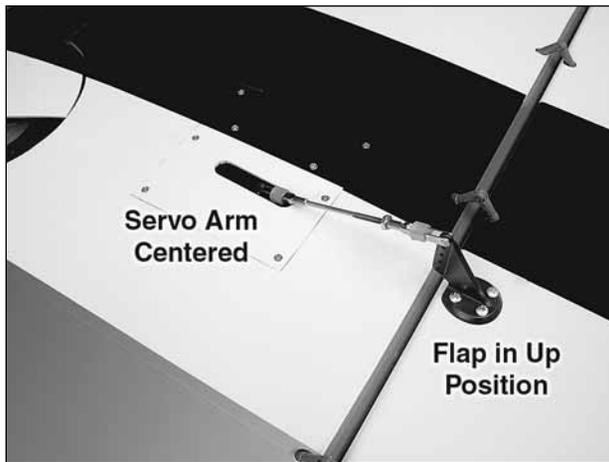
4. Immediately after the solder has solidified, but while it is still hot, use a cloth to quickly wipe off the flux before it hardens. **Important:** After the joint cools, coat the joint with oil to prevent rust. **Note:** Do not use the acid flux that comes with silver solder for electrical soldering.



This is what a properly soldered clevis looks like – shiny solder with good flow, no blobs and flux removed.



❑ 4. Slide a silicone clevis retainer over the solder clevis. Reinstall the aileron pushrod with the threaded clevis attached to the control horn.



❑ 5. Assemble and connect the flap pushrods following the same procedure. We installed the pushrod in the outer hole of the control horn and the hole 3/8" [9.5mm] from the center of the servo arm. **Note:** With the flap fully retracted "up", the servo arm is centered on the servo.

❑ 6. Return to step 1 and install the aileron and flap pushrods on the right wing.

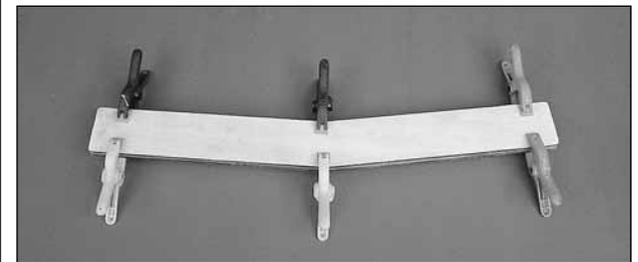


The Thunderbolt was a massive airplane, the biggest and heaviest single engine, single-place fighter ever built. The engine, the Pratt & Whitney 18 cylinder twin-row radial, developed 2,000 H.P. and was the most powerful engine at the time. However, in turn, it needed a highly efficient duct system for its super-charger. The designer, Alexander Kartvile, designed the duct system first, then built the fuselage around it.

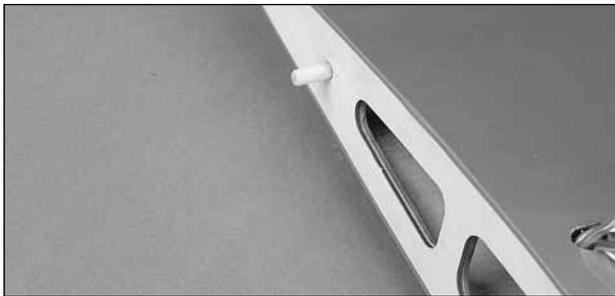
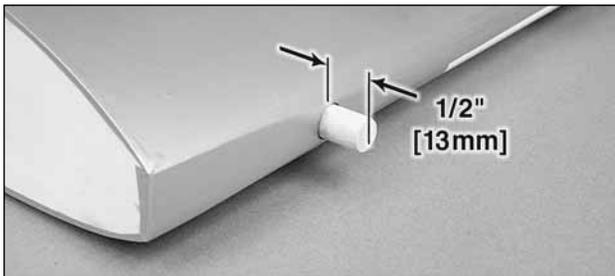
## JOIN THE WING

**Note:** Keep the retracts (if installed) in the retracted (up) position so they do not extend and retract as you handle the wing.

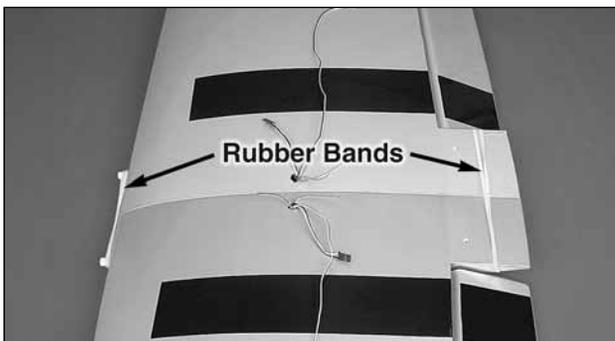
❑ 1. Clean the aluminum wing joiner with denatured alcohol to remove any possible contaminant.



❑ 2. Gather everything required for gluing the wing joiner and wing together including 30-minute epoxy, mixing sticks, epoxy brush, clamps, #64 rubberbands, 12" [305mm] long dowel or wire, denatured alcohol and small paper towel squares. Mix up a 1/2" oz. [14.7cc] of 30-minute epoxy. Apply a generous amount of epoxy to one side of each of the plywood wing joiners. Sandwich the aluminum wing joiner between the two plywood wing joiners. Hold the joiner together with clamps. Use a paper towel dampened with denatured alcohol to wipe off any excess epoxy around the edges.



❑ 3. Use 6-minute epoxy to glue the two 3/8" [9.5mm] diameter forward wing dowels in the leading edge of the wing. The wing dowels should protrude approximately 1/2" [12.7mm] from the wing. Also glue the 1/4" [6.4mm] aft root rib guide dowel in the left wing half. Clean off any excess epoxy before it cures.



❑ 4. Once the epoxy has cured, remove the clamps from the wing joiner and sand off any excess epoxy you may have missed. Test fit the wing joiner in each wing half making sure that both wings halves fit together at the root without any gap. Trial fit clamping

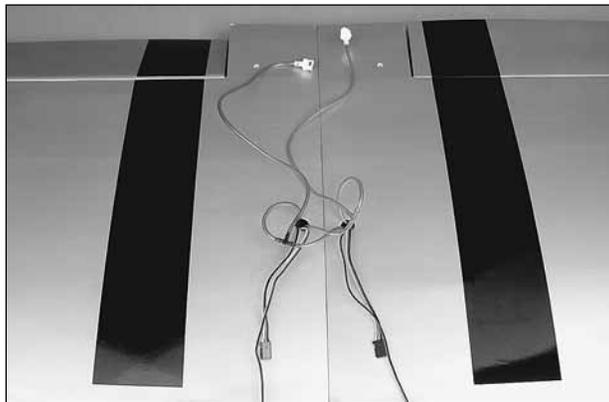
the wing together with rubberbands around the wing dowels and the trailing edge.

❑ 5. Remove the rubberbands and separate the wing halves. Remove the wing joiner. Mix 2 oz. [59.1cc] of 30-minute epoxy. **Working quickly**, pour a generous amount into the joiner pocket of one wing half. Use your wire or dowel to thoroughly distribute the epoxy, coating all surfaces inside the joiner pocket. Coat the root rib and one half of the wing joiner that goes into the wing. Insert the joiner in the wing. Proceed **immediately** to the next step.

❑ 6. Coat the joiner pocket in the other wing half and the other end of the wing joiner. Join the wing halves together. Then, stand the wing on end with one of the wing tips resting on the floor. Use a piece of R/C foam or something similar to cushion and stabilize the wing so it won't slide around.

❑ 7. With the wing resting on end, use paper towel squares to wipe off any excess epoxy as it squeezes out. Wrap the rubberbands around the wing dowels and the aft end of the wing. Add several strips of masking tape to tightly hold the wings together as you continue to wipe off excess epoxy as it squeezes out. Be certain the leading and trailing edges of the wing **accurately** align. Do not disturb the wing until the epoxy has fully cured.

Perform this step only if you have installed retracts.

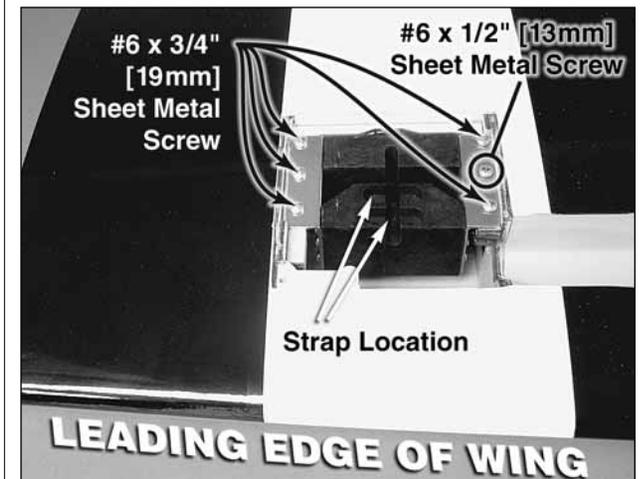


❑ 8. Join the matching air lines from each wing half with a couple of T-fittings that came with the Robart

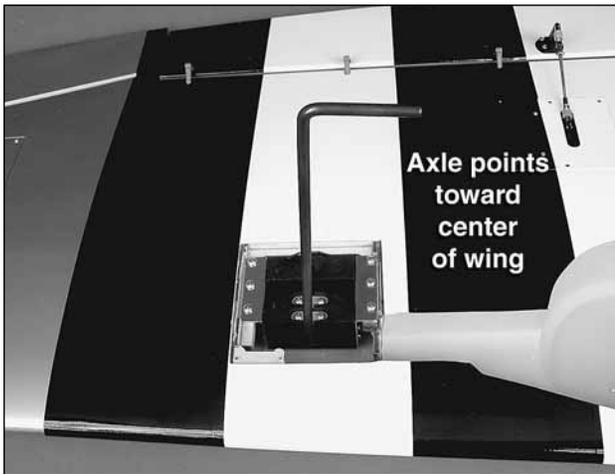
air control kit. Cut two 10" [254mm] pieces of air line (also from the control kit) and fit each line to the T-fittings. Connect one quick-connector **with** an O-ring to one of the air lines and one of the quick connectors **without** an O-ring to the other line. This will prevent improper connection to the quick-connectors on the air valve when mounting the wing to the fuselage.

## INSTALL THE FIXED MAIN LANDING GEAR

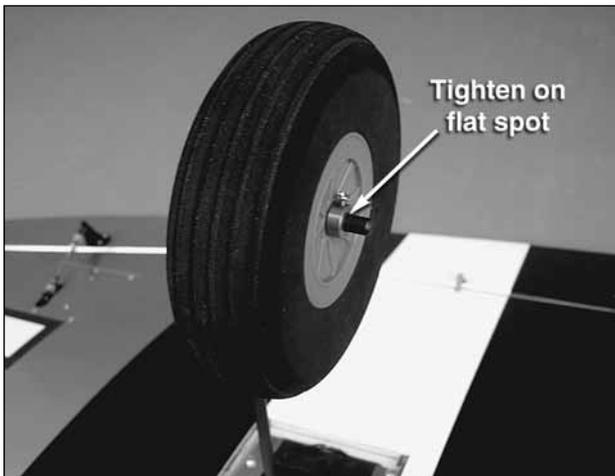
If you have installed the retractable landing gear proceed to **ASSEMBLE THE FUSELAGE**.



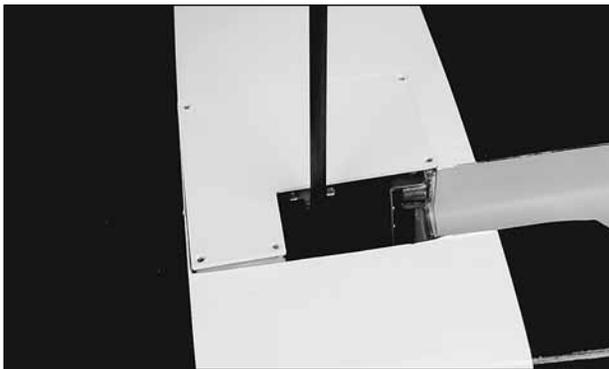
❑ 1. Place both fixed landing gear mounts on the landing gear plates. The mounts are the same, but the part with the straps goes towards the leading edge of the wing. Using the holes in the mounts as a guide, drill six 7/64" [2.8mm] holes into the landing gear plates. Attach the landing gear mounts to the landing gear plates with five #6 x 3/4" [19.1mm] sheet metal screws and one #6 x 1/2" [12.7mm] sheet metal screw.



❑ 2. Mount each main landing gear wire in the landing gear mount with two metal straps and four #4 x 1/2" [12.7mm] sheet metal screws.



❑ 3. Mount the wheels to the landing gear with a wheel collar on both sides of both wheels. Use a small drop of threadlocker on all the 3 x 5mm machine screws. Make sure the machine screw in the outer wheel collar tightens against the flat spot on the landing gear wire.



❑ 4. Use a sharp hobby knife to remove the covering from over the five mounting holes in the plywood retract cover. Set the retract cover over the retract and drill a 1/16" [1.6mm] pilot hole using the holes in the cover as a guide.

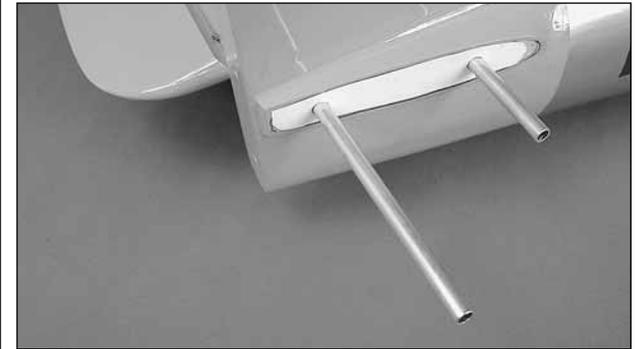
❑ 5. Mount the retract cover to the wing with five #2 x 3/8" [9.5mm] flat head sheet metal screws.



Various prototypes and incarnations of the P-47 began to materialize at Republic Aircraft around 1940. One of the first designs recognizable as a P-47 was the XP-44 *Rocket*. One of the engine performance features carried over from Seversky was the gear-driven supercharger and later a turbo-supercharger.

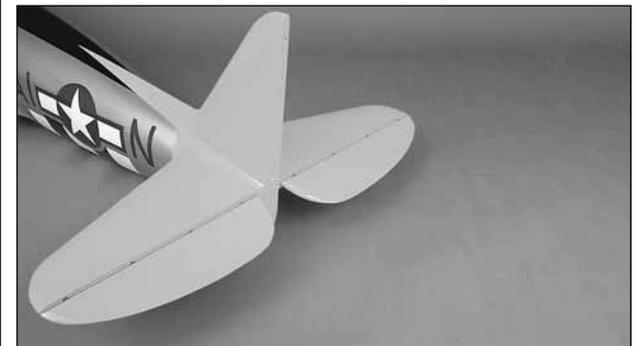
## ASSEMBLE THE FUSELAGE

### INSTALL THE STABILIZER



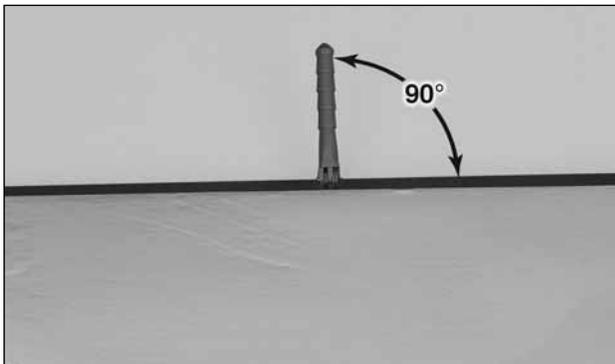
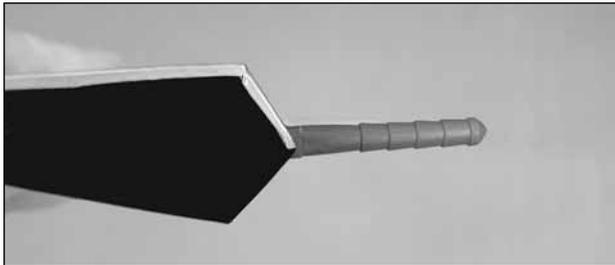
❑ 1. Test fit the two aluminum stabilizer tubes in the fuselage and slide the stabilizers on the tubes. The shorter tube goes in the front hole. If the aluminum tubes are too tight to slide through the holes, take a sharp hobby knife and gently scrape the inside of the holes. During the manufacturing process a small amount of resin or filler may be left behind in the hole.

❑ 2. Once you are satisfied with the fit of the stabilizer halves, remove the stabilizer halves and the joiner tubes. Use medium grit sandpaper to roughen up the aluminum tubes. Clean the tubes with denatured alcohol and insert both tubes back into the fuselage until the end exits on the opposite side by approximately 1" [25.4mm].



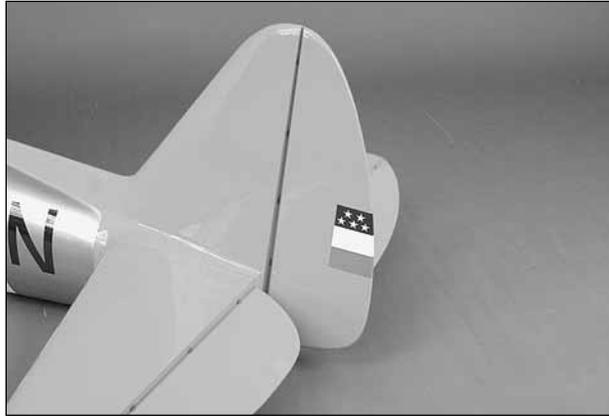
❑ 3. Gather everything required for gluing the stabilizer halves to the fuselage, including 30-minute

epoxy, mixing sticks, epoxy brush, 12" [305mm] long dowel or wire, masking tape, denatured alcohol and small paper towel squares. Mix up 3/4 oz. [22.1cc] of 30-minute epoxy. Apply a generous amount of epoxy to the long side of the aluminum joiner tubes. Pull the tubes through the fuselage so that they are close to centered. Pour a small amount of epoxy into both holes of one of the stabilizer halves and using a dowel or wire, coat the inside of the holes. Apply epoxy to the root rib of the stabilizer and the fuselage. Insert the end of the aluminum tubes with epoxy on them into the stabilizer and press the stabilizer against the fuselage. Wipe off any excess epoxy that may have squeezed out before it runs down the fuselage. Quickly repeat the process on the other side. Wipe off any excess epoxy with a dampened paper towel and denatured alcohol. Use pieces of masking tape to hold the stabilizer tight against the fuselage until the epoxy cures.

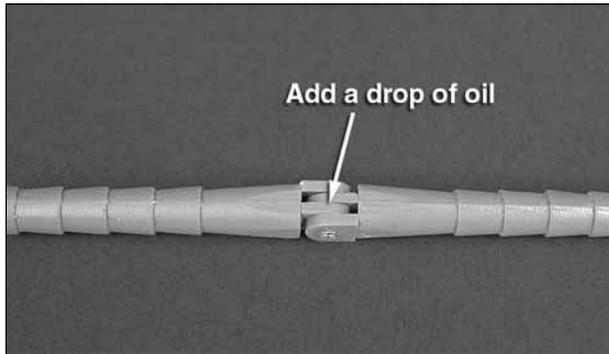


□ □ 4. Without using any glue, install five hinges into the rudder. Note that the pivot point of each hinge must align with the center of the leading edge.

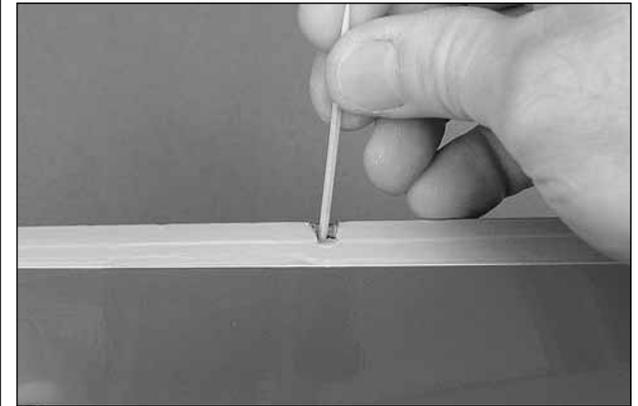
To achieve this alignment, the hinges will be fairly deep in the rudder. Also note that the hinges must be perpendicular to the leading edge.



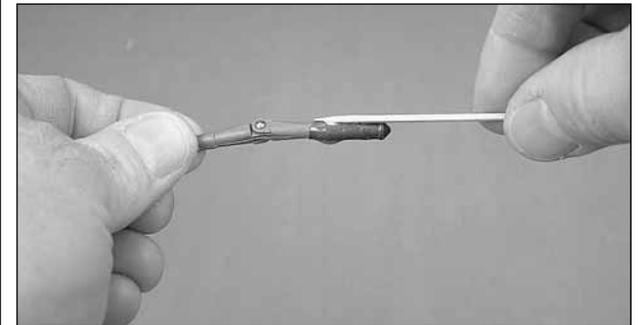
□ □ 5. Again without glue, test fit the rudder to the fin. Move it left and right a few times to align the hinges. The rudder doesn't have to move very far, only 2" [50.8mm] left and 2" [50.8mm] right measured at the widest part of the rudder at the trailing edge. If there is too much resistance, or if you are not able to move the rudder left and right 2" [50.8mm], widen the gap slightly between the rudder and the fin.



□ □ 6. Remove the rudder and all the hinges. Add a small drop of oil to the pivot point on the hinges. This will prevent the epoxy from adhering to the pivot point. Make sure oil does not get on the gluing surface of the hinge. If it does, clean the oil off with a paper towel square dampened with denatured alcohol.



□ □ 7. Mix up approximately 1/4 oz. [7.4cc] of 30-minute epoxy. Use a toothpick to thoroughly apply the epoxy in the holes in the fin and rudder. Use the toothpick to get the epoxy out of the opening of the holes in the rudder and fin so it doesn't get into the hinge pin. Wipe away any excess epoxy around the outside of the holes with a couple of the small paper towel squares dampened with denatured alcohol.



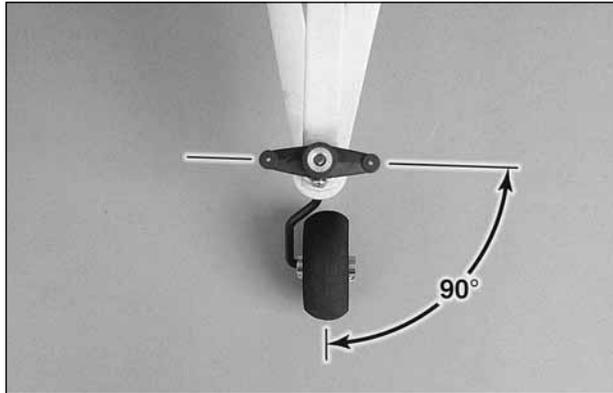
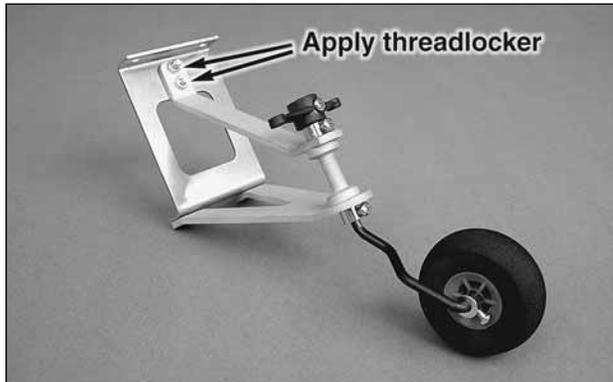
□ □ 8. Use the toothpick to apply epoxy to the ends of the rudder hinges that go into the fin. Insert each hinge into the fin and wipe away any excess epoxy that squeezes out of the hole.

□ □ 9. Apply epoxy to the other end of the hinges. Join the rudder to the fin, pushing the hinges only about 3/4 of the way into the rudder. Use a toothpick to wipe away any epoxy that squeezes out. Then, fit the rudder the rest of the way in.

□ □ 10. Move the rudder left and right a few times to align the hinges and make certain that the rudder deflects left and right enough. Use a small piece of masking tape to hold the tip of the rudder in alignment with the tip of the fin. Allow the epoxy to fully cure.

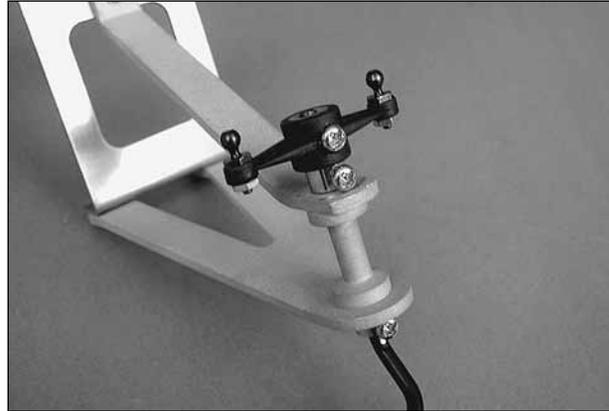
## MOUNT THE FIXED TAIL GEAR

If you are installing the retractable tail gear, skip to “MOUNT THE RETRACTABLE TAIL GEAR” on this page.



□ 1. Slide a 3.5mm wheel collar on the tail gear wire. Insert the tail gear wire in the tail gear mount. Install a second wheel collar followed by the steering arm on the tail gear wire. Apply a drop of threadlocker on three 3x6mm machine screws. Secure the two wheel collars and the steering arm to the tail gear wire with

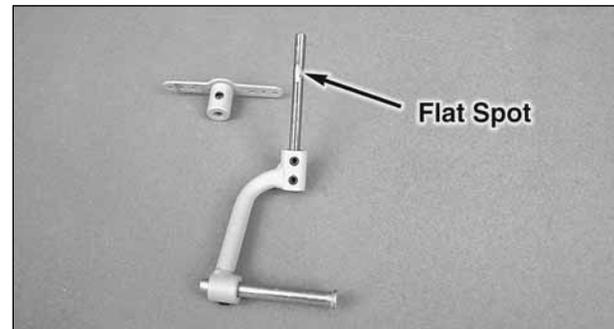
the three 3x6mm machine screws. Adjust the location of the steering arm so that it is flush with the top of the tail gear wire and perpendicular to the tail wheel. Also, remove the two nuts from the top of the tail gear, apply threadlocker and reinstall the nuts.



□ 2. Enlarge the holes in the steering arm with a 5/64" [2mm] drill bit. Mount a 2-56 ball link ball to each arm with a 2-56 nut and a drop of threadlocker.

□ 3. Skip to step 5 in “*Mount the Retractable Tail Gear*” and follow the steps for installing the pull-pull cable.

## MOUNT THE RETRACTABLE TAIL GEAR

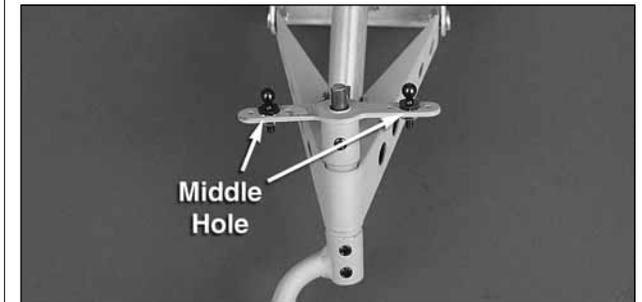


□ 1. Remove the steering arm from the Robart #160LWC retractable tail gear assembly (not included). File a flat spot near the top of the shaft for the set screw in the steering arm to lock onto.

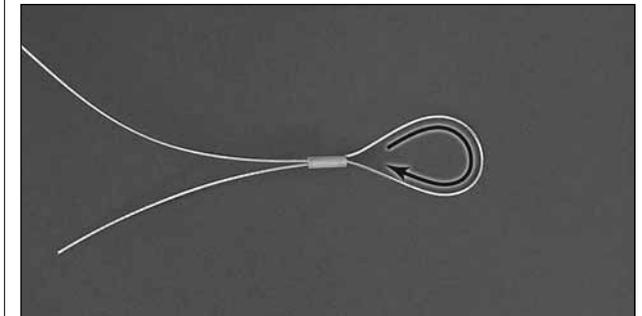
Mount the steering arm to the shaft with a drop of threadlocker and the set screw.

□ 2. File another flat spot near the bottom of the shaft for one of the set screws in the strut. Tighten both set screws with a drop of threadlocker on each. Be certain the steering arm and the axle in the strut remain parallel with each other. Make adjustments to the flat spots if necessary.

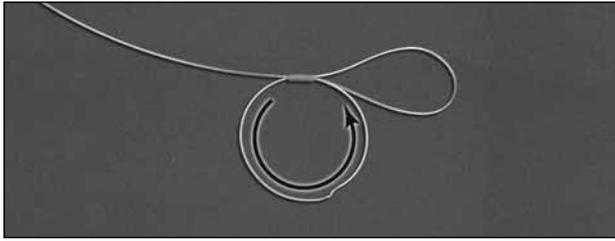
□ 3. Enlarge the hole through the 1-3/4" [44mm] tail wheel with a #9 [5mm] drill. Cut the axle included with the Robart retractable tail gear to the correct length, then file a flat spot on it and mount it to the strut.



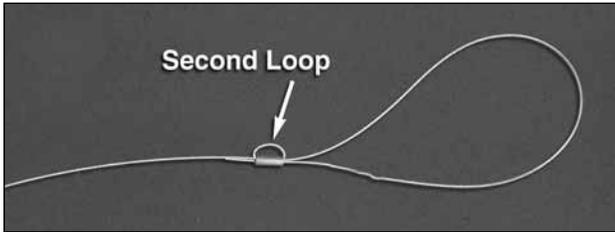
□ 4. Enlarge the middle hole in both sides of the steering arm with a 3/32" [2.4mm] drill. Insert a 2-56 ball link ball in the hole. Secure each ball with a 2-56 nut and a drop of threadlocker.



□ 5. Use wire cutters to cut the supplied braided cable into two equal lengths. Slide a small copper tube (called a swage) over one end of the cables, then guide the end of the cable back through.



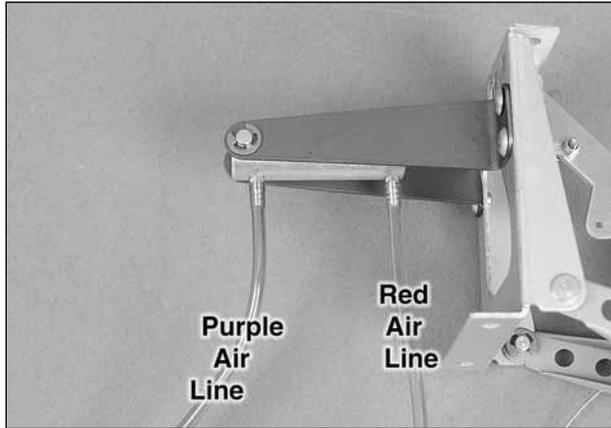
❑ 6. Wrap the cable back around the swage and back through the swage.



❑ 7. Use pliers to pull the cable from the first loop to reduce the size of the second loop.

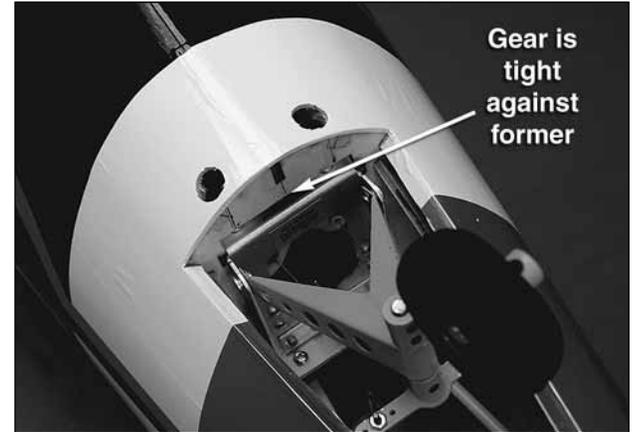
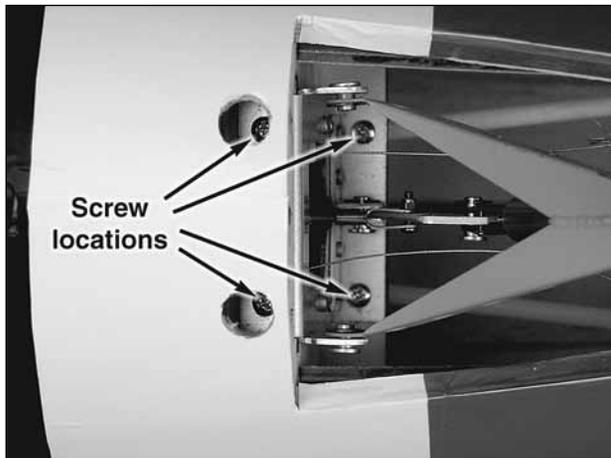


❑ 8. Now pull on the long end of the cable to reduce the size of the first loop. Slip the loop over one of the ball link balls on the steering arm. Tighten the loop until it is small enough to remain secure on the ball, yet may still be pried off. Squeeze the swage with pliers. Connect the other cable to the other ball link ball the same way.



❑ 9. **Retractable tail gear only:** Connect 40" [1016mm] of purple air line to the forward air fitting and 40" [1016mm] of red air line to the aft fitting on the air cylinder. There is not enough air line leftover from the main gear, so additional line will have to be purchased separately (Robart #169 Pressure Tubing).

❑ 10. Place the tail gear in the fuselage while simultaneously guiding the pull/pull cable through the white plastic guide tubes. If installing the retractable tail gear, also guide the air lines through the fuselage.



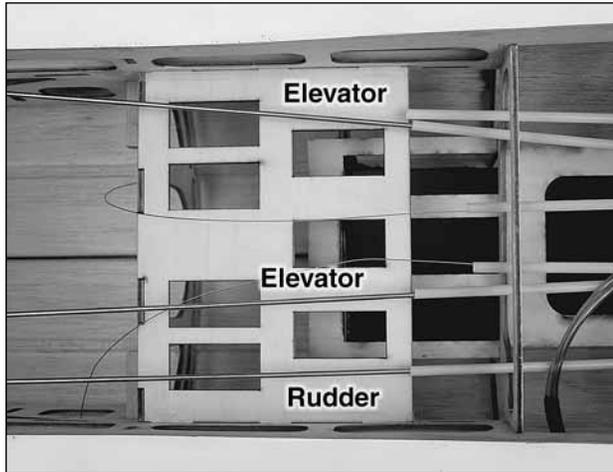
❑ 11. Remove the covering from over the two tail gear mounting holes in the bottom of the fuselage. Drill four 3/32" [2.4mm] holes through the rails for mounting the tail gear. If your drill bit is not long enough to reach the rail nearest the top of the fuselage, use medium CA to temporarily glue a 3/32" [2.4mm] drill bit in a 1/8" [3.2mm] brass tube. After drilling the holes, the drill bit can be removed from the tube by heating the tube.

❑ 12. Mount the tail gear in the fuselage with four #6 x 1/2" [12.7mm] sheet metal screws.

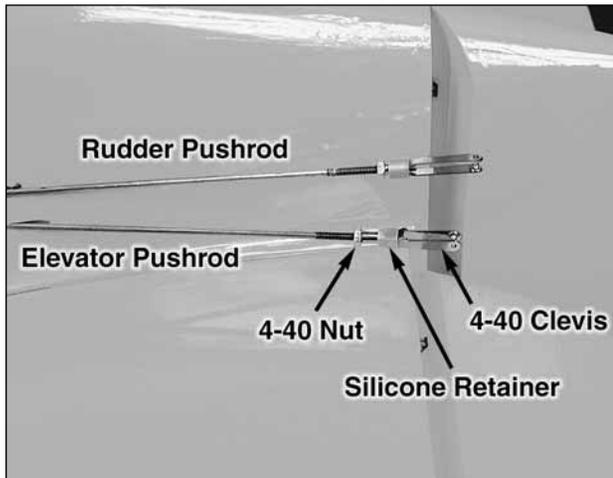


After the British policy of giving names to aircraft had caught on in the U.S., the XP-47B was dubbed "Thunderbolt" by C. Hart Miller, Republic's Director of Military Contracts. Republic officially approved the name.

## INSTALL THE ELEVATOR & RUDDER SERVOS



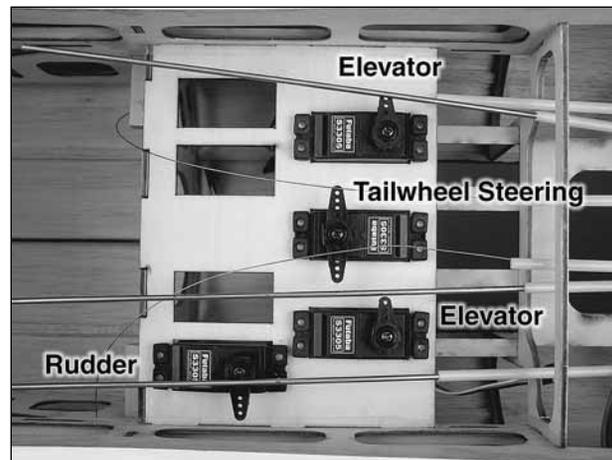
❑ 1. Insert the three 4-40 x 48" [1220mm] metal pushrods in the three outer pushrod tubes shown in the photo.



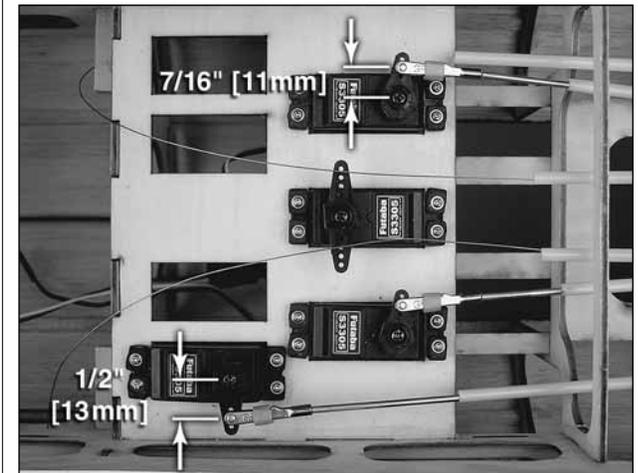
❑ 2. Thread a 4-40 nut, threaded clevis and a silicone clevis retainer, 12 turns, onto both elevator pushrods and the rudder pushrod.



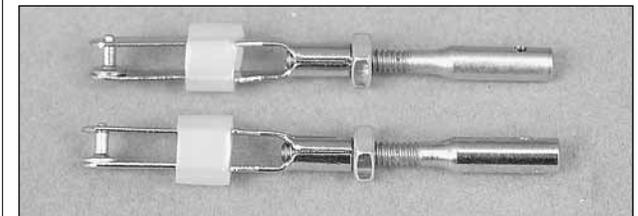
❑ 3. Mount the control horns to the elevators and the rudder. Follow the same procedure used for the ailerons, by drilling 3/32" [2.4mm] holes and using #4 x 1/2" [12.7mm] sheet metal screws. Attach the elevator clevis in the third hole from base of the control horn. Install the rudder clevis in the second hole from the base of the control horn. Don't forget to harden the holes with thin CA after first installing, then removing the screws.



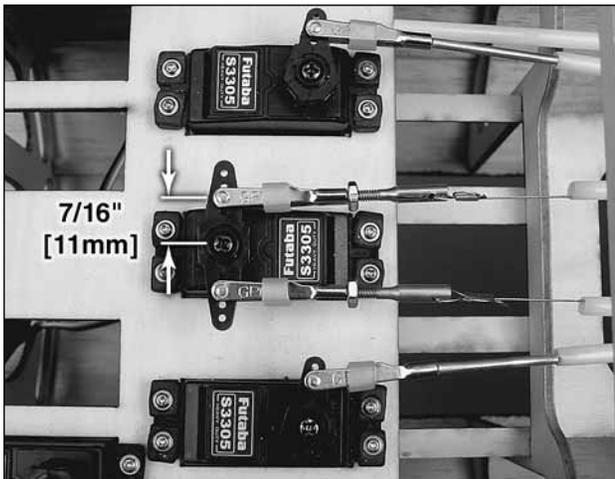
❑ 4. Place two elevator, one rudder and one tail wheel steering servo in the servo tray as shown. Make three one-arm servo arms and one two-arm servo arm from the servo arms that came with your servos. Position the servo arms as shown.



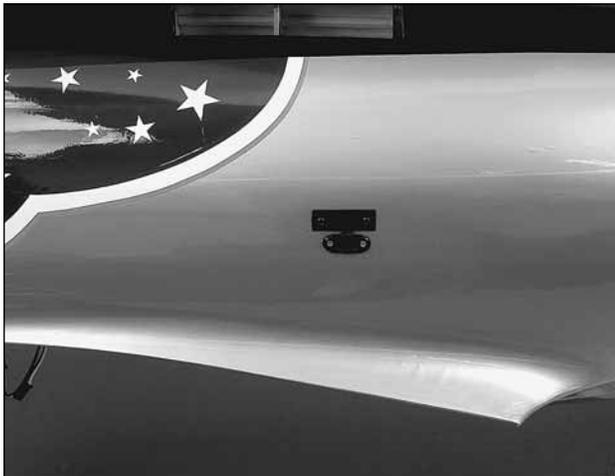
❑ 5. Install solder clevises on the elevator servo arms in the hole 7/16" [11.1mm] from the center of the servo arm. Install a solder clevis on the rudder servo arm in the hole 1/2" [12.7mm] from the center of the servo arm. Following the same procedure that was done for the aileron and flap pushrods, mark the elevator and rudder pushrods where they are to be cut for the solder clevises. One at a time, remove the threaded metal clevis from the control horn end, remove the pushrod from the fuselage, cut it to the correct length and solder a metal solder clevis on the end. Reinstall the pushrod from the front and connect the solder clevis to the servo arms. Reinstall the threaded metal clevis and 4-40 nut. **Don't forget to use a silicone clevis retainer on all the clevises.**



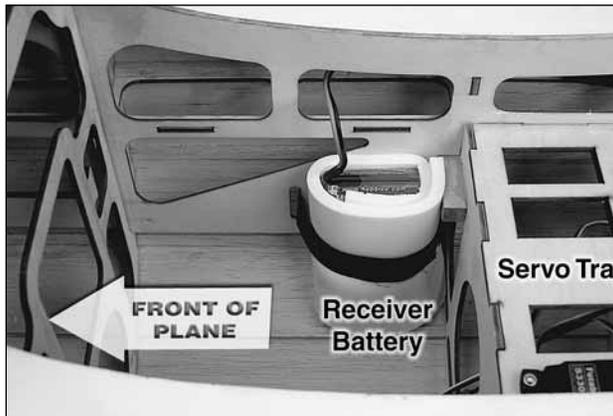
❑ 6. Thread a 4-40 nut and a 4-40 metal clevis, 12 turns, on to each of the 4-40 rigging couplers. Slide a silicone clevis retainer over each clevis. Install the clevises on the tailwheel steering servo arm in the holes 7/16" [11.1mm] from the center of the servo arm.



❑ 7. Center the servo arm and the tailwheel gear. Install a swage on each cable, securing it following the same procedure used on the tail gear. Use a pliers to crimp the swage tightly on the cable.



❑ 8. Mount the receiver on/off switch and charge receptacle in a strategic location where it won't interfere with anything inside the fuselage and where it will not get coated with engine exhaust outside the fuselage.



❑ 9. Overlap by 1" [25.4mm] a 6" [152mm] long piece of hook and a 6" [152mm] long piece of loop material. Route the hook and loop material through the two slots in the left forward fuselage side. Wrap your receiver battery in R/C foam rubber and secure it to the side of the fuselage with the hook and loop material. Connect the receiver battery to the receiver switch. **Use the included heat shrink material to secure the connectors. Make sure the receiver battery is secure.**

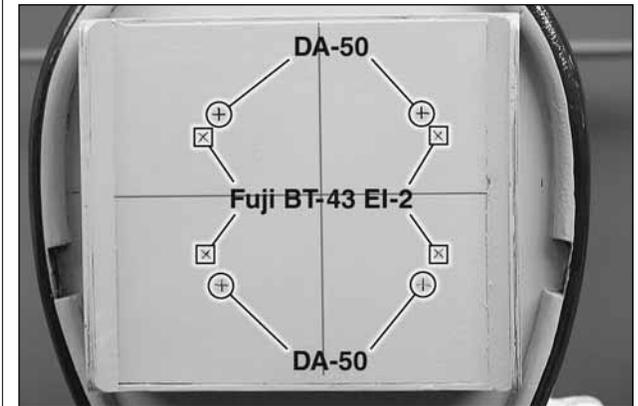
❑ 10. Mount the receiver on the other side of the fuselage using hook and loop material. Connect the receiver switch and the servos to the receiver. Route the receiver antenna through the remaining pushrod tube. Attach a strain relief on the antenna.



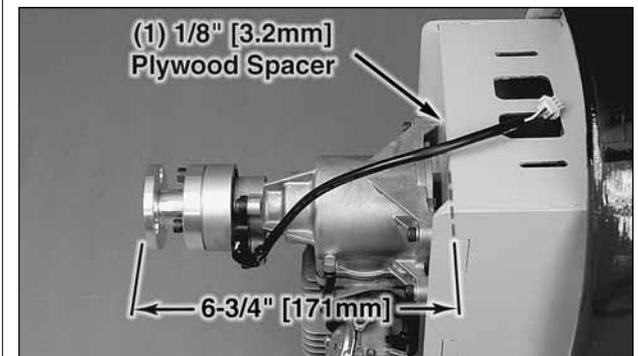
Early production Thunderbolts were not without teething pains typical of any new aircraft. Takeoff runs were long (nearly a half-mile to clear a fifty foot obstacle) and there were several electrical and hydraulic glitches, not to mention the unfamiliarity of a totally new design. One fighter group damaged or wrecked half of the P-47s received.

## INSTALL THE ENGINE

The following engine mounting instructions shows the installation of the Fuji-Imvac BT-43EI-2 gas engine. The installation of other brands of engines will be similar and the following instructions can be used as a guide.



❑ 1. The Giant P-47 ARF firewall has two sets of engine mounting bolt patterns embossed on it. The "X" is for the Fuji-Imvac BT-43EI-2 gas engine and the "+" is for the DA-50 gas engine. If you are installing an engine with a different mounting bolt pattern the firewall also has crosshairs embossed on it to help locate the correct mounting location.

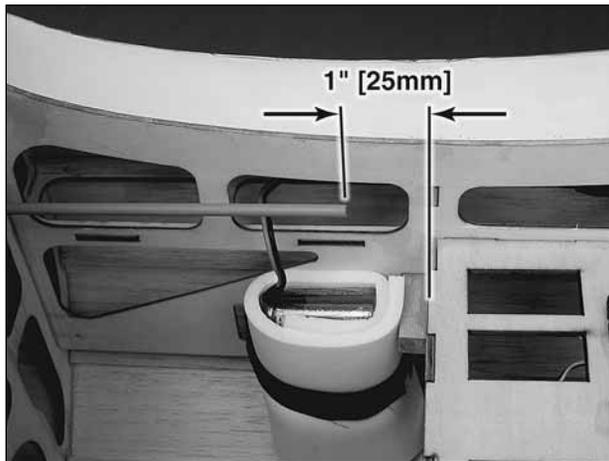
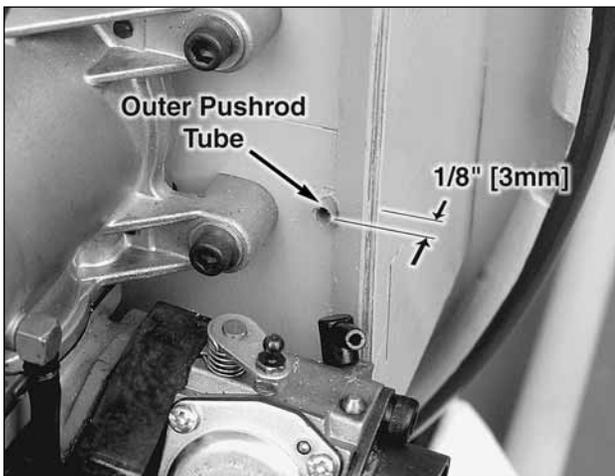


❑ 2. Drill a 1/4" [6.4mm] hole through the firewall at each location marked with an "X". Install the M5 blind nuts in the holes from the back of the firewall. Mount

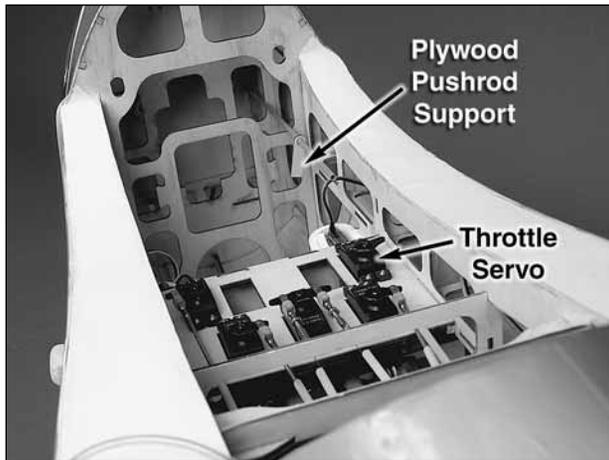
the engine to the firewall using four M5 x 30mm long and four M5 flat washers. Apply a drop of threadlocker to each bolt before installing. For reference, the distance from the front of the firewall to the front of the drive washer is 6-3/4" [171.4mm]. With the Fuji-Imvac BT-43EI-2 one of the 1/8" [3.2mm] plywood engine spacers was required between the engine and the firewall.



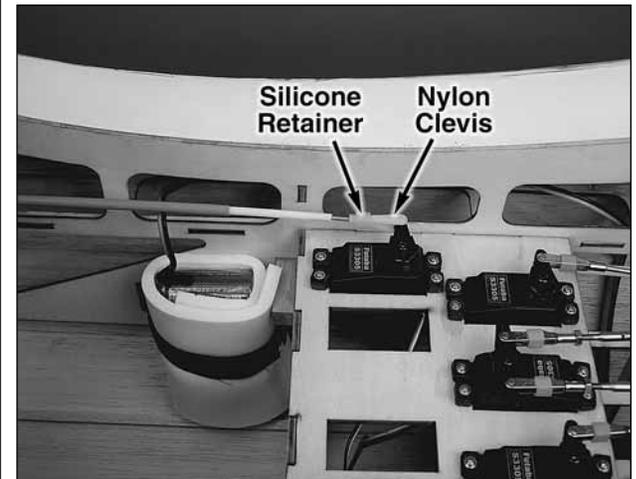
❑ 3. Install a 2-56 ball link ball on the throttle arm of the carburetor. Secure the ball link ball with a 2-56 lock nut.



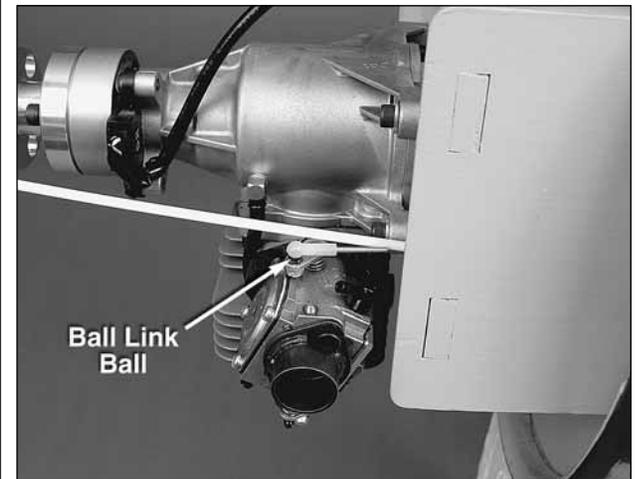
❑ 4. Drill a 3/16" [4.8mm] hole inline with the ball link ball. Use medium sandpaper to roughen the gray outer pushrod tube. Clean the tube with denatured alcohol and insert the tube into the previously drilled hole in the firewall. Route the tube through the front formers of the fuselage until it protrudes approximately 1/8" [3mm] from the firewall. Use thin CA to glue the tube to the firewall. Trim the tube approximately 1" [25.4mm] in front of the servo tray.



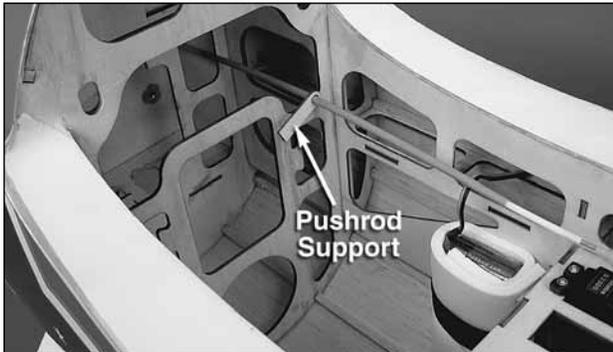
❑ 5. Mount the throttle servo in the servo tray and slide a plywood pushrod support onto the outer pushrod tube.



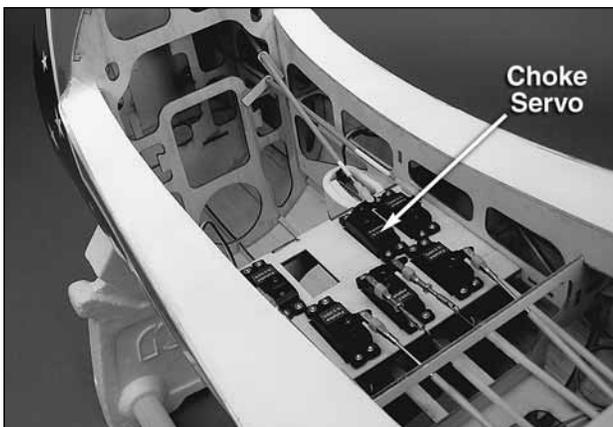
❑ 6. Thread a 2-56 x 1" [25.4mm] threaded rod approximately 3/8" [9.5mm] into the end of the white inner pushrod tube. Thread a nylon clevis 14 turns onto the end of the threaded rod. Slide a silicone clevis retainer over the clevis. Attach the clevis to the throttle servo arm.



❑ 7. Thread the nylon ball link socket 14 turns onto the second 2-56 x 1" [25.4mm] threaded rod. Attach the ball link socket to the ball link ball on the throttle arm.



❑ 8. Position the throttle stick so that it is centered on the transmitter. Adjust the throttle servo arm so that it is centered on the throttle servo. Move the throttle arm on the carburetor so that the throttle is open approximately half way. Mark and cut the white pushrod tube to length. Remove the ball link socket from the throttle arm and thread it into the cut end of the white pushrod tube. Reattach the clevis to the throttle servo arm and the ball link socket to the ball link ball. Make adjustments as needed so that the throttle opens and closes completely. Glue the plywood pushrod support to the second former and the outer pushrod tube to the support. If needed a second pushrod support could be glued to the fuselage side, closer to the throttle servo.



❑ 9. Install the servo operated choke following the same procedure.



❑ 10. Place the ignition module on a piece of R/C foam rubber and secure it to the top of the firewall box with hook and loop material. Rubber straps, cut from a rubberband (not included) can be glued to the firewall box to hold the excess wires.

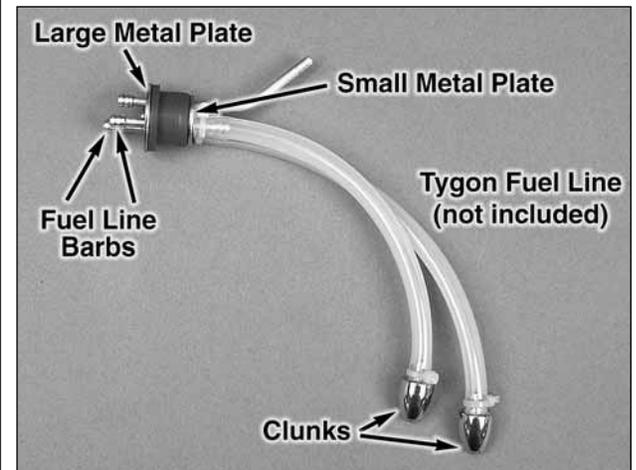
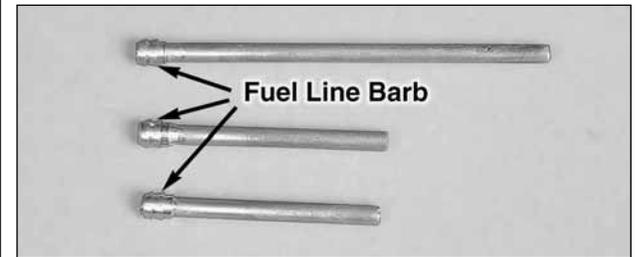
❑ 11. Wrap the ignition battery in R/C foam rubber and attach it to the bottom of the firewall box with hook and loop material. The ignition switch can be installed in the fuselage side at this time or a separate switch mount has been provided that mounts to the side of the firewall box. The switch can be accessed through a hole in the cowl.

## ASSEMBLE AND INSTALL THE FUEL TANK



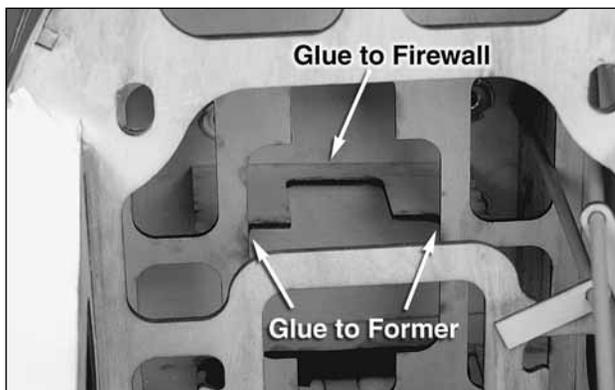
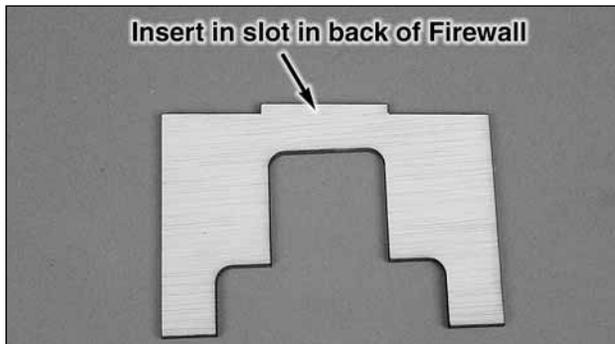
❑ 1. Attach a 12" [305mm] piece of airline tubing to the pressure tank. Insert the pressure tank into the fuselage. A couple of dabs of silicone sealant such

as Shoe Goo® can be applied at the front to hold the tank in position, but still allow it to be removed if necessary. A plywood plate will be installed later to secure the tank at the aft end.



❑ 2. Assemble the fuel tank stopper assembly with the fuel tubes as shown. The easiest way is to first solder a fuel line barb (not included) onto **one** end of all three tubes. Insert the tubes into the stopper with the metal plates, and then solder a barb onto the other end of the two short tubes. Bend the vent tube and connect the pickup and fueling/defueling lines (not included) to the short tubes. Connect the clunks to the lines and secure the lines to the clunk and brass tubing with the included small tie straps.

❑ 3. Install the fuel tank stopper assembly in the fuel tank. Check that the clunks move around freely in the fuel tank. Tighten the fuel tank stopper screw. Refer to step 5 on page 22 for the orientation of the fuel tank.



❑ 4. Glue the fuel tank brace to the back of the firewall and the #2 former.



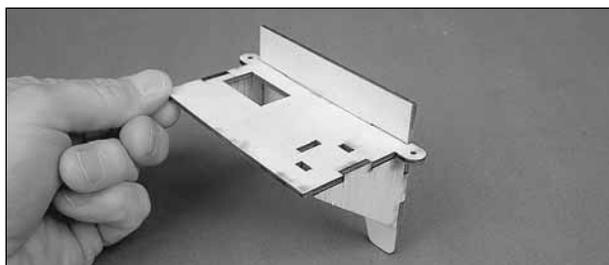
❑ 5. Determine how you want to run the fuel line and drill holes where necessary in the firewall. Install fuel line on the three tubes from the fuel tank. Insert the fuel tank in the fuselage making sure the vent tube is towards the top of the fuselage. Connect the fuel

line from the pickup to the carburetor. The other two fuel lines can be routed out the bottom of the cowl. Insert an aluminum fuel plug in the fueling/defueling line. Secure the fuel tank in the fuselage with the two included rubberbands.

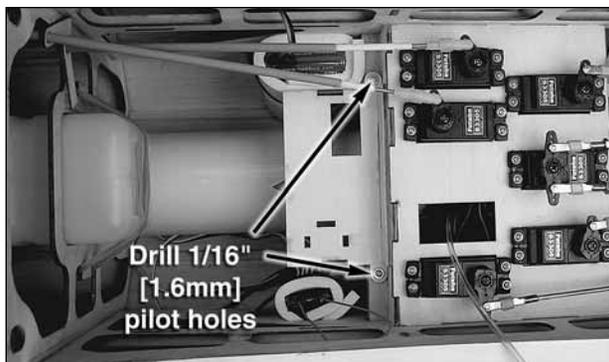


During speed run testing of early production P-47s, test pilots attained a level flight speed of over 400 mph.

### INSTALL THE AIR RETRACT CONTROLS



❑ 1. Glue the retract servo tray together as shown.



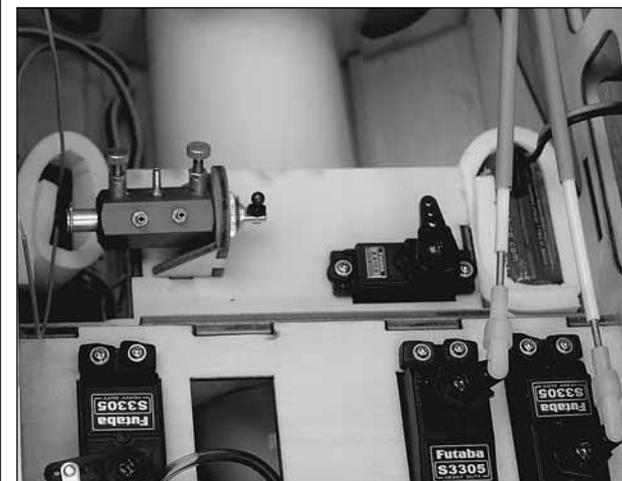
❑ 2. Test fit the retract servo tray in the fuselage. It should fit between the two hardwood rails. The back of the tray will help retain the air pressure tank. Drill

a 1/16" [1.6mm] pilot hole in the hardwood rails using the two mounting tabs as guides. Attach the retract servo tray to the rails with #2 x 3/8" [9.5mm] sheet metal screws and #2 washers.

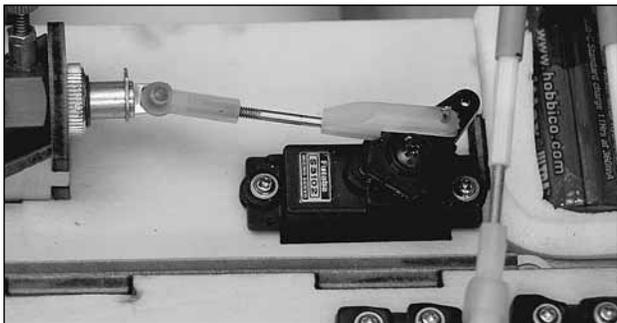
❑ 3. Install the retract control valve servo in the retract servo tray and plug it into the receiver.



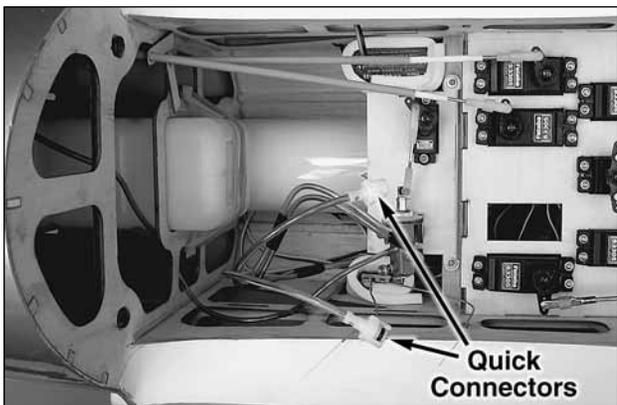
❑ 4. Assemble the retract control valve mount and install the retract control valve. Install a .080 ball link ball and .080 nut on the valve. Be sure to use a drop of threadlocker on the threads of the ball link ball.



❑ 5. Glue the retract control valve mount on the retract servo tray.



❑ 6. Cut off 1/2" [12.7mm] from the threaded end of the 2-56 x 6" [152mm] metal pushrod. Thread the nylon ball socket on the pushrod. Snap the ball socket onto the ball link ball on the retract control valve. Mark the pushrod where it crosses the servo arm and make a 90 degree bend at the mark. Install the pushrod in the servo arm and install a nylon FasLink. Cut the pushrod 1/8" [3mm] past the top of the *FasLink*.



❑ 7. Install a fill valve in the fuselage side in a convenient location. Refer to the air retracts instructions. Connect the pressure tank, fill valve and control valve to a T-fitting. Connect the two air lines coming from the tail gear retract to separate T-fittings. Then, connect the T-fittings to the control valve. Finally connect the quick connects to the T-fittings. Make sure the quick connectors correspond to the quick connectors installed in the wing. Electrical tape can be used to wrap the air lines together to clean up the installation.

❑ 8. Connect the air lines from the retracts in the wing to the quick connectors in the fuselage. Pump-up the pressure tank to the recommended pressure and operate the retracts a couple of times, making any adjustments as needed. The opening for the tail gear may need to be widened slightly at the steering arm to prevent the steering arm from rubbing on the fuselage. Tape the fiberglass tail gear retract cover over the retract opening. Again, operate the retracts, checking that the tail gear retract does not hit the cover.



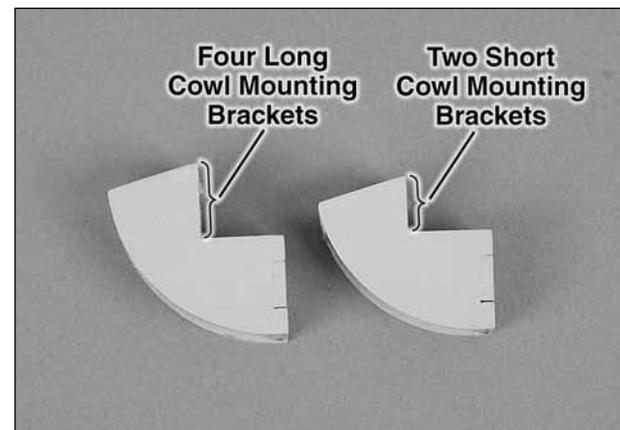
❑ 9. The tail gear retract cover can be permanently installed using CA glue or with screws. If CA glue is used it will be difficult to remove the cover and access the retracts if needed. To install the cover with screws, tape a piece of paper to the fuselage at each corner of the tail gear opening. Place a mark on the paper

at the center of the stringer. Reposition the retract cover and tape it in place. Drill 1/16" [1.6mm] holes through the cover and the stringers at each mark. Remove the cover and enlarge the holes in the cover only with a 3/32" [2.4mm] drill bit. Attach the cover to the fuselage with #2 x 3/8" [9.5mm] sheet metal screws and #2 washers. Harden the screw holes with thin CA glue.

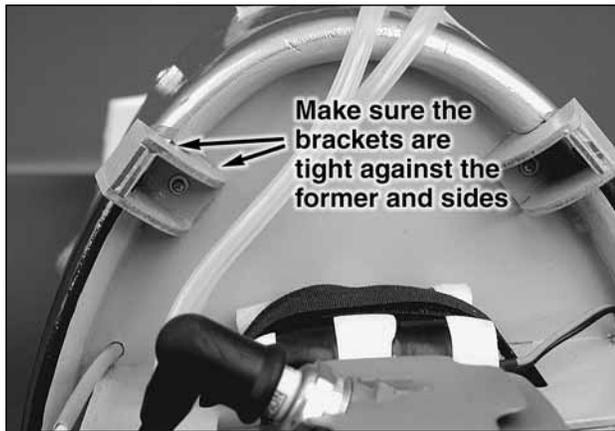


One might question the selection of an older technology, bulkier radial engine vs. a more modern and streamlined "V" engine for the P-47. A problem of "V" engines is their liquid cooling system (including a radiator) which is susceptible to gun fire. Before Glycol became available, liquid cooled engines also featured extremely large radiators adversely affecting aerodynamics. Early P-47 design team members were not willing to "put all their eggs in one basket" and utilized "V" engines for some of their other projects.

## INSTALL THE COWL



❑ 1. Note that there are four long cowl mounting brackets and two short cowl mounting brackets.

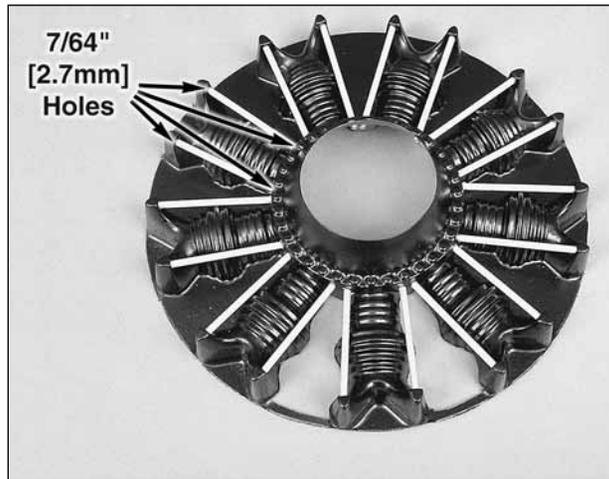


❑ 2. Position the two short cowl mounting brackets in the two bottom slots in the front of the fuselage. Drill a 1/16" [1.6mm] hole through the forward former using the hole in the cowl mounting bracket as a guide. Attach the cowl mounting bracket to the forward former using 6-minute epoxy, #2 x 3/8" [9.5mm] sheet metal screws and #2 flat washers.

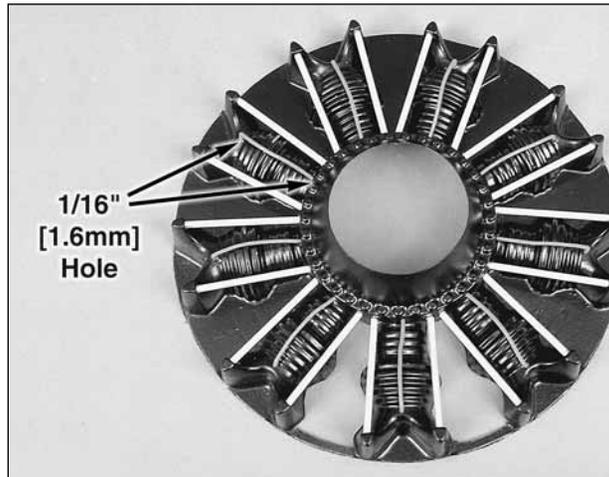
❑ 3. Install the four long cowl mounting brackets in the remaining slots following the same procedure.



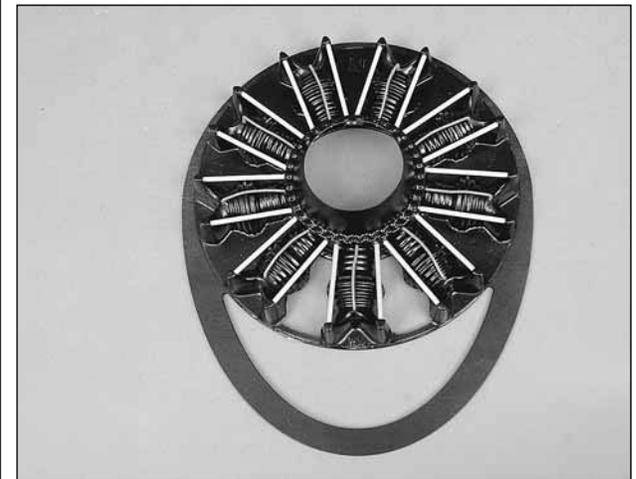
❑ 4. Cut out two openings between the cylinders and the center of the plastic radial engine. The center hole needs to be large enough to clear the drive washer of the gas engine.



❑ 5. Drill 7/64" [2.7mm] holes in the bottom of the rocker arms and in the crankcase as shown. Glue the eighteen aluminum tubes in the holes.



❑ 6. Drill 1/16" [1.6mm] holes in the front of the cylinder head and the crankcase. Glue the red sparkplug wire in the holes.



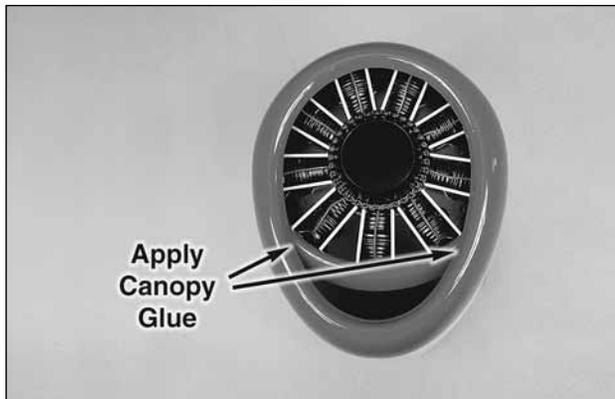
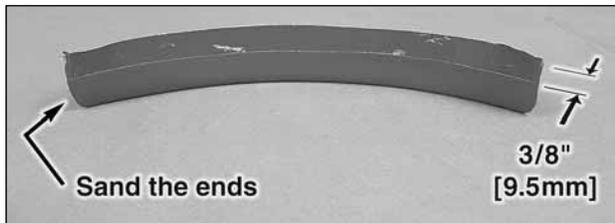
❑ 7. The plywood engine frame can be painted black. Use 6-minute epoxy to glue the plastic radial engine to the plywood engine frame. Align the radial engine with the embossed circle on the plywood frame.



❑ 8. Test fit the radial engine assembly in the cowl. Position it so it is centered and equal distance from the edge of the cowl. Mark the location on the inside of the cowl. This will help you reposition the engine once you have applied epoxy to the engine assembly. Use masking tape to hold the dummy engine in position and test fit the cowl on the fuselage over the gas engine.



❑ 9. Before gluing, use sandpaper to roughen the gluing area inside the cowl. Clean the area with a paper towel dampened with denatured alcohol. Mix approximately 1/2 oz [14.7cc] of 30-minute epoxy. For a stronger joint, add some milled fiberglass to the epoxy. Apply epoxy to the edge of the engine assembly and insert it in the cowl. Use the remaining epoxy to create a fillet around the edge of the assembly.



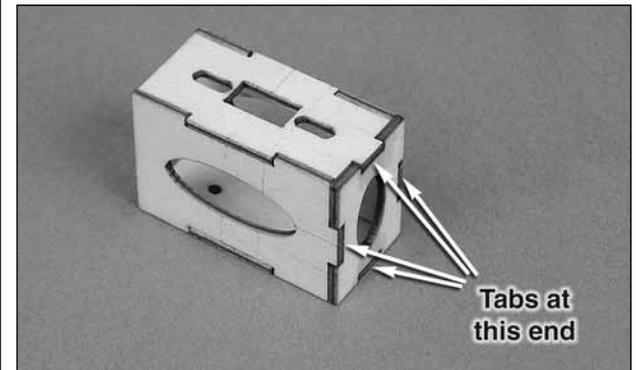
❑ 10. Trim the red turbo charger/oil cooler intake around the base. Then mark and trim the top of the

intake 3/8" [9.5mm] from the base. Trial fit the intake in the cowl. It should fit over the rocker arm covers of the radial engine, against the inner lip of the cowl. Once satisfied with the fit, use medium sandpaper to roughen the end of the intake. Clean the sanding dust off with denatured alcohol and glue it to the cowl inside with CA. Use canopy glue to attach the front of the intake to the back of the cowl lip.

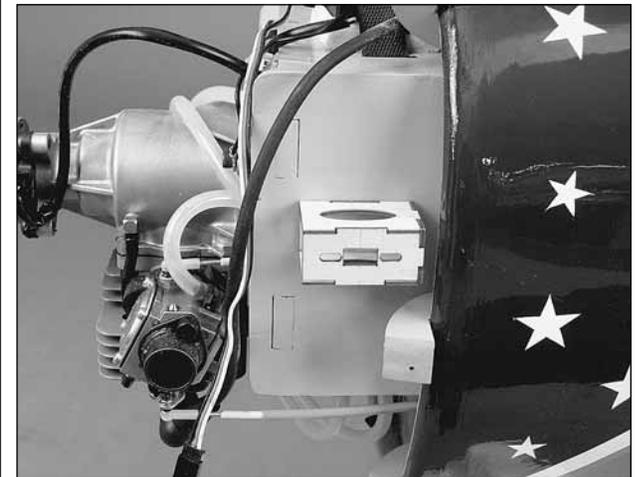


❑ 11. Test fit the cowl over the engine. Install the recommended propeller on the engine. Adjust the position of the cowl so that the dummy radial engine is centered on the drive washer and the propeller clears the front of the cowl by 1/8" [3.2mm]. The cowl mounting brackets should be approximately 1/8" [3.2mm] inside the edge of the cowl.

❑ 12. The six cowl mounting brackets can be seen from the rear of the cowl. Drill a 3/32" [2.4mm] pilot hole through the cowl and the center of the cowl mounting brackets. Enlarge the holes in the cowl to 1/8" [3.2mm]. Secure the cowl to the mounting brackets with #4 x 1/2" [12.7mm] sheet metal screws and #4 flat washers. Be sure to harden the screw holes with thin CA.

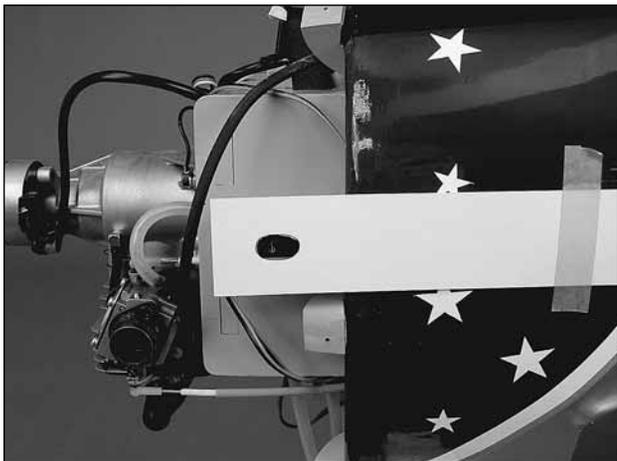


❑ 13. Assemble the ignition switch bracket as shown. Note that the tabs on the sides, top and bottom should all be at the same end.



❑ 14. Attach the switch bracket to the side of the firewall box with 6-minute epoxy and two #2 x 3/8" [9.5mm] sheet metal screws and #2 flat washers. Coat the switch bracket with thinned epoxy or fuel proof paint after it is installed.

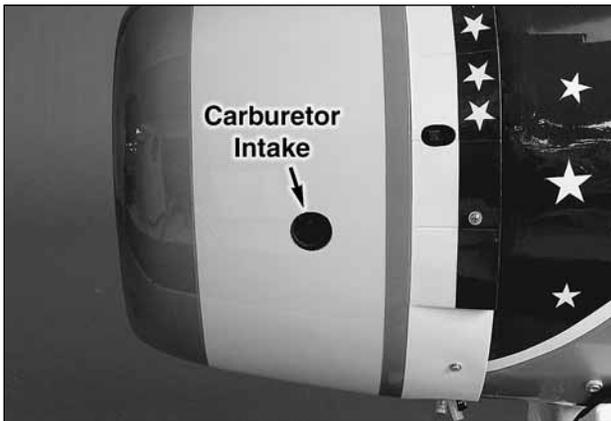
❑ 15. Install the ignition switch in the switch bracket. Connect the switch to the ignition battery and the ignition module. Use heat shrink to help secure the connections. As with the ignition wires, pieces of rubberbands can be glued to the firewall box, over the ignition switch wires to hold them in position.



- ❑ 16. Use a piece of stiff card stock or a file folder taped to the side of the fuselage to mark the location of the ignition switch.

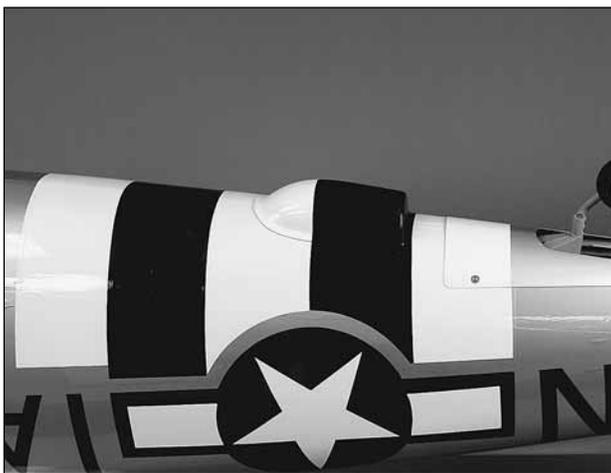


- ❑ 17. With the card stock still taped to the fuselage, re-install the cowl. Make the switch location, remove the cowl and cut the opening for the ignition switch in the side of the cowl using a high speed rotary tool with a carbide cutting bit. Start with a small hole and slowly enlarge the hole, while test fitting the cowl on the fuselage.



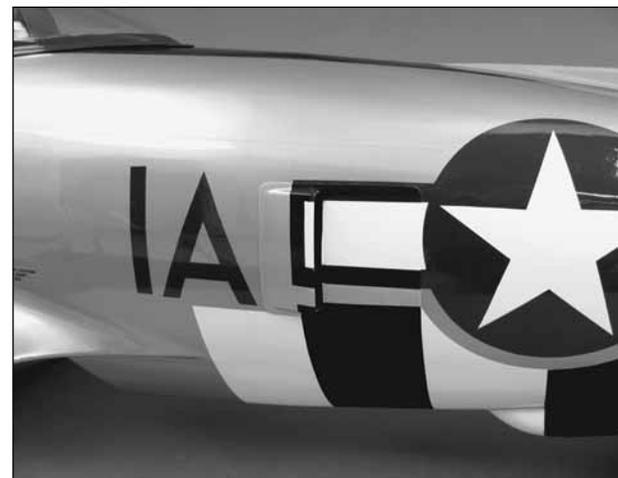
- ❑ 18. Follow the same procedure for the muffler, cooling air exit and the carburetor air intake if the Fuji-Imvac BT-43EI-2 has been installed. Remove the cowl before cutting the holes to prevent fiberglass dust from entering the carburetor. Route the fuel/defuel and vent fuel lines out the cooling air exit in the bottom of the cowl. Install the aluminum fuel line plug in the fuel/defueling line.

### ***APPLY THE FINAL DETAILS***



- ❑ 1. Position the turbocharger exhaust fairing as shown. Mark on the fuselage the outline of the fairing. Inside the outline use a T-pin to prick small holes in

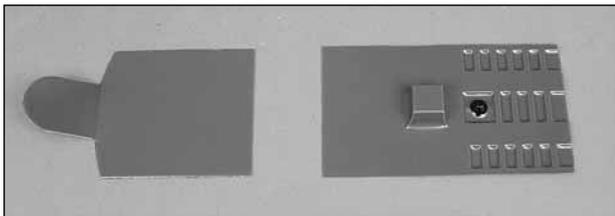
the covering, or trim and remove the covering from inside the outline. This will help the glue hold the fairing on. Glue the turbocharger exhaust fairing on the fuselage with canopy glue or medium CA.



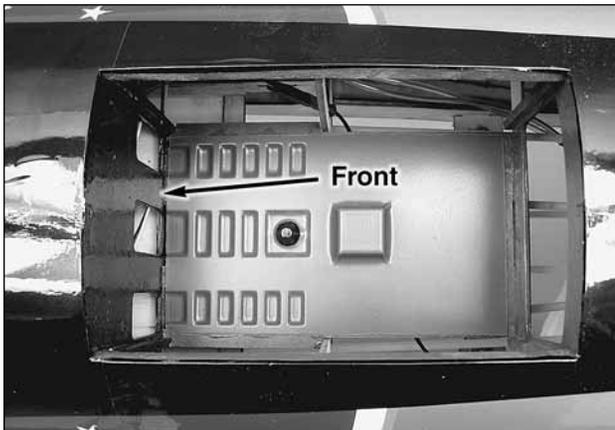
- ❑ 2. Glue the two innercooler exhaust doors in the two cutouts in the aft end of the fuselage.



- ❑ 3. Glue the two oil cooler louvers to the forward lower fuselage following the same procedure used to install the turbocharger exhaust fairing.



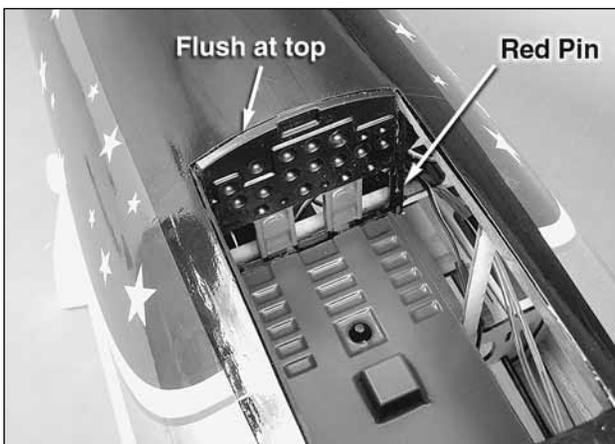
the red round headed pins in the lower right corner of the instrument panel to represent a knob. Glue the instrument panel in the front of the cockpit so that the top of the instrument panel is flush with the top of the fuselage. Canopy glue or thick CA works well for attaching the instrument panel.



❑ 4. Trim the armor plate and the cockpit floor along the edge so that they lay flat. Use medium CA to glue the floor in the bottom of the cockpit. The floor should be positioned as far forward as possible.



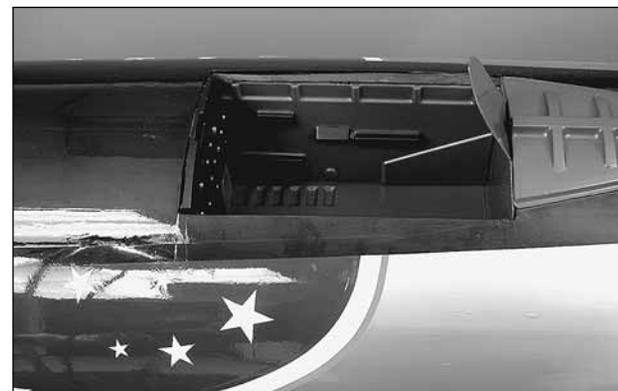
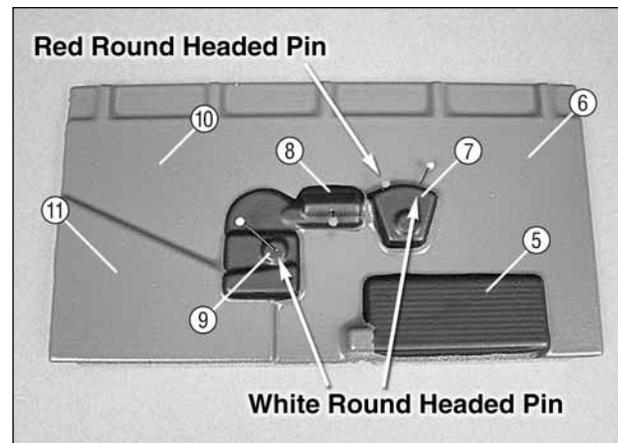
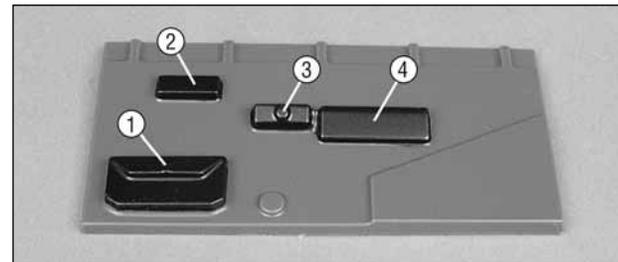
❑ 6. Trim and glue the canopy track to the top of the fuselage. Note that the front of the canopy track overhangs into the cockpit.



❑ 5. Trim the plastic from around the rudder pedals on the bottom of the instrument panel. Insert one of



❑ 7. Glue the armor plate to the back of the cockpit.



❑ 8. Trim the sides of the cockpit leaving approximately 1/16" [1.6mm] lip around the edges. The ends will need to be trimmed to fit between the instrument panel and the armor plate. Apply the decals to the numbered locations on the side cockpit panels. Install the white and red round head pins and decals as shown. The top edge of the cockpit sides should fit under the stringer at the top of the cockpit.



- ❑ 9. Drill a 1/8" [3.2mm] hole through the center of the control stick boot. Trim the seat along the cutout lines and glue it to the pedestal on the cockpit floor. Now glue the control stick in the previously drilled hole using the height of the seat as a guide.

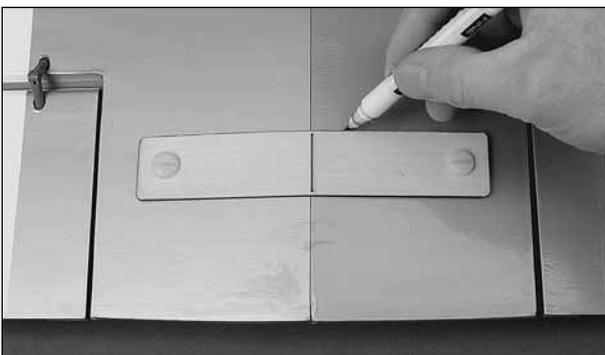


- ❑ 10. Now is the time to install a pilot before gluing the canopy on. Wash the canopy in warm water, and then, dry it off. Place the canopy on the fuselage. Be certain it is centered from side-to-side and mark the outline on the fuselage. As before, prick holes in the covering or trim and remove the covering, just inside the outline. Use canopy glue to attach the canopy on the fuselage.



The "bubble canopy" version was a result of pilots' complaints of lack of rearward visibility. In 1943 a P-47D-5 was modified by removing the razor spine and fitting a modified Hawker Tempest bubble canopy. In addition to the new canopy was a flat, armored windscreen. The first production version of the bubble canopy was designated P-47D-25-RE (produced in Farmingdale), of which 385 were built.

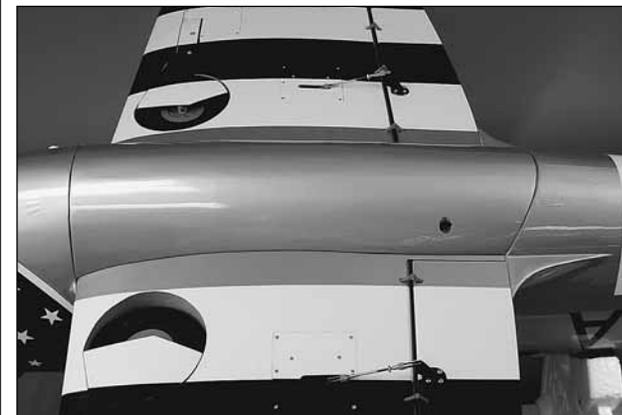
## FINISH THE WING



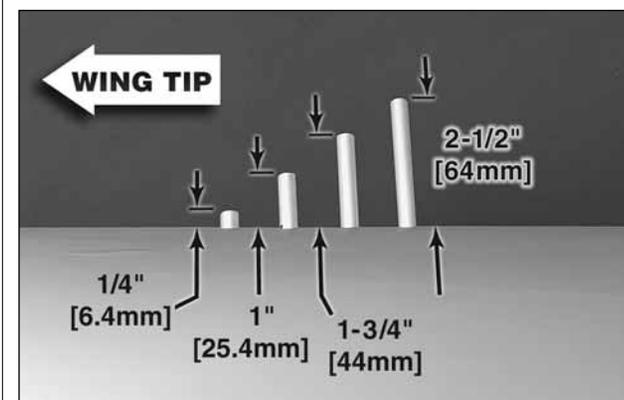
- ❑ 1. Place the wing bolt plate on the bottom of the wing and insert the 1/4-20 x 2" [51mm] nylon wing bolts through the wing bolt plate and the wing. Mark the outline of the wing bolt plate onto the bottom of the wing.
- ❑ 2. Carefully cut the covering with a sharp hobby knife, using the outline as a guide. Be careful not to cut into the balsa. Peel the covering from the wing. Glue the wing bolt plate to the wing with 6-minute epoxy, using the wing bolts and masking tape to hold it down.
- ❑ 3. Mount the wing on the fuselage. Position the belly pan on the wing so that it is evenly spaced between the fuselage. Mark the outline of the belly

pan on the bottom of the wing. Cut and remove a 1/2" [12.7mm] wide strip of covering, 1/32" [0.8mm] from inside the outline.

- ❑ 4. Remove the wing and place waxed paper between the wing and the fuselage at the leading and trailing edge. This will prevent the wing from becoming glued to the fuselage if the epoxy should run out of the joint. Reinstall the wing.



- ❑ 5. Glue the belly pan to the wing using 30-minute epoxy. Make sure that the belly pan is tight against the bottom of the wing and centered between the fuselage. Wipe off any excess epoxy before it cures.



- ❑ 6. Clean the aluminum tubes with denatured alcohol and glue the gun barrels in the wing with

6-minute epoxy. Note the distance from the leading edge of the wing to the end of each gun barrel.



The “belly pan” under the wing conceals the air ducting for the supercharger. One duct carries air from the intake in the front of the cowl back to the supercharger (driven by the turbine) and two smaller ducts carry exhaust gasses from the engine to the turbine.

## APPLY THE DECALS

1. Use scissors or a sharp hobby knife to cut the decals from the sheet. Where possible, round the corners so they won't catch and lift while cleaning and handling the model.
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 1/2 teaspoon [2.5cc] of soap per gallon of water. Submerge one of the decals in the solution 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 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 remaining water from under the decal. Apply the rest of the decals the same way.

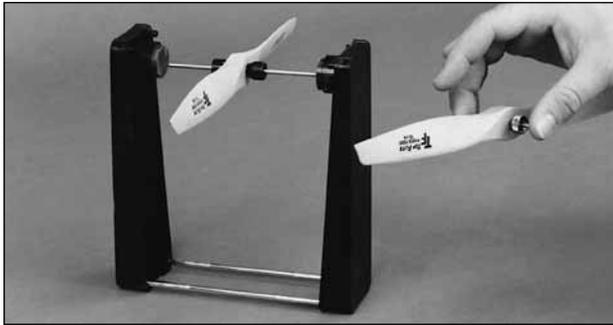
Please use the following pictures as a guide for decal placement.



One problem that occurred with the removal of the razor spine to accommodate the bubble canopy was tail flutter. Beginning with the D-40, a dorsal fin was added to rectify this. The dorsal fin was also retrofitted to all previous variants still flying.

## GET THE MODEL READY TO FLY

### INSTALL THE PROPELLER



❑ 1. Carefully balance the propeller and any spare propellers. An unbalanced propeller can be the single most significant cause of vibration that can damage the model. Not only will engine mounting bolts loosen, possibly with disastrous effect, but vibration may also damage the receiver and receiver batteries. Vibration can also cause the fuel to foam, which will, in turn, cause the engine to run hot and quit.

We use a Top Flite Precision Magnetic Prop Balancer (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.



❑ 2. The included aluminum prop hub was designed to be used with the DA-50 or the Fuji-Imvac BT-43E1-2 gas engines. Bolt the include prop hub in front of the propeller in place of the prop washer.



❑ 3. Install the prop hub cone on the engine using a M5 x 50mm socket head cap screw. Use a drop of threadlocker on the threads.

### 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.

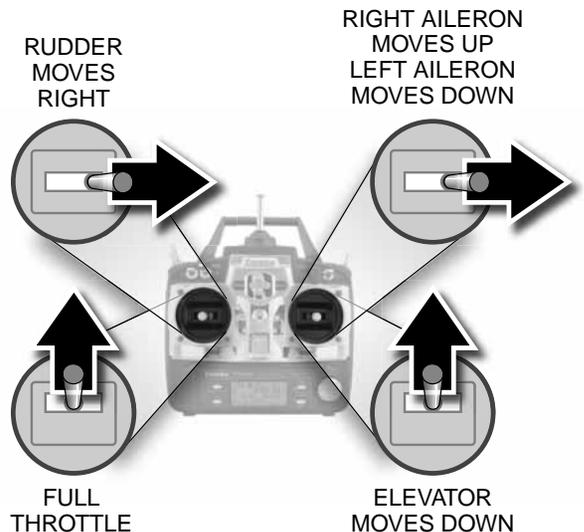
❑ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

### CHECK THE CONTROL DIRECTIONS

❑ 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 screws that hold on the servo arms.

❑ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces.

### 4-CHANNEL RADIO SETUP (STANDARD MODE 2)



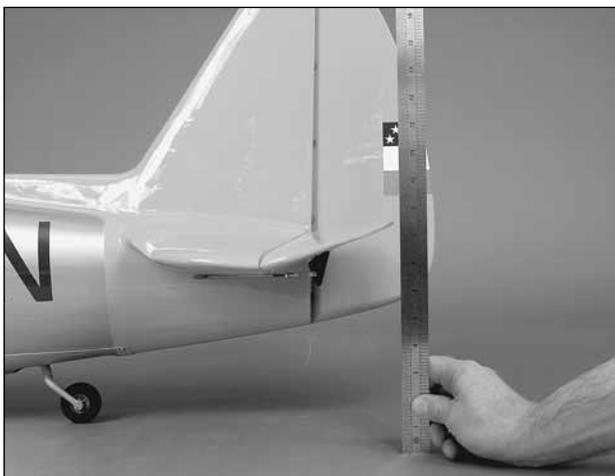
❑ 3. Make certain that the control surfaces and the carburetor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces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

### SET THE CONTROL THROWS

To ensure a successful first flight, set up your Giant P-47D ARF according to the control throws specified in this manual. The throws have been determined through actual flight testing and accurate record-keeping, allowing the model to perform in the manner in which it was intended. If, after you have become accustomed to the way the Giant P-47D 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 too responsive and difficult to control, so remember, "more is not always better."



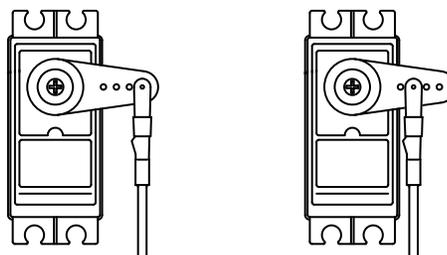
❑ 1. Use a box or something similar to prop up the bottom of the fuselage so the horizontal stabilizer and wing will be level. Hold a ruler vertically on your workbench against the widest part (front to back) of the trailing edge of the elevator. Note the measurement on the ruler.



❑ 2. Measure the high rate elevator throw first. Move the elevator up with your transmitter and move the ruler forward so it will remain contacting the trailing edge. The distance the elevator moves up from center is the "up" elevator throw. Measure the down elevator throw the same way.

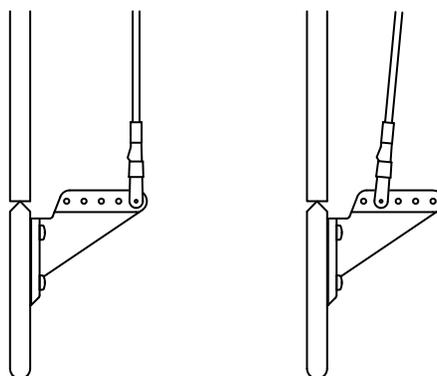
### At the Servos

The pushrod farther out means **More Throw**      The pushrod closer in means **Less Throw**



### At the Control Surfaces

The pushrod farther out means **Less Throw**      The pushrod closer in means **More Throw**



❑ 3. If necessary, adjust the location of the pushrod on the servo arm or on the elevator horn, or program the ATVs in your transmitter to increase or decrease the throw according to the measurements in the control throws chart.

❑ 4. Measure and set the **low rate** elevator throws and the high and low rate throws for the rest of the control surfaces the same way.

If your radio does not have dual rates, we recommend setting the throws at the high rate settings.

**NOTE:** The throws are measured at the **widest part** of the elevators, rudder and ailerons.

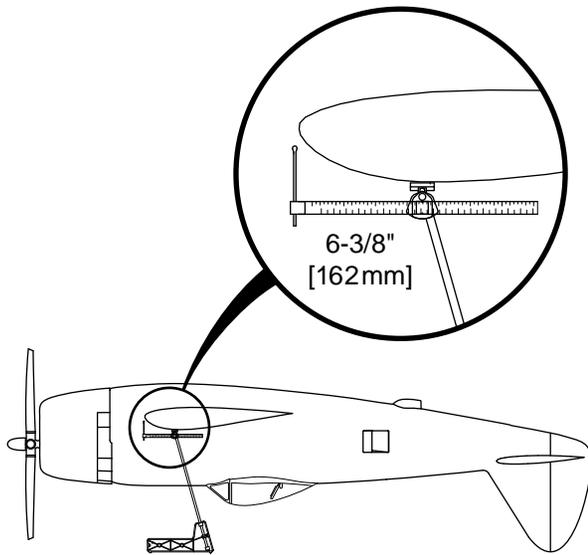
These are the recommended control surface throws:				
	<b>HIGH RATE</b>		<b>LOW RATE</b>	
<b>ELEVATOR</b>	<b>Up</b>	<b>Down</b>	<b>Up</b>	<b>Down</b>
	3/4" [19.1mm]	3/4" [19.1mm]	1/2" [12.7mm]	1/2" [12.7mm]
	12°	12°	8°	8°
<b>RUDDER</b>	<b>Right</b>	<b>Left</b>	<b>Right</b>	<b>Left</b>
	1-7/8" [47mm]	1-7/8" [47mm]	1-3/8" [35mm]	1-3/8" [35mm]
	22°	22°	16°	16°
<b>AILERONS</b>	<b>Up</b>	<b>Down</b>	<b>Up</b>	<b>Down</b>
	3/4" [19.1mm]	3/4" [19.1mm]	1/2" [12.7mm]	1/2" [12.7mm]
	15°	15°	10°	10°
<b>FLAPS</b>	<b>Down</b>			
	2-3/8" [60mm]		34°	

Once the throws are set, apply a drop of threadlocker to the threads on the pushrod and tighten the nuts against the clevises.

### BALANCE THE MODEL (C.G.)

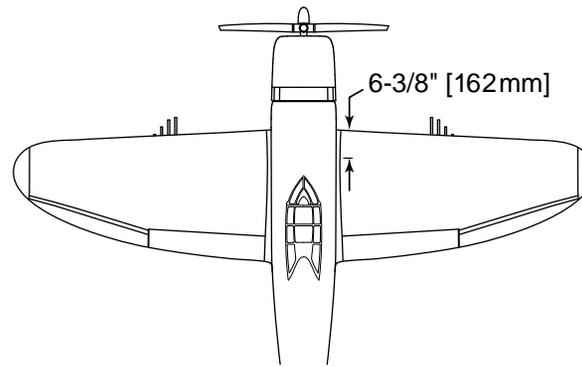
More than any other factor, the C.G. (center of gravity/balance point) can have the greatest effect on how a model flies and could determine whether or not your first flight will be successful. If you value your model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.**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

At this stage the model should be in ready-to-fly condition with **all** of the components in place including the complete radio system, engine, muffler, propeller, spinner and pilot. The fuel tank should be empty.



❑ 1. If using a Great Planes C.G. Machine, set the rulers to 6-3/8" [162mm]. If not using a C.G. Machine, use a fine-point felt tip pen to mark lines on the top of the wing on both sides of the fuselage 6-3/8" [162mm] back from the leading edge. Apply narrow (1/16" [2mm]) strips of tape over the lines so you will be able to feel them when lifting the model with your fingers.

This is where your model should balance for the first flights. Later, you may experiment by shifting the C.G. 1/4" [6.4mm] forward or 1/4" [6.4mm] back to change the flying characteristics. Moving the C.G. forward will improve the smoothness and stability, but the model will then be less aerobatic (which may be fine for less-experienced pilots). Moving the C.G. aft makes the model more maneuverable and aerobatic for experienced pilots. 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) and an empty fuel tank, 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." If the nose drops, the model is "nose heavy." For a tail heavy model the receiver battery pack can be moved aft. For a nose heavy model use Great Planes "stick-on" lead (GPMQ4485). To find out how much weight is required, place incrementally increasing amounts of weight on the bottom of the fuselage over the location where it would be mounted inside until the model balances. A good place to add stick-on nose weight is to the firewall. Do not attach weight to the cowl—this will cause the mounting screws to open up the holes in the cowl. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuse and gluing it permanently inside.

If mounting weight where it may be exposed to fuel or exhaust, do not rely upon the adhesive on the back to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Instead, permanently attach the weight with glue or screws.

**Note:** It is highly recommended that with gas powered planes the ignition system and all its components be separated from the radio system components by

at least 10" [254mm] to prevent ignition noise from interfering with the radio system. If the plane is nose heavy, do not move the receiver battery forward closer to the ignition system. If the plane is tail heavy, do not move the ignition battery aft closer to the receiver.

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

## CHECK LIST

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 check list 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 (that's why it's called a *check list!*).

- ❑ 1. Fuelproof all areas exposed to fuel or exhaust residue such as the cowl ring, wing saddle area, etc.
- ❑ 2. Check the C.G. according to the measurements provided in the manual.
- ❑ 3. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- ❑ 4. 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.
- ❑ 5. Balance your model *laterally* as explained in the instructions.
- ❑ 6. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), engine bolts, etc.
- ❑ 7. Add a drop of oil to the axles so the wheels will turn freely.
- ❑ 8. Make sure all hinges are **securely** glued in place.

- 9. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).
- 10. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- 11. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.
- 12. 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.
- 13. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- 14. Make sure the fuel lines are connected and are not kinked.
- 15. Balance your propeller (and spare propellers).
- 16. Tighten the propeller nut and cone.
- 17. Place your name, address, AMA number and telephone number on or inside your model.
- 18. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- 19. If you wish to photograph your model, do so before your first flight.
- 20. Range check your radio when you get to the flying field.



The final variant of the P-47 was the P-47N-25 rolling off the Republic Farmingdale production line in 1945. The "N" featured squared-off clipped wing tips and an increased wingspan to accommodate four additional 50-gallon internal wing tanks. The goal of increasing range to fulfill the roll of bomber escort (and to become more competitive with the P-51 Mustang) was accomplished.

## 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 page 36 and place it on or inside 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 and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

**CAUTION:** Unless the instructions that came with your radio system state differently, the **initial** charge on **new** transmitter and receiver batteries should be done for 15 hours **using the slow-charger that came with the radio system**. This will "condition" the batteries so that the next charge may be done using the fast-charger of your choice. If the initial charge is done with a fast-charger the batteries may not reach their full capacity and you may be flying with batteries that are only partially charged.

### GROUND CHECK AND RANGE CHECK

Run the engine for a few minutes to make sure it idles reliably, transitions smoothly and maintains full power indefinitely. Afterward, shut the engine off and inspect the model closely, making sure all fasteners, pushrods and connections have remained tight and the hinges are secure. Always ground check the operational range of your radio before the first flight of the day following the manufacturer's instructions that came with your radio. This should be done once with the engine off and once with the engine running at various speeds. 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.

## ENGINE SAFETY PRECAUTIONS

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

Keep all engine fuel in a safe place, away from high heat, sparks or flames, as fuel is very flammable. Do not smoke near the engine or fuel; and remember that engine exhaust gives off a great deal of deadly carbon monoxide. Therefore **do not run the engine in a closed room or garage**.

Get help from an experienced pilot when learning to operate engines.

Use safety glasses when starting or running engines.

Do not run the engine in an area of loose gravel or sand; the propeller 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 propeller as you start and run the engine.

Keep these items away from the prop: 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 prop.

Use a "chicken stick" or electric starter to start the engine. Do not use your fingers to flip the propeller.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch it during or right after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine, causing a fire.

To stop a gasoline powered engine an on/off switch should be connected to the engine ignition. Do not throw anything into the propeller of a running engine.

### AMA SAFETY CODE (excerpts)

Read and abide by the following excerpts from the Academy of Model Aeronautics Safety Code. For the complete Safety Code refer to *Model Aviation* magazine, the AMA web site or the Code that came with your AMA license.

## 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 and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized 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.

5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: This does not apply to models while being flown indoors.

7) 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) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in the front of the flight line. Intentional flying behind the flight line is prohibited.

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

5) **I will not knowingly operate my model within three miles of any pre-existing flying site except in accordance with the frequency sharing agreement listed [in the complete AMA Safety Code].**

9) Under no circumstances may a pilot or other person touch a powered model in flight; **nor should any part of the model other than the landing gear, intentionally touch the ground, except while landing.**

Since the Giant P-47D ARF qualifies as a "giant scale" model and is therefore eligible to fly in IMAA events, we've printed excerpts from the IMAA Safety Code which follows.

## IMAA SAFETY CODE (excerpts)

### Definition:

For the purpose of the following IMAA Safety Code, the term Giant Scale shall refer to radio controlled model aircraft, either scale or non-scale, which have a wingspan of 80 inches [2032mm] or more for monoplanes and 60 inches [1524mm] or more for multi-winged model aircraft and have a ramp weight (fueled and ready to fly) of 55lbs. [24.75kg.] or less.

### Section 1.0: SAFETY STANDARD

1.1 Adherence to Code: This safety code is to be strictly followed.

1.2 The most current AMA Safety Code in effect is to be observed. However, the competition sections of the code may be disregarded.

### Section 3.0 Safety Check

3.4 Flight Testing: All Giant Scale R/C aircraft are to have been flight tested and flight trimmed with a minimum of six flights before the model is allowed to fly at an IMAA Sanctioned event.

3.5 Proof of Flight: The completing and signing of the Declaration section of the Safety Inspection form by the pilot (or owner) shall document as fact that each aircraft has been successfully flight-tested and proven airworthy prior to an IMAA event.

### Section 5.0: Emergency Engine Shut Off (kill switch)

5.1 All magneto spark ignition engines must have a coil grounding switch on the aircraft to stop the engine. This will also prevent accidental starting of the engine. This switch shall be readily available to both pilot and helper. This switch is to be operated manually and without the use of the radio system.

5.2 Engine with battery power ignition systems must have a switch to turn off the power from the battery pack to disable the engine from firing. This will also prevent accidental starting of the engine. This switch shall be readily available to both pilot and helper. This switch shall be operated manually and without the use of the radio system.

5.3 There must also be a means to stop the engine from the transmitter. The most common method is to close the carburetor throat completely using throttle trim. However, other methods are acceptable. This requirement applies to all glow/gas ignition engines regardless of size.

### Section 6.0: RADIO REQUIREMENTS

6.1 All transmitters must be FCC type certified.

6.2 FCC Technician or high-class license required for 6 meter band operation only.

### Additional IMAA General Recommendations

The following recommendations are included in the Safety Code not to police such items, but rather to offer basic suggestions for enhanced safety.

Servos need to be of a rating capable to handle the loads that the control surfaces impose upon the servos. Standard servos are not recommended for control surfaces. Servos should be rated heavy-duty. For flight-critical control functions a minimum of 45 inch/ounces of torque should be considered. This should be considered a minimum for smaller aircraft and higher torque servos are strongly encouraged for larger aircraft. The use of one servo for each aileron and one for each elevator half is strongly recommended. Use of dual servos is also recommended for larger aircraft.

On-board batteries shall be 1000 mAh up to 20 lbs., 1200 mAh to 30 lbs., 1800 mAh to 40 lbs. and 2000 mAh over 40 lbs. flying weight. The number and size of the servos, size and loads on control surfaces, and added features should be considered as an increase to these minimums. Batteries should be able to sustain power to the onboard radio components for a minimum of one hour total flying time before recharging.

Both redundant and fail-safe battery systems are recommended.

There is no minimum engine displacement limit, as it is the position of this body that an underpowered

aircraft presents a greater danger than an overpowered aircraft. However, the selection of engine size relative to airframe strength and power loading mandates good discretionary judgment by the designer and builder. Current AMA maximums for engine displacement are 6.0 cu. in. for two-stroke and 9.6 cu. in. for four-stroke engine. These maximums apply only to AMA Sanctions concerning competition events (such as 511, 512, 515 and 520) and, as such, the maximums apply. All IMAA (non competition) events should be sanctioned as Class "C" events, in which these engine size maximums do not apply.

Generally, it is recommended that no attempt should be made to fly a radio controlled model aircraft with a gasoline engine in which the model aircraft weight would exceed twelve (12) pounds (underpowered) per cubic inch of engine displacement, or be less than five (5) pounds (overpowered) per cubic inch of engine displacement. Example: Using a 3 cu. in. engine, a model would likely be underpowered at an aircraft weight greater than 36 pounds. With the same engine, an aircraft weighing less than 15 pounds would likely be overpowered.

Servo arms and wheels should be rated heavy duty. Glass-filled servo arms and control horns are highly recommended.

Control surfaces linkages are listed in order of preference:

1. Cable system (pull-pull). A tiller bar is highly recommended along with necessary bracing.
2. Arrow Shaft, fiberglass or aluminum, 1/4" or 5/16" [6 or 8mm] O.D. bracing every six (6) to ten (10) inches is highly recommended.
3. Tube-in-tube (nyrod). Bracing every few inches is highly recommended. Inner tube should be totally enclosed in outer tube.
4. Hardwood dowel, 3/8" O.D. bracing every six (6) to ten (10) inches is highly recommended.

Hinges should be rated heavy duty and manufactured for Giant Scale use primarily. Homemade and original design hinges are acceptable if determined to be adequate for the intended use.

Clevis (steel, excluding heavy duty ball links) and attachment hardware should be heavy duty 4-40 threaded rod type. 2-56 threaded size rod is acceptable

for some applications (e.g. throttle). Clevis is to have lock nuts and sleeve or spring keepers.

Propeller tips should be painted or colored in a visible and contrasting manner so as to increase the visibility of the propeller tip arc.

## FLYING

The Giant P-47D ARF is a great-flying model that flies smoothly and predictably. The Giant P-47D 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.

## FUEL MIXTURE ADJUSTMENTS

A fully cowled engine may run at a higher temperature than an un-cowled engine. For this reason, the fuel mixture should be richened so the engine runs at about 200 rpm below peak speed. By running the engine slightly rich, you will help prevent dead-stick landings caused by overheating.

### 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

If you are using the optional air retracts, remember to pump them up before each flight. 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. If you need to calm your nerves before the maiden flight, shut the engine down and bring the model back into the pits. Top off the fuel, then check all fasteners and control linkages for peace of mind.

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 to maintain tail wheel steering, 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 engine 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 engine 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 Giant P-47D 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 fuel, practice slow flight and execute practice landing approaches by reducing the throttle and lowering the flaps 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 fuel level, but use this first flight to become familiar with your model before landing.

## LANDING

One of the keys to landing a giant-scale model is to maintain sufficient airspeed throughout the landing approach. An unusually high airspeed is not necessary, but those unfamiliar with landing giant-scale models are sometimes deceived by the model's larger size. Larger models often appear to be closer than they actually are. Additionally, most giant-scale models slow down rapidly, thus causing the uninitiated to land short. To avoid this initial illusion, make your landing pattern closer than you normally might for a .40-size sport model. Also, don't pull the throttle all the way back and leave it there the way you normally would. Instead, momentarily pull the throttle all the way back, but then advance it a "click" or two to keep the engine RPM up and maintain airspeed. Once over the runway you can cut the throttle the rest of the way and the model will slow for the landing flare.

The Giant P-47D ARF may be landed with or without flaps. Flaps increase lift and drag, so the plane may be landed slower, thus reducing rollout after touchdown (not as much of a factor on grass runways). To initiate a landing approach, reduce the throttle while on the downwind leg. If using flaps, allow the model to slow before extending them. 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) keeping the nose down to maintain airspeed and control. If using flaps, keep a few additional "clicks" of power so the model doesn't slow too much. 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 retract the flaps when enough airspeed is gained. Climb out to make another attempt. When 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, regaining tail wheel control.

**Note:** If ever the occasion arises when a dead-stick landing must be performed, do not extend the flaps until **certain** the model will be able to reach the landing zone

(on dead-stick landings it is common to land with no flaps at all). Without engine power, flaps can unexpectedly reduce the model's range, thus causing you to come up short of the field.

One final note about flying your Giant P-47D ARF. 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				

## GEAR DOOR DRILL GUIDE

