NOBLER ARF

Wingspan: 50.5 in [1,285mm]
Wing Area: 500 sq in [32.2 dm²]
Weight: 42 – 50 oz [1,190 – 1,420g]
Wing Loading: 12 – 14 oz/sq ft [37 – 43 g/dm²]
Length: 38.5 in [980mm] (tip of rudder to tip of spinner)
Engine: .35 – .46 cu in [5.5 – 7.5cc] 2-stroke glow

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.**

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

READ THROUGH THIS INSTRUCTION BOOK FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

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INTRODUCTION

Congratulations and thank you for purchasing the Top Flite Control Line Nobler ARF. Originally designed and flown by the legendary George Aldrich in the 1950's, the Nobler is now recognized as one of the most popular and successful control line stunt models of all time. While studying the Nobler's history, it was revealed just how much of a control line legend the late Mr. Aldrich is. Much of the fun, success and satisfaction control line pilots enjoy today can be directly attributed to Mr. Aldrich and his Nobler. And now, Top Flite merges the past with the present by bringing this old-time favorite back to life–only in ARF form. Reincarnated from original Top Flite plans, the Nobler ARF is a perfect way to get into beginner stunt flying without the initial time and money commitment required for today's kit-built stunters. And if you plan to just dabble in control line, the Nobler ARF has the perfect blend of maneuverability and stability to get you into the air with minimal assistance from an experienced flyer.

Note: The Top Flite Nobler ARF pictured on the kit box cover features a Great Planes 1-3/4" [45mm] aluminum spinner (not included). However, serious stunt pilots who wish to reduce the model's overall weight should use a lightweight plastic spinner, thus reducing the amount of tail-weight that would be required to offset an aluminum spinner.

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

1. Your Top Flite Nobler ARF should not be considered a toy, but rather a working model that functions like a full-size airplane. Because of its performance capabilities, the Nobler 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 lines that are in first-class condition, and a correctly sized engine and components throughout the building process.

5. You must correctly install all pushrods and other components so that the model operates correctly on the ground and in the air.

6. You must check the operation of the model before **every** flight to insure that all equipment is operating and that the model has remained structurally sound.

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

8. 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, the modeler is responsible for taking steps to reinforce the high stress points.

9. **WARNING:** The cowl included in this kit is made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into any fiberglass 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 any fiberglass part and thoroughly vacuum the part and work area afterward.

Note: 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.

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

In addition to joining a control line club, we strongly recommend you join the AMA (Academy of Model Aeronautics). AMA membership is required to fly at AMA sanctioned clubs. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the following address or toll-free phone number:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252
Tele. (800) 435-9262
Fax (765) 741-0057
Or via the Internet at: http://www.modelaircraft.org

ENGINE & LINE RECOMMENDATIONS

A .35-.46 cu in [5.5-7.5cc] two-stroke glow engine is recommended for the Top Flite Nobler ARF. Our test models performed superbly with the O.S.® MAX .40 LA-S and a Top Flite 11 x 4 Power Point® wood prop. This combination provided good line-tension and lap times on 60' lines. A .46 engine could be used as well, but expect faster speeds with this setup. For most engines, .015" [.38mm] multi-strand lines are recommended, but .018" [.46mm] multi-strand lines are recommended if flying with a .46 engine.

#132 U156 .015" x 60' [.38mm x 18m] lines (SULP2632)
#135 U186 .018" x 60' [.46mm x 18m] lines (SULP2635)
#136 U187 .018" x 70' [.46 x 21.3m] lines (SULP2639)

#166 IJ1 Standard handle (SULP2866)
#148 80 lb. [36kg] test line connectors (SULP2948–pkg. of 2)

ADDITIONAL ITEMS REQUIRED

Hardware & Accessories

In addition to the engine, lines, handle and connectors previously listed, following is the list of hardware and accessories required to finish the Top Flite Control Line Nobler ARF. Order numbers are provided in parentheses.

- ❏ 3' [900mm] Standard silicone fuel tubing (GPMQ4131)
- ❏ Aluminum fuel line plug (GPMQ4166)
- ❏ 1-3/4" [45mm] White spinner (GPMQ4505)

-or-

- ❏ 1-3/4" [45mm] Aluminum spinner (GPMQ4551) and appropriate adapter (GPMQ4581 for O.S. MAX LA and other engines with 1/4-28 crankshaft thread)
- ❏ 1/4" [6mm] White striping tape (GPMQ1610)
- ❏ 1/16" [2mm] White striping tape (GPMQ1580)

Adhesives & Building Supplies

In addition to common hobby tools and household tools, this is the "short list" of the most important items required to build the Top Flite Nobler ARF. ***Great Planes® Pro™*** *CA and Epoxy glue are recommended.*

- ❏ 1/2 oz. [15g] Thin Pro CA (GPMR6001)
- ❏ Pro 30-minute epoxy (GPMR6047)
- ❏ Threadlocker™ thread-locking cement (GPMR6060)
- ❏ Silver solder w/flux (GPMR8070)
- ❏ RTV silicone (for mounting fuel tank)
- ❏ #1 Hobby knife (HCAR0105)
- ❏ #11 blades (5-pack HCAR0211, or 100-pack HCAR0311)
- ❏ Drill bits: 1/16" [1.6mm], 3/32" [2.4mm], 1/8" [3.2mm], 9/64" [3.6mm]
- ❏ 1/8" [3.2mm] K&S brass tube or 1/8" [3.2mm] drill
- ❏ Small metal file
- ❏ Rotary tool such as Dremel® with cutting/grinding assortment (for cutting holes in fiberglass cowl)
- ❏ Stick-on segmented lead weights (GPMQ4485)
- ❏ Top Flite Panel Line Pen (TOPQ2510)
- ❏ Sandpaper assortment

Optional Supplies & Tools

These are some of the items used while building the Nobler that are not absolutely necessary, but are mentioned in the manual.

- ❏ 2 oz. [57g] Spray CA activator (GPMR6035)
- ❏ 4 oz. [113g] Aerosol CA activator (GPMR634)
- ❏ CA applicator tips (HCAR3780)
- ❏ CA debonder (GPMR6039)
- ❏ Epoxy brushes (6, GPMR8060)
- ❏ Mixing sticks (50, GPMR8055)
- ❏ Mixing cups (GPMR8056)
- ❏ Builder's Triangle Set (HCAR0480)
- ❏ Curved-tip canopy scissors for trimming plastic parts (HCAR0667)
- ❏ Milled fiberglass (GPMR6165)
- ❏ Denatured alcohol (for epoxy clean up)
- ❏ K & S #801 Kevlar® thread (for stab alignment, K+SR4575)
- ❏ Hobby Heat™ micro torch (HCAR0750)
- ❏ Dead Center™ Engine Mount Hole Locator (GPMR8130)
- ❏ CG Machine™ (GPMR2400)
- ❏ Precision Magnetic Prop Balancer™ (TOPQ5700)
- ❏ Prop Reamer (GPMQ5005)

Covering Tools

- ❏ 21st Century® (COVR2700) or Top Flite MonoKote® sealing iron (TOPR2100)
- ❏ 21st Century (COVR2702) or Top Flite Hot Sock™ iron cover (TOPR2175)

The Top Flite Control Line Nobler ARF is factory covered with Top Flite MonoKote Sapphire blue film (6' [1.8m] roll–TOPQ0226). 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.

Note: 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.top-flite.com*** and click on "Technical Data." Due to manufacturing tolerances which will have little or no effect on the way the model will fly, there may be 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 on page 5.

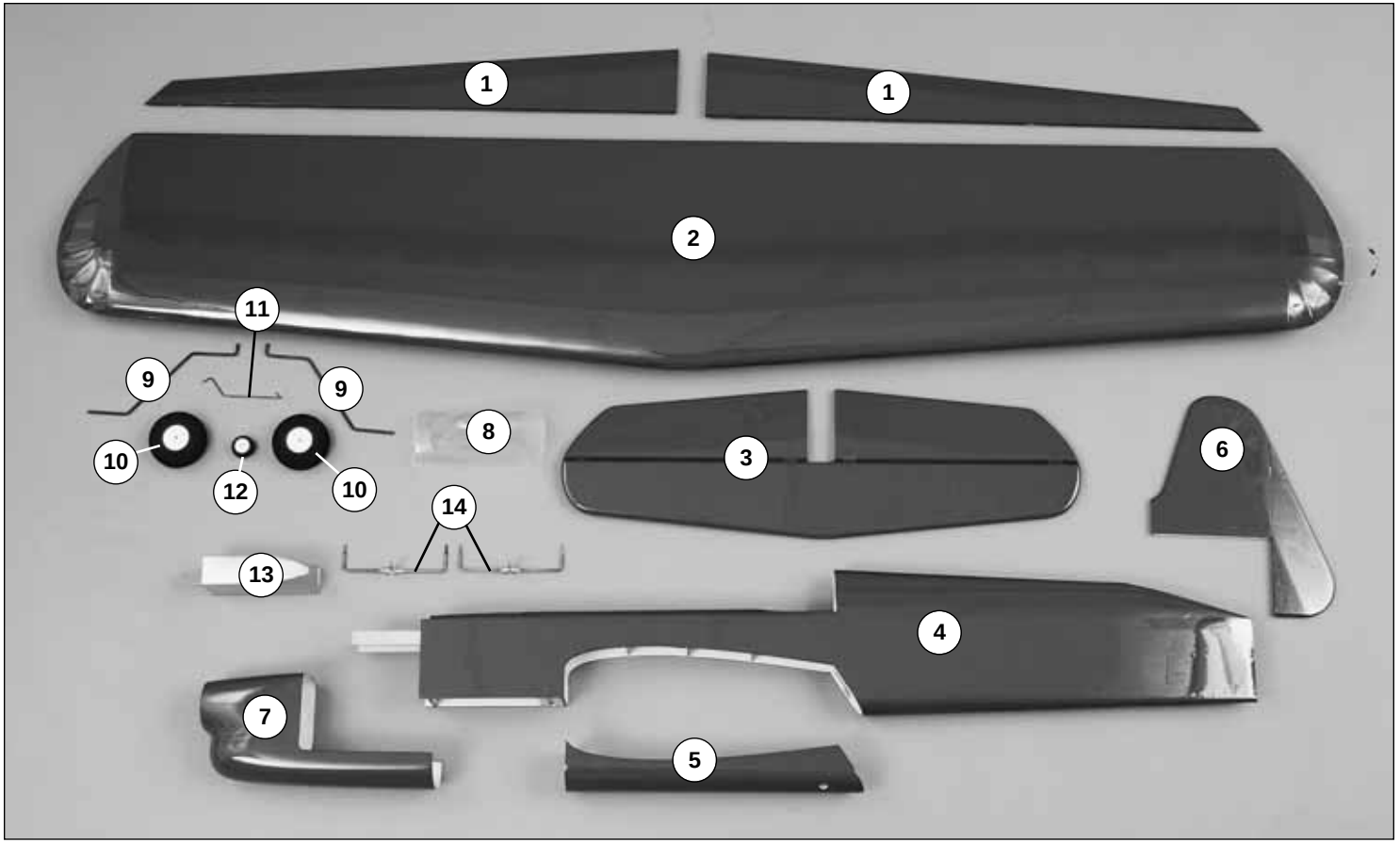
Great Planes Product Support
3002 N Apollo Drive Suite 1
Champaign, IL 61822
Telephone: (217) 398-8970
Fax: (217) 398-7721
E-mail: *airsupport@top-flite.com*

ORDERING REPLACEMENT PARTS

Top Flite offers replacement parts for all of its models. However, due to the nature of the Nobler ARF and the fact that it is essentially a "one-piece" model, fuselage and wing kits are not offered separately. The only replacement parts offered are the cowl (TOPA1300) and canopy (TOPA1301). Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. Hardware items (screws, nuts, bolts) are also available from these outlets. If you need assistance locating a dealer to purchase parts, visit **www.greatplanes.com** and click on "Where to Buy." If this kit is missing parts, contact **Product Support**.

Note: Full-size plans are not available for the Nobler ARF.

KIT CONTENTS



PARTS PHOTOGRAPHED

1. Flaps
2. Wing
3. Horizontal Stabilizer with Elevators
4. Fuselage
5. Belly Pan
6. Vertical Stabilizer (Fin) with Rudder
7. Fiberglass Cowl
8. Canopy
9. Main Landing Gear (2)
10. 2-1/2" [65mm] Main Wheels (2)
11. Tail Gear Wire
12. Tail Wheel
13. Fuel Tank
14. Joiner Wires (2)

PARTS NOT PHOTOGRAPHED

- (2) 4-40 x 17-1/2" [445mm] Pushrods
- (2) 4-40 Threaded Metal Clevises
- (1) Non-threaded Metal Clevis
- (2) 4-40 x 1-1/2" [38mm] Phillips Head Screws (wing mounting)
- (4) 4-40 x 1" [25mm] Socket Head Cap Screws (engine mounting)
- (6) 4-40 Blind Nuts (2-wing mounting, 4-engine mounting)
- (6) #4 Flat Washers (2-wing mounting, 4-engine mounting)
- (4) #4 Lock Washers (engine mounting)
- (2) 4-40 Nuts (for pushrods)
- (4) 1/8" [3mm] Wheel Collars (main wheels)
- (1) 3/32" [2mm] Wheel Collar (tail wheel)
- (5) 6-32 Set Screws (wheel collars)
- (4) #2 x 1/2" [13mm] Screws (landing gear straps)
- (6) #2 x 1/4" [6mm] Screws (cowl)
- (2) Nylon Straps (main landing gear)
- (14) Hinges
- (3) Silicone Clevis Retainers
- (1) Bellcrank w/leadouts (factory installed)
- (1) 1/4" x 1/2" x 5" [6 x 12 x 130mm] Balsa Stick (fuel tank mounting)
- (1) 1" x 1-1/2" [26 x 38mm] Plywood Wing Bolt Plate
- (1) Decal Sheet.

IMPORTANT BUILDING NOTES

- **There are two types of screws used in this kit:**

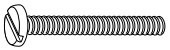
Sheet metal screws are designated by a number and a length.

For example #6 x 3/4" long [19mm]

This is a number six screw that is 3/4" [19mm] long.

Machine screws are designated by a number, **threads per inch**, and a length.

For example 4-40 x 3/4" long [19mm]



This is a number four screw that is 3/4" [19.1mm] long with forty threads per inch.

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

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

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

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

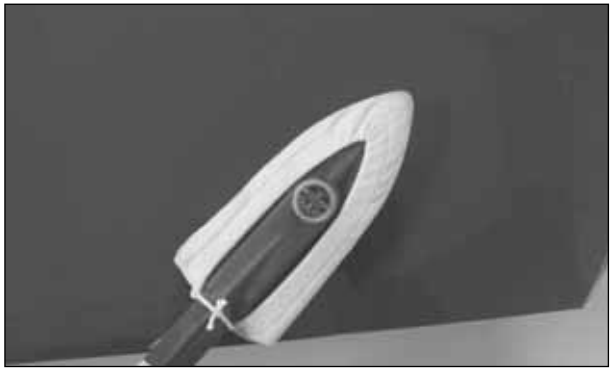
ASSEMBLE THE WING

Hinge the Flaps

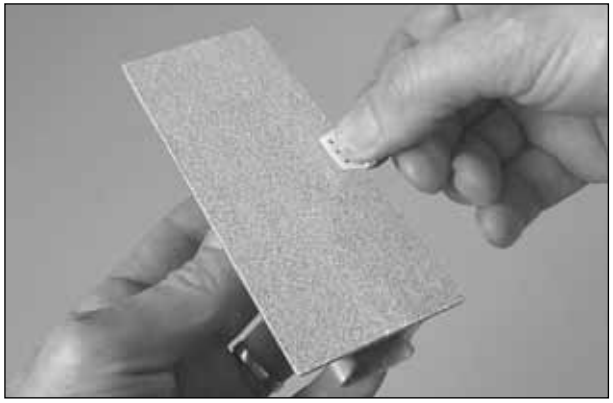
❑ 1. Mark the **flaps** as “right” and “left” before removing them from the wing (the **right** flap is about 3/4" [20mm] **shorter** than the left flap).

❑ 2. Separate the flaps from the wing by peeling off the tape. Any glue left from the tape can be removed with naphtha lighter fluid or denatured alcohol.

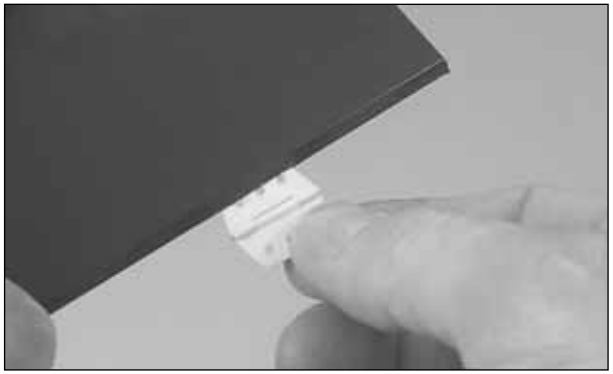
❑ 3. Cut and remove the covering from the top of the wing over the bellcrank opening and the pushrod exit. Also cut the covering from the opening in the bottom of the wing directly under the bellcrank screw.



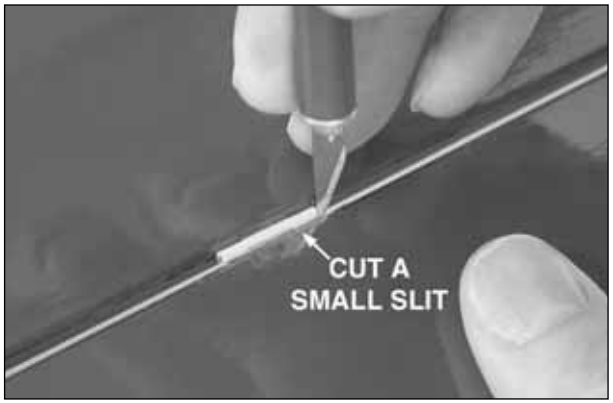
❑ 4. Use a covering iron with a covering sock to remove any wrinkles in the covering on the wing and flaps. The best way is to glide the iron over the covering until the wrinkles disappear, and then go over the area again pushing down to bond the covering to the wood. If the wrinkles don’t go away, the balsa in that area may be bending inward. If this is happening, do not press down on the iron in that area. 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.



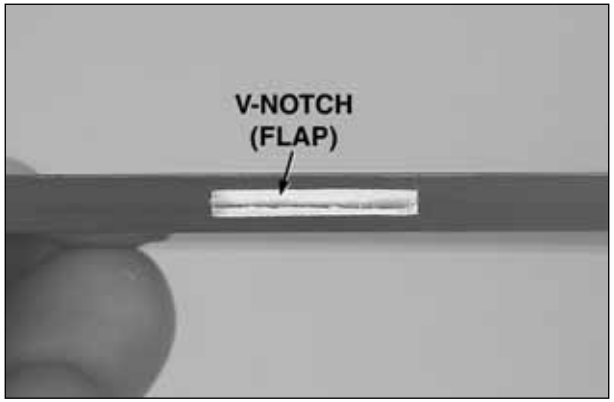
❑ 5. Using a bar sander or a sanding block with medium-grit sandpaper, remove any raised molding imperfections and roughen the gluing surface of all the hinges so glue will adhere.



❑ 6. Test fit the hinges in the hinge slots in the wing and flaps. If necessary, use a hobby knife or a small razor saw blade to enlarge any hinge slots that are too tight.

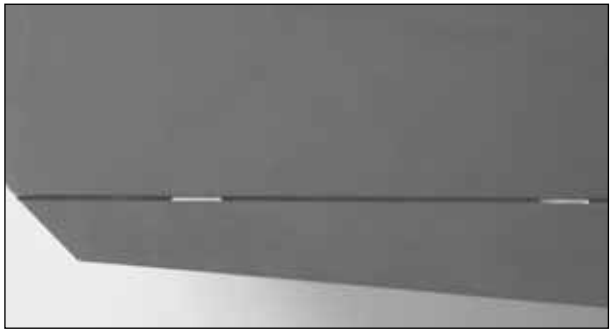


❑ 7. Without using any glue **temporarily** join both flaps to the wing with eight hinges. Use a #11 hobby blade to cut a small slit in the wing and flap on both sides of all the hinges. These slits will mark the ends of the hinge slots.



❑ 8. Remove the flaps from the wing and take out the hinges. Cut a small "V-notch" between the slits cut **in the flaps only** to accommodate the pin portion of the hinges. This will allow the flaps to fit close to the wing.

❑ 9. Cut a small strip of covering between the slits you cut over each hinge slot in the wing.



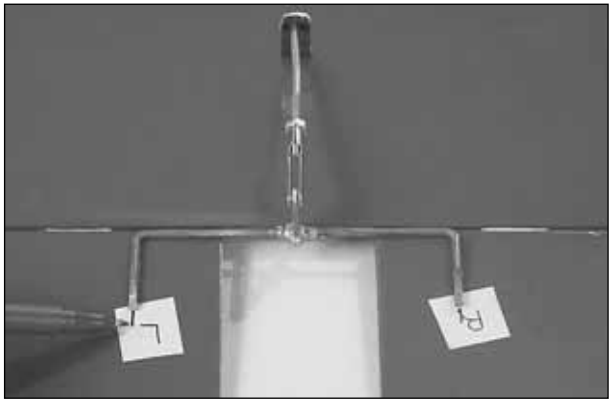
❑ 10. Without using any glue **temporarily** rejoin the flaps to the wing with the hinges. There should be little or no hinge gap and the flaps should move up and down freely. Make adjustments where necessary to close the hinge gaps.

Make the Flap Pushrod

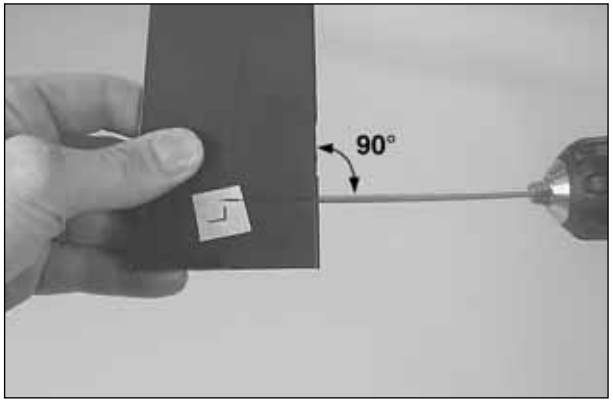
❑ 1. Bend and cut the **flap pushrod** as shown in the full-size drawing on the back cover page from a 4-40 x 17-1/2" [445mm] threaded one-end pushrod. Thread a 4-40 nut followed by a clevis onto the pushrod.

❑ 2. Use a 7mm socket wrench or needle nose pliers to loosen, but do not remove, the 4mm nut on the top of the wing that secures the bellcrank. Guide the flap pushrod through the exit slot in the top of the wing. Then lift the bellcrank and fit the pushrod up through the **middle** hole. Tighten the nut. Make sure the pushrod and bellcrank operate freely.

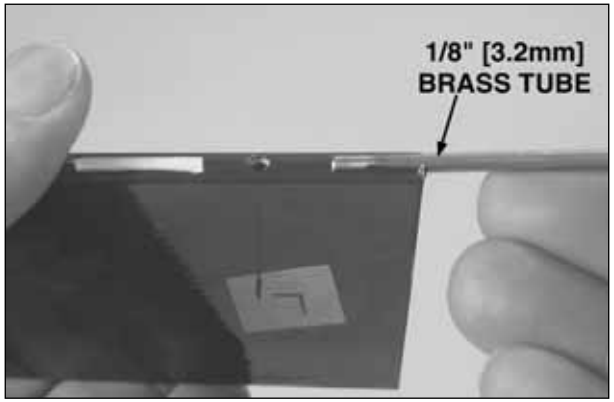
❏ 3. Test fit one of the metal clevises in the holes in both **control horns** on both **joiner wires**. If the clevis pins don't go in, enlarge the holes in the joiner wires with a 1/16" [1.6mm] drill. Clean the joiner wires with denatured alcohol, and then thoroughly roughen them with coarse sandpaper so epoxy will adhere.



❏ 4. Temporarily connect the clevis on the flap pushrod to the **top** hole in the control horn on one of the joiner wires. Position the joiner wire so the pushrod is centered in the exit slot in the wing. Then mark the location of the joiner wire onto the flaps.



❏ 5. Use a 1/8" [3.2mm] brass tube sharpened on the end or a 1/8" [3.2mm] drill to drill holes into the flaps in alignment with the marks that note the location of the joiner wire.

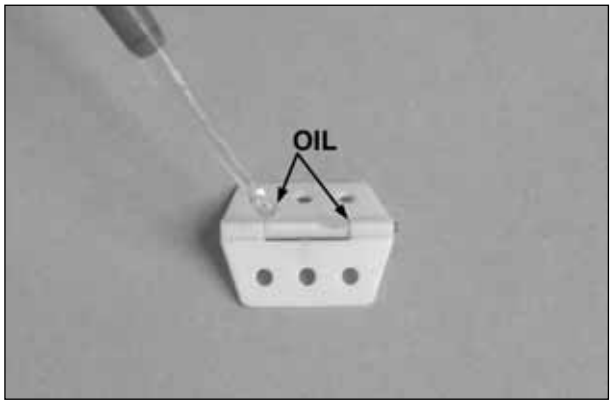


❏ 6. Use a 1/8" [3.2mm] brass tube sharpened on the end or a hobby knife to cut grooves in the leading edge of the flaps to accommodate the wire.

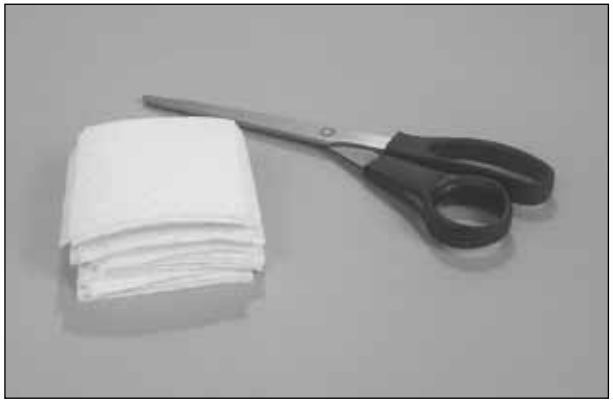
❏ 7. Test fit both flaps to the joiner wire. View the trailing edges of the flaps from the end of the wing. See if the flaps are parallel with each other (have the same "up" and "down"). If necessary, "tweak" the joiner wire to align the flaps.

❏ 8. Test fit the flaps to the wing with the joiner wire. Cut a half-round notch in the trailing edge of the wing to accommodate the solder joint and the control horn during maximum flap deflection. Make certain nothing interferes with full, smooth flap movement. Make adjustments where necessary.

Join the Flaps to the Wing



❏ 1. Remove the flaps, hinges and joiner wire from the wing. **Carefully** apply a small dab of petroleum jelly or **small** drop of oil to the pivot points on the hinges to keep epoxy from getting into the hinge joint and jamming up the hinges.



❏ 2. Lay two or three paper towels on top of each other. Cut the stack into small squares by cutting the stack into four, equal-width strips. Cut the strips into four equal squares. These paper towel squares will come in handy throughout the building project (and save you from wasting whole paper towels!).

One flap at a time will be glued to the wing…

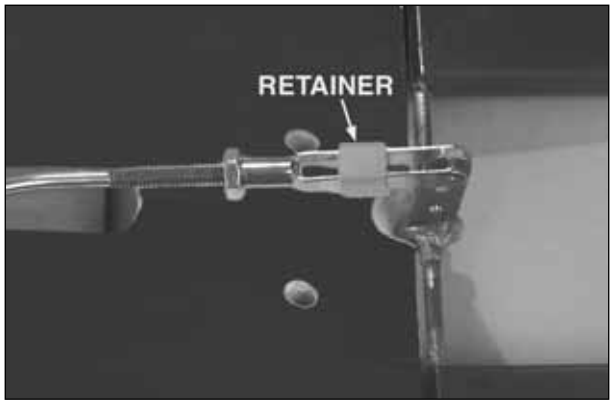
❏ 3. Mix a small batch of 30-minute epoxy. Use a thin, metal ruler or something similar to force epoxy into the hinge slots in **one** of the flaps and in the hinge slots in the matching half of the wing. Proceed immediately to the next step.

❏ 4. One at a time, lightly coat the top and bottom of one half of four hinges with epoxy, then insert the coated end of the hinges into the flap. Working carefully not to get any epoxy into the hinge pins, use small scraps of balsa or something similar to wipe off excess epoxy as it is forced back out of the hinge slots. Proceed immediately to the next step.

❏ 5. Use a piece of wire or a toothpick to apply epoxy in the hole and groove in the flap for the joiner wire. Coat the matching half of the control horn with epoxy, and then insert it into the flap. Coat the other side of hinges protruding from the flap with epoxy, and then join the flap to the wing with the joiner wire. Wipe away excess epoxy as it squeezes out.

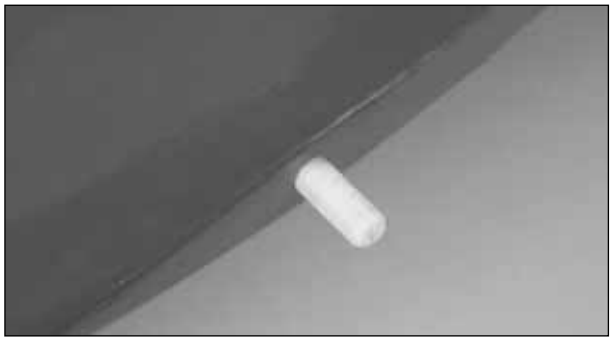
❏ 6. **Without using any glue, temporarily** join the other flap to the wing and the joiner wire. This will align the joiner wire while the epoxy on the other side is hardening. Do not disturb the wing until the epoxy hardens.

❏ 7. After the epoxy on the first flap has hardened, glue the other flap to the wing the same way. Allow the epoxy on both flaps to fully harden for at least a few hours before moving them. After the epoxy has hardened, "break" the flaps free by rapidly moving them up and down several times. Use a hobby knife to pick any bits of epoxy from the hinge pins.

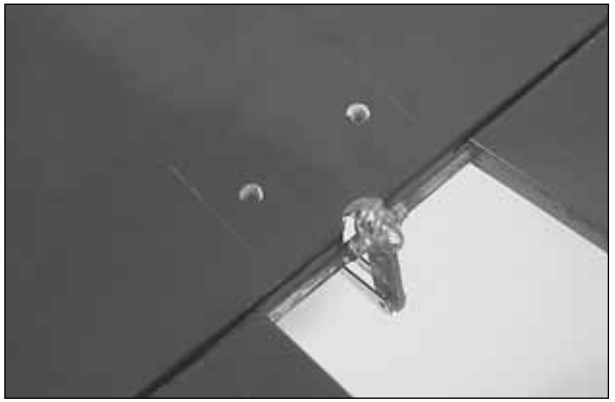


❏ 8. Adjust the clevis on the flap pushrod so the flaps will be centered when the bellcrank is neutral. Slip a silicone clevis retainer over the clevis, then connect the clevis to the top hole in the control horn. Slip the retainer over the clevis, and then tighten the 4-40 nut.

Finish the Wing

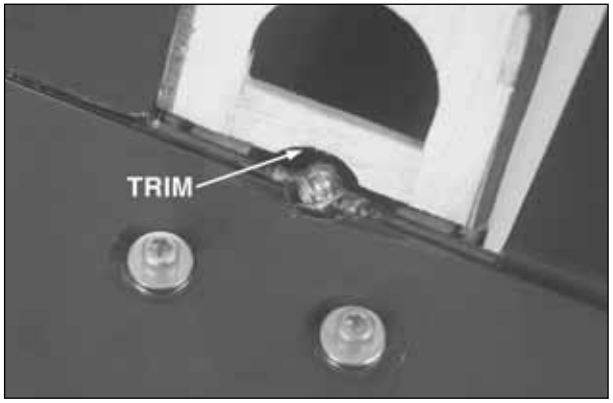


❏ 1. Cut the covering from the hole in the front of the wing and glue in the **wing dowel**.



❏ 2. Cut the covering from the top and bottom of the wing over the holes near the trailing edge for the wing bolts.

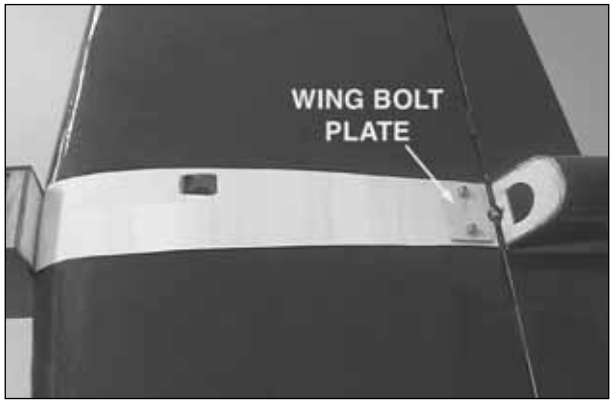
Note: The Nobler includes bolts for mounting the wing to the fuselage. However, the wing bolts are intended for alignment and assembly only. Later, the wing will be permanently glued to the fuselage. If considering modifying your Nobler to make the wing removable, keep in mind that disengaging the elevator pushrod from the flap control horn in order to remove the wing would be cumbersome. Further, the Nobler has not been flight tested with a removable wing.



❑ 3. Remove the **belly pan** from the bottom of the fuselage. Temporarily bolt the wing to the fuselage with two 4-40 x 1-1/2" [38mm] screws and #4 washers. Trim the balsa **cross brace** as necessary to accommodate the solder joint holding the control horn to the flap joiner wire.

❑ 4. Place the belly pan on the bottom of the wing in alignment with the fuselage. Tape the belly pan into position. Use a fine-point felt-tip pen to mark the outline of the belly pan onto the bottom of the wing. Mark the fuselage sides on the top of the wing.

Refer to this photo for the following two steps.



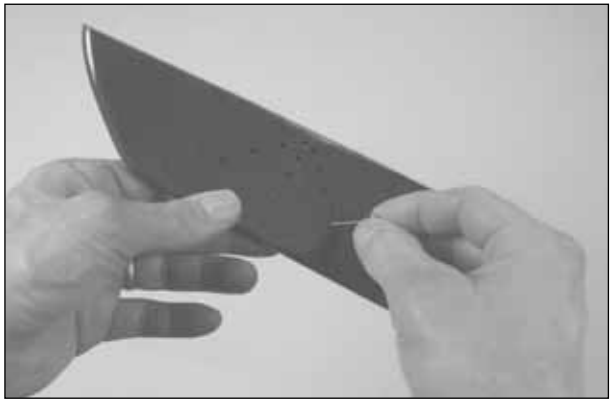
❑ 5. Remove the belly pan and wing. Use a sharp, new knife blade or a heated soldering iron to cut the covering from the wing 1/16" [2mm] inside the lines. If using a knife, use a **light touch** and **great care** not to cut into the sheeting under the covering or the wing will be weakened. Using a soldering iron is preferred because it melts through the covering without cutting into the wood. Move the soldering iron fast enough to melt through the covering without burning the wood. After cutting the covering use denatured alcohol and a tissue to clean the ink lines from the covering. Then, peel off the covering.

❑ 6. Center the 1" x 1-1/2" [26 x 38mm] plywood **wing bolt plate** over the holes on the bottom of the wing. Glue the plate into position. Using the holes in the top of the wing as a guide, drill 9/64" [3.6mm] (or 1/8" [3.2mm]) holes through the plate. Bolt the wing onto the fuselage.

ASSEMBLE THE FUSELAGE

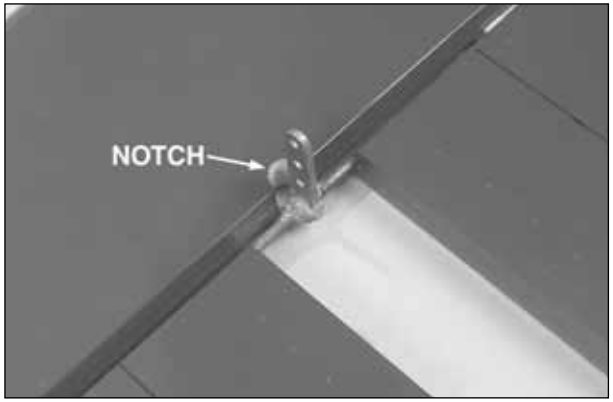
Prepare the Stab

❑ 1. Examine the stab and elevators and determine which side looks best. Use a felt-tip pen to write “top” on the side that looks best.

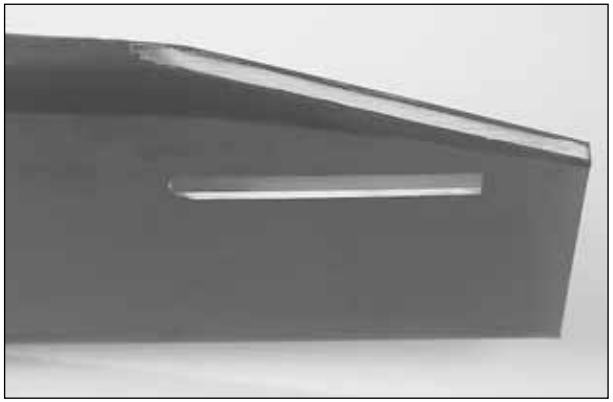


❑ 2. Separate the elevators from the stab by peeling off the tape. Use a pin to poke three or four holes along one side of all the “ribs” in the bottom of the stab and elevators. These holes will allow expanded air to escape while tightening the covering.

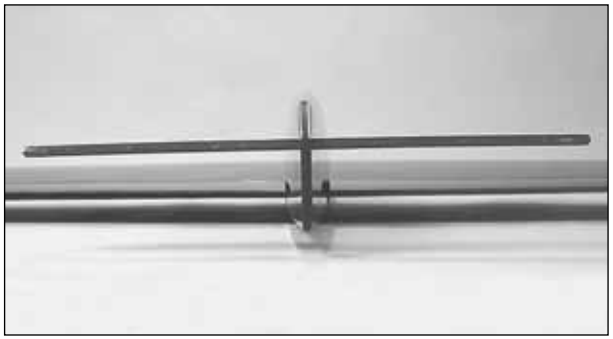
❑ 3. Use a covering iron to tighten the covering on the stab and elevators.



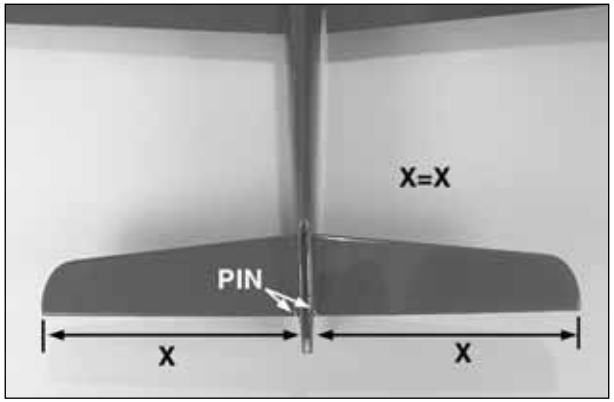
❑ 4. The same as was done with the wing and flaps, prepare the elevators and stab for the hinges by enlarging the slots if necessary, test fitting the hinges and cutting “V” notches in the elevators to accommodate the hinge pins. Also prepare the elevators for the joiner wire. Trim the trailing edge of the stab as necessary to accommodate the solder joint on the joiner wire. “Tweak” the joiner wire as necessary to align the elevators with each other.



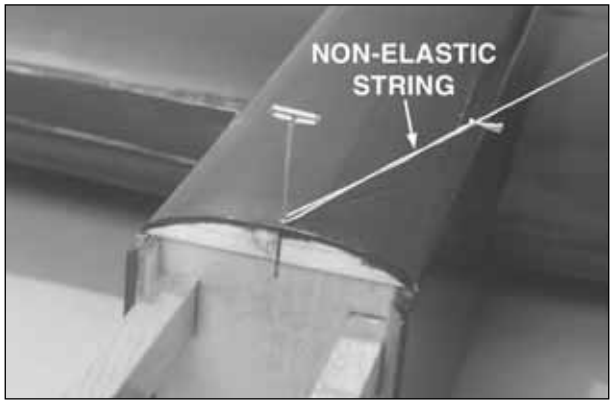
❏ 5. Cut the covering from the fuselage over the slots for the stab and fin.



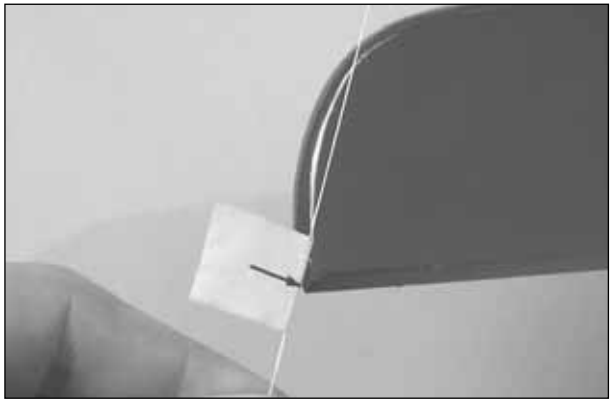
❏ 6. Slide the stab into position. For now, center the stab in the fuselage as best as you can by "eye." Stand approximately ten feet behind the model and view the alignment of the stab and wing. If the stab is not parallel with the wing, place a small weight on the "high side" of the stab to bring it into alignment. If weight is not enough, remove the stab from the fuselage and lightly trim or sand the stab saddle as necessary until you can get the stab to align with the wing.



❏ 7. Now that the stab is level with the wing, center the trailing edge of the stab in the fuselage by measuring from both tips to the fuselage. Make sure "X" = "X" on both sides of the stab as indicated in the photo. Stick pins into the stab near the trailing edge on both sides of the fuselage. This will keep the trailing edge of the stab centered.

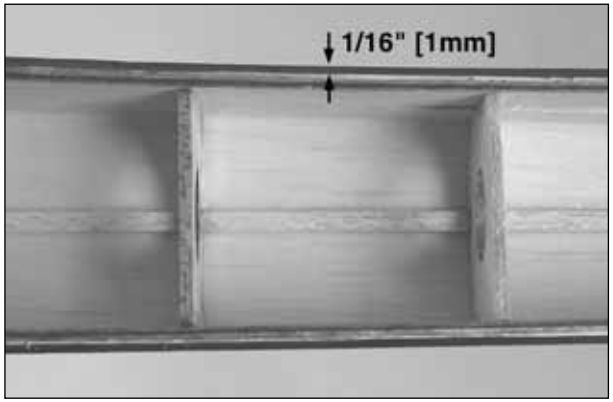


❏ 8. Insert a pin through the top, center of the fuselage over the firewall. Tie a loop in one end of a 36" [1m] piece of non-elastic string such as monofilament or Kevlar line (K+SR4575). Slip the loop in the string over the T-pin.



❏ 9. Fold a piece of masking tape over the string near the other end and draw an arrow on it. Slide the tape along the string and align the arrow with one end of the stab as shown in the photo. Swing the string over to the other end of the stab and hold it in the same position. Keeping the trailing edge of the stab **centered** from side-to-side, move the stab tips forward or back as necessary until the arrow aligns with both ends of the stab.

❏ 10. The same as was done for the wing, use a fine-point felt-tip pen to mark the outline of the fuselage all the way around both sides of the stab. Then, cut and remove the covering from the center-section.



❏ 11. Cut the covering from the wing saddle 1/16" [1mm] from the fuselage sides.

Make the Elevator Pushrod

❏ 1. Make the elevator pushrod by cutting a 4-40 x 17-1/2" [445mm] threaded one-end pushrod to a length of 13" [330mm]. Read the following ***Hot Tip*** about soldering. Then, solder a clevis onto the un-threaded end of the pushrod (this will be the aft end of the pushrod).

HOT TIP

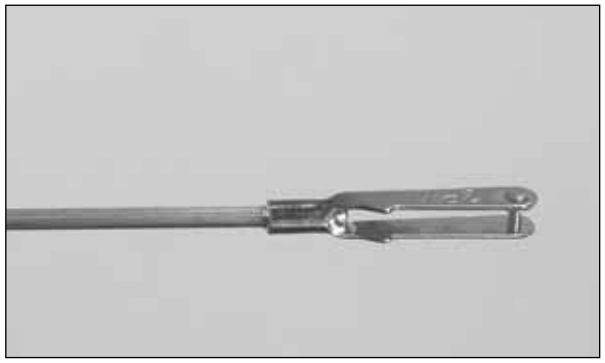
HOW TO SOLDER

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

2. Apply a few drops of soldering flux to the end of the pushrod, and then use a soldering iron or a torch to heat it. "Tin" the heated area with **silver solder** (GPMR8070) 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.

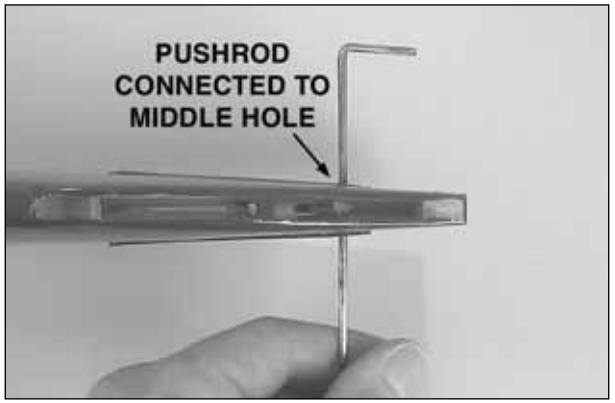
3. Place the clevis on the end of the pushrod. Add another drop of flux. Then, simultaneously heat the clevis and pushrod. Slide the clevis the rest of the way onto the pushrod as the solder melts. Apply another small amount of solder while the pushrod and clevis are still hot. The same as before, the 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, carefully use a cloth to quickly wipe off the flux before it hardens. **Important:** After the joint cools, coat 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, flux removed.

❏ 2. Thread a 4-40 nut and a clevis onto the threaded end of the pushrod (this will be the front of the pushrod and is the end that connects to the control horn on the flap joiner wire). Slip a silicone clevis retainer over both clevises on the pushrod.



❏ 3. Fit the elevator control horn into the slot in the fuselage for the stabilizer. Then, guide the pushrod down through the fuselage. Connect the clevis on the pushrod to the **middle** hole in the flap control horn.

❏ 4. Bolt the wing to the fuselage. Working through the cockpit, use hemostats or needle-nose pliers to connect the clevis on the elevator pushrod to the **middle** hole in the flap control horn.

❏ 5. Slide the stabilizer into the fuselage. Temporarily join the elevators to the stab and joiner wire with the hinges. Make certain the stab is pushed all the way **forward**. The elevators must be centered when the flaps are centered. If necessary, adjust the clevis on the front of the elevator pushrod to center the elevators with the flaps. This can be done by disconnecting the clevis on the front of the pushrod, removing the stab, and then feeding the pushrod forward to access the clevis. Screw the clevis in or out as necessary to lengthen or shorten the pushrod.

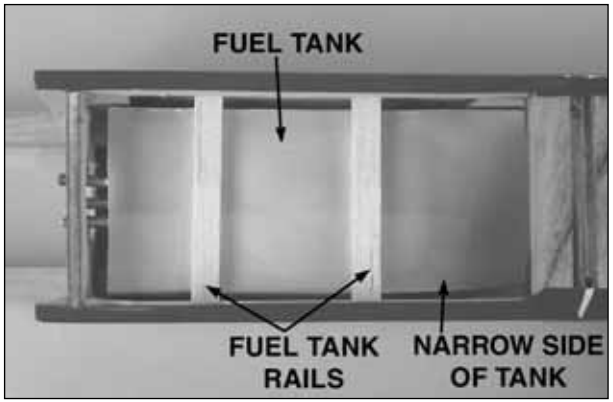
❏ 6. While the stab is in position and the pushrod is connected, operate the flaps and elevators by pulling on the leadouts. Make any adjustments necessary to achieve **smooth** control movement. (When the elevators move up, the flaps should move down.)

It's best to install the fuel tank before permanently mounting the wing, so let's do that first.

Mount the Fuel Tank

❏ 1. Use epoxy thinned with denatured alcohol, epoxy or fuelproof paint to fuelproof the fuel tank compartment and the main landing gear rail.

Refer to this photo for the following two steps.



❏ 2. Add a bead of RTV silicone to the bottom of the engine mount rails where the fuel tank will contact them, and then install the tank. Be certain the narrower "wedge" portion of the tank faces the outside of the circle (the right wing tip).

❏ 3. Cut two **fuel tank rails** from the 1/4" x 1/2" x 5" [6 x 12 x 130mm] balsa stick to fit between the fuselage sides below the tank. Apply a bead of RTV silicone to the bottom of the rails. Glue them into the fuselage securely, holding the tank in place.

…Now back to the wing.

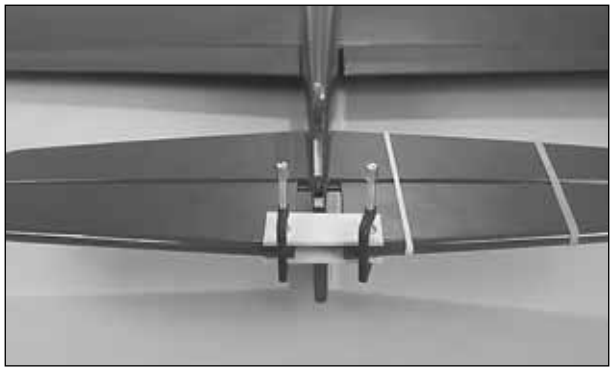
Join the Wing & Stab to the Fuselage

❏ 1. Disconnect the elevator pushrod from the flap and remove the wing and stab from the fuselage. Now that the final length of the elevator pushrod has been determined, tighten the 4-40 nut to the clevis on the front of the pushrod.

❏ 2. Paint the cockpit and add any other details at this time. The cockpit in the prototype was simply painted black.

❏ 3. Mix up a batch of 30-minute epoxy. Apply epoxy to the wing saddle on both sides of the fuselage and to the wing where it contacts the fuselage. Install the wing and bolt it into position. Use small balsa sticks and/or your paper towel squares to wipe up excess epoxy. Be certain none of the epoxy enters the flap linkage. Allow the epoxy to fully harden before proceeding.

❏ 4. Reconnect the elevator pushrod to the flap control horn (middle hole). Apply 30-minute epoxy to the stab and fuselage where they join. Then, slide the stabilizer into position. Use your paper towel squares dampened with denatured alcohol to clean off any excess epoxy. Then, confirm the stab alignment using the pin-and-string and by viewing the model from the rear.

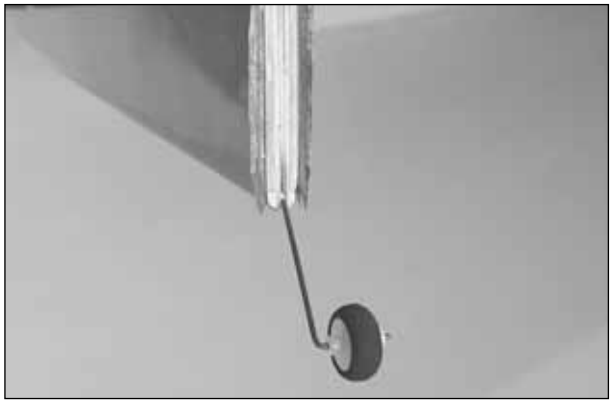


❏ 5. The same as was done with the flaps, apply a few drops of oil or a dab of petroleum jelly to the hinge pins on the elevator hinges. Use 30-minute epoxy to permanently join one of the elevators to the stab and the joiner wire with the hinges. **Temporarily** join the other elevator to the other side of the stab. Use a couple of rubber bands to close the hinge gap by holding the elevator to the stab and clamp the elevators together to keep them aligned with each other.

❏ 6. After the epoxy from the previous step has hardened permanently, join the other elevator.

Join the Fin & Tail Wheel

Refer to this photo for the following four steps.

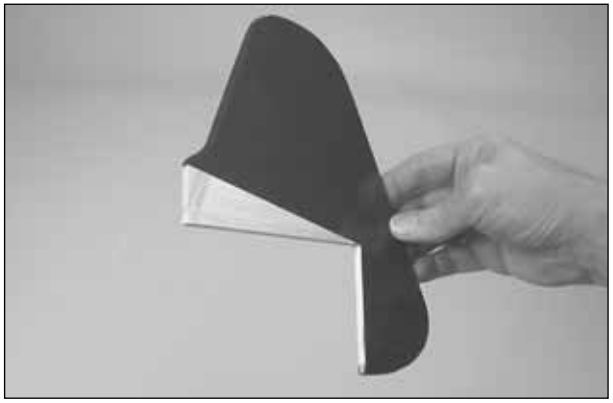


❏ 1. Mount the tail wheel to the prebent **tail gear wire** with a small wheel collar and a 6-32 set screw. Use Threadlocker on the set screw before installing it into the collar.

❏ 2. Cut the covering on the end of the fuselage down the center. Peel back the covering, but don't cut any off.

❏ 3. Drill a 1/16" [1.6mm] hole and cut a groove in the end of the fuselage for the tail gear wire.

❏ 4. Clean the tail gear wire with denatured alcohol or other solvent. Roughen the wire so glue will adhere. Glue the wire in the end of the fuselage with 30-minute epoxy.

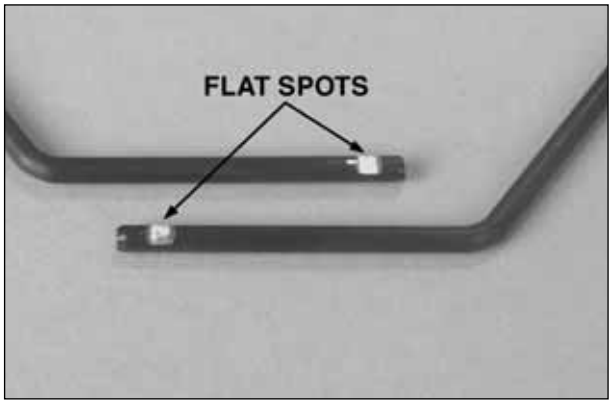


❏ 5. Using the same technique you used when marking, cutting and removing the covering from the wing and stabilizer, cut and remove the covering from the fin where it will be glued to the fuselage.

❏ 6. Test fit the fin to be certain it fits well. Make adjustments where necessary.

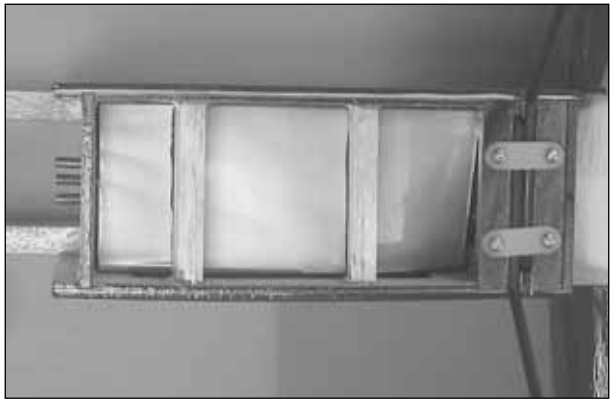
❏ 7. Glue the fin into position with 30-minute epoxy. Use a builder's triangle to make certain the fin is perpendicular to the stabilizer. If necessary, masking tape could be used to pull the fin to one side or the other of the stab. Wipe away excess epoxy before it hardens.

Mount the Main Landing Gear



❏ 1. Use a small metal file to grind a flat spot near the end of both prebent **main landing gear wires**.

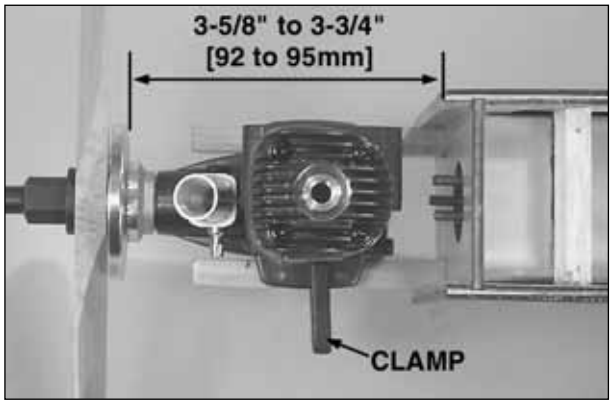
❏ 2. Mount the wheels to the landing gear with a 1/8" [3mm] wheel collar fastened by a 6-32 set screw on both sides. Add a drop of oil to both sides of the wheels so they spin freely.



❏ 3. Install the main landing gear wires in the landing gear rail. Using the screw holes in the nylon straps as a guide, drill 1/16" [1.6mm] holes through the landing gear rail. Then, mount the gear with the straps and four #2 x 1/2" [13mm] screws.

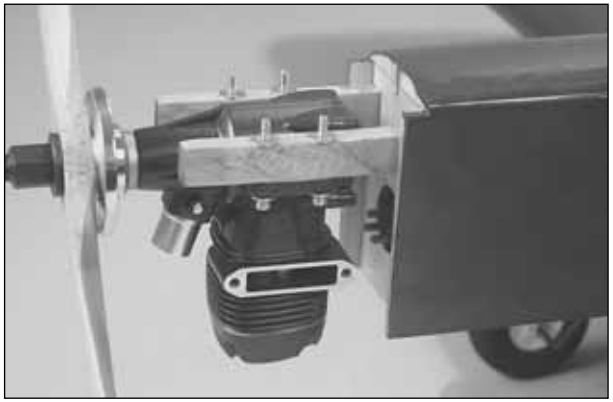
❏ 4. Use epoxy to glue the belly pan to the bottom of the wing and fuselage.

Mount the Engine



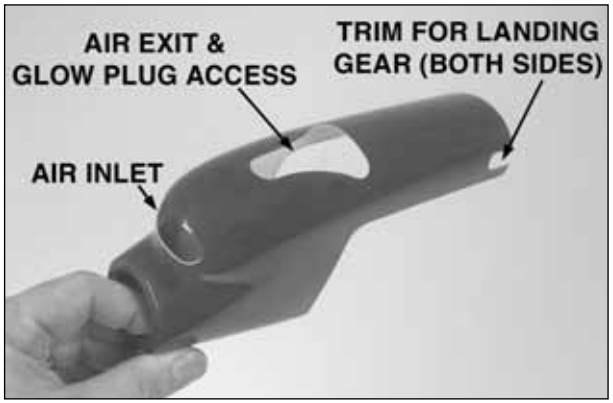
❏ 1. Position the engine on the mounting rails so the front of the drive washer (or the backplate of your spinner) will be 3-5/8" to 3-3/4" [92 to 95mm] from the firewall. With some engines (such as the O. S. .40 LA) it may be necessary to slightly trim the lower, inner edges of the mounting rails to accommodate the engine. **Note:** The remote needle valve was temporarily removed from the engine to facilitate mounting and cowl installation.

❏ 2. Use a Great Planes Dead Center™ Hole Locator or a wire sharpened on the end to mark the engine mounting rails for the mounting screws.



❑ 3. Remove the engine. Drill 1/8" [3.2mm] holes at the marks. Mount the engine to the mount with four 4-40 x 1" [25mm] SHCS (socket head cap screws), #4 flat washers and lock washers and 4-40 blind nuts.

Mount the Cowl



❑ 1. Use a high-speed rotary tool with a cutting bit to cut slots in the aft end of the cowl to accommodate the landing gear wires. Also cut an air inlet and air exit hole. The exit hole may be combined with the glow plug access hole.

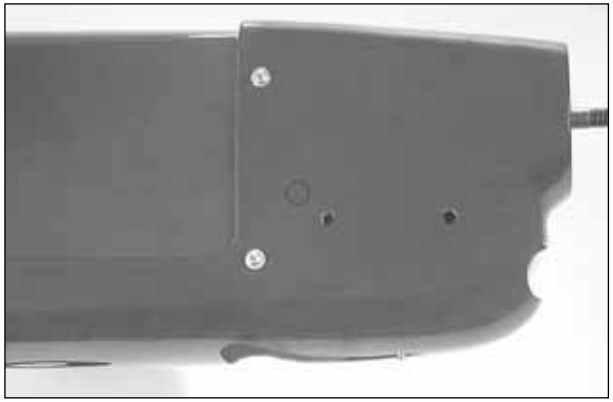
❑ 2. Place the cowl on the fuselage and mount the spinner and propeller. Align the cowl with the spinner. There should be approximately 3/32" [2mm] between the spinner and the cowl.

❑ 3. Holding the cowl in position, drill a 1/16" [1.6mm] hole through the cowl and fuselage for one of the cowl mounting screws. The hole should be about 5/16" [8mm] from the aft edge of the cowl, placing it about 1/4" behind the front edge of the fuselage side. Screw in a #2 x 1/4" [6mm] screw just enough to hold the cowl, but do not tighten the screw.

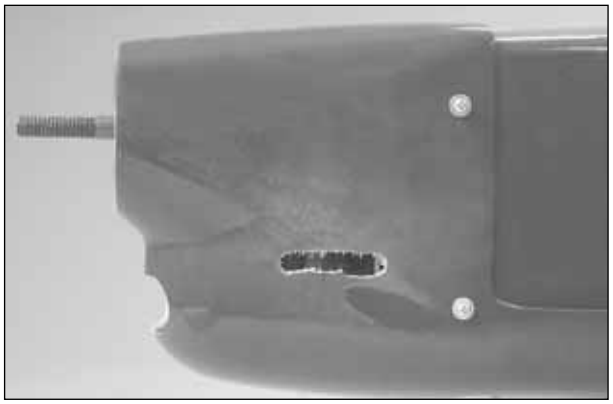
❑ 4. One at a time while holding the cowl in position, drill a 1/16" [1.6mm] hole and insert a screw at the remaining three marks. Also drill a hole through both sides of the cowl and fuselage approximately 3/4" [20mm] forward of the landing gear.

❑ 5. Remove the cowl. Enlarge the holes **in the cowl only** with a 3/32" [2.4mm] drill. Test fit the cowl and mount it to the fuselage with six #2 x 1/4" [6mm] screws.

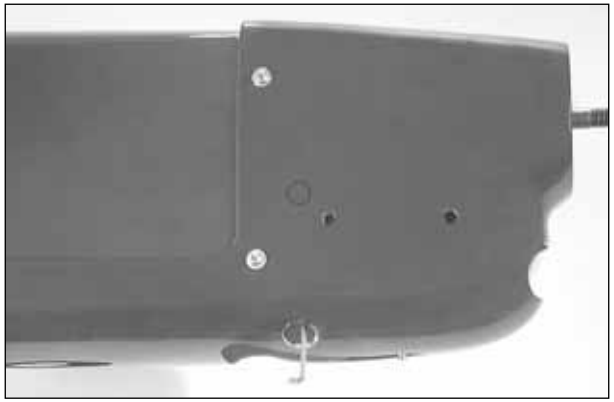
❑ 6. Remove the cowl screws and cowl. Add a couple of drops of thin CA to the screw holes–don't add too much CA, or you will seal the holes.



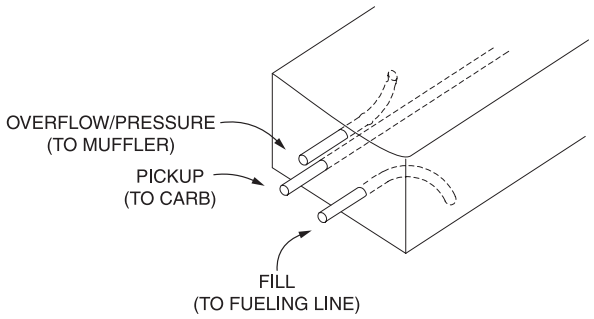
❑ 7. Cut the holes in the cowl for the muffler screws. This can be done by using a pencil to mark the heads of the screws on the inside of the cowl, and then removing the cowl and cutting the holes.

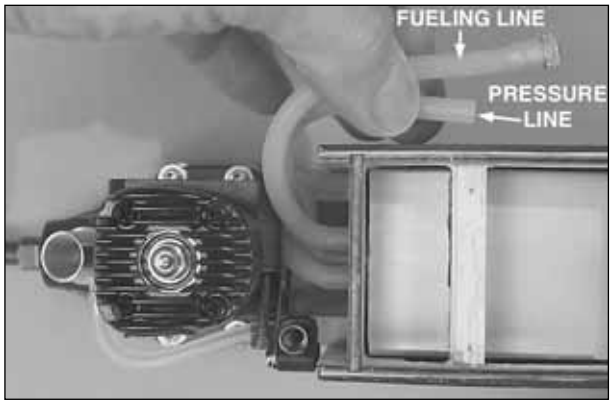


❑ 8. Cut the hole for the muffler. Start by making the hole small, and then enlarge it until the muffler can be mounted.



❑ 9. Mount the needle valve and cut an access hole for it in the cowl. **Note:** On the model featured in this manual, the needle valve was mounted inverted. If mounting the needle sideways (as the engine is provided from the factory), a slot must be cut in the cowl to accommodate the needle valve body.





❑ 10. Connect the fuel lines. The fuel tank included with this kit uses a three-line system. As shown in the sketch to the left, one line is the fuel pickup which goes to the carburetor (or to the remote needle as in the case of the O.S. LA engines). The other line goes to the muffler for pressure (when the tank is full, fuel will overflow through this line indicating that the tank is full). The third line is used for filling the tank. This line should be accessible from outside the fuselage and is to be closed after fueling. A Great Planes aluminum fuel line plug (GPMQ4166) was used to close the fueling line. After the tank has been filled, the fueling line can be tucked back inside the cowl.

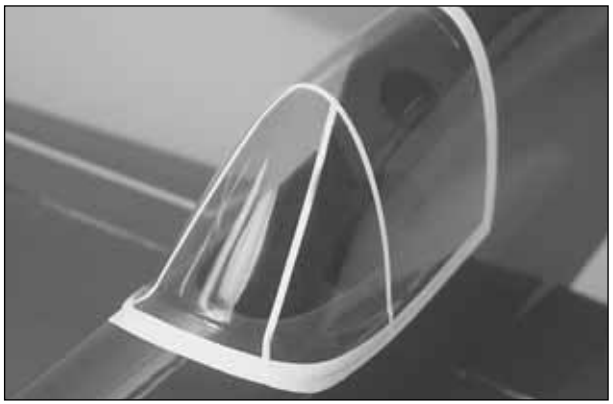
FINAL DETAILS

Mount the Canopy

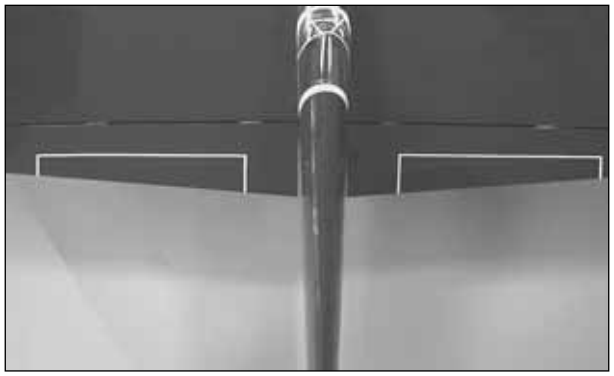
❏ 1. Be certain that the flaps are centered when the elevators are centered. Also be certain that all the pushrods are connected and that the flaps and elevator are operating smoothly. Make any adjustments necessary.

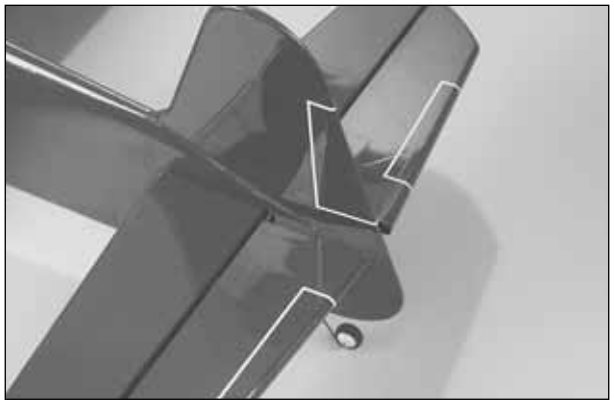
❏ 2. Use scissors to cut out the canopy on the molded-in cutlines. Start by cutting approximately 1/8" [3mm] from the lines. Then, do a final cut right on the lines.

Do not **permanently** mount the canopy. If adjustments are ever required to the pushrods, the canopy may be removed to do so.



❏ 3. Mount the canopy to the fuselage with 1/4" [6mm] white striping tape. Use 1/16" [2mm] white striping tape to add the panel lines.





❏ 4. While you've got the 1/16" [2mm] striping tape out, add the flap, elevator and rudder trim tab lines as well.

Apply the Decals

1. Use scissors or a sharp hobby knife to cut the decals from the decal sheet. Where possible, round the corners so they are less likely to peel up during cleaning and handling.

2. Be certain the model is clean. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water–about 1/2 teaspoon of soap per gallon of water. Submerse 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 the decal on the model where desired. Holding the decal down, use a paper towel to wipe away most of the water.

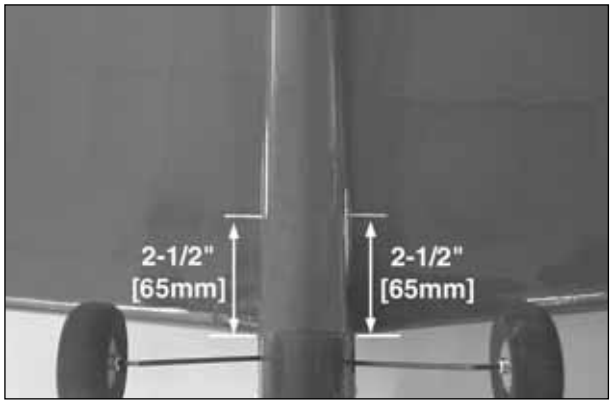
4. Use a piece of soft balsa or something similar to squeegee remaining water from under the decal. Apply the rest of the decals the same way.

GET THE MODEL READY TO FLY

Balance the Model (C.G.)

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

At this stage the model should be **completely** ready-to-fly with all of the components installed including the engine, muffler, propeller, spinner, landing gear and wheels.



❏ 1. If using a Great Planes C.G. Machine to balance the model, set the rulers to **2-1/2" [65mm]**. If not using a C.G. Machine, use a fine-point felt-tip pen or

1/8" wide tape to accurately mark the recommended C.G. (center of gravity, or “balance point”) on the bottom of the wing **2-1/2" [65mm]** back from the leading edge on both sides of the belly pan.

This is where the Nobler should balance for the first flights–especially for sport flying and beginning aerobatics. After the first few flights, experienced modelers may wish to experiment by shifting the C.G. forward up to 1/4" [5mm] or by shifting the C.G. back, up to 1/4" [5mm] to change the flying characteristics. If the C.G. is moved too far forward (nose-heavy) response is slow and the model becomes too difficult to flare for landing. If the C.G. is moved too far aft (tail-heavy) the model becomes too unstable and over-responsive to control inputs. In any case, **start at the recommended balance point**.

❏ 2. Place the model on a Great Planes CG Machine, or lift it at the balance point you marked on both sides of the fuselage. Note whether the nose or tail drops. If the tail drops, the model is “tail heavy” and weight must be added to the nose to balance. If, however, the nose drops (as will likely be the case), weight must be added to the tail to balance.

❏ 3. Add nose or tail weight to balance the model. If nose weight is required it may be added by using a “spinner weight” (GPMQ4645 for the 1 oz. [30g] weight, or GPMQ4646 for the 2 oz. [55g] weight) or Great Planes (GPMQ4485) “stick-on” lead which may be added to the firewall (don’t attach weight to the cowl–it is not intended to support weight). If tail weight is required it may be placed on the right side of the fuselage (opposite the muffler) under the stabilizer. After the final amount of tail weight has been determined (from several test flights) the covering may be cut from the lightening hole in the back of the fuselage and the lead permanently glued inside.

Note: Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Use #2 sheet metal screws, RTV silicone or epoxy to permanently hold the weight in place.

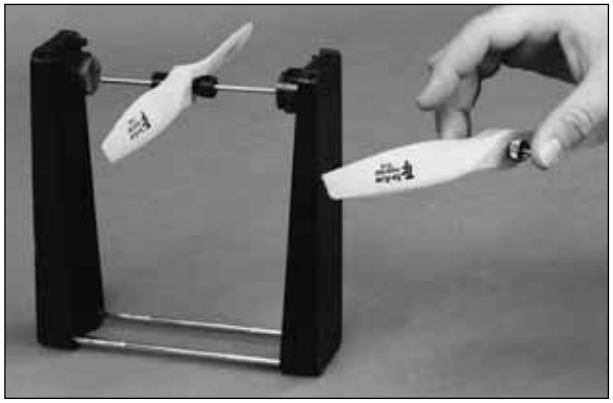
❏ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

Wing Tip Weight

To begin, add 1 oz. [30g] of lead weight to the right wing tip. This can be temporarily attached to the bottom of the wing with the self-adhesive foam tape attached to the weight. After the final amount of weight required has been determined (after test flying), it can be permanently attached inside the wing tip with epoxy.

PREFLIGHT

Balance the Propellers



Carefully balance your propeller and spare propellers before you fly. An unbalanced prop can be the single most significant cause of vibration that can damage your model. Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or 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.

Engine Check

If the engine is new, follow the engine manufacturer’s instructions to break-in the engine. After break-in, confirm that the engine runs reliably and smoothly and maintains full power–indefinitely. After you run the engine on the model, inspect the model closely to make sure all screws remained tight, the hinges are secure and the prop is secure.

Control Check

With the lines connected to the leadouts and your assistant holding the model, operate the controls to make sure they move smoothly. If any binding or hesitation is detected, inspect the model and eliminate the problem.

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 certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running 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 glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer’s recommendations. Do not use hands, fingers or any other body part to try to stop the engine. To stop a gasoline powered engine an on/off switch should be connected to the engine coil. Do not throw anything into the propeller of a running engine.

AMA SAFETY CODE (excerpt)

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

GENERAL

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

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.

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

8. I will not consume alcoholic beverages prior to, nor during, participation in any model operations.

9. Children under 6 years old are only allowed on the flight line as a pilot or while under flight instruction.

CONTROL LINE

1. I will subject my complete control system (including safety thong, where applicable) to an inspection and pull test prior to flying. Pull test will be in accordance with the current Competition Regulations for applicable model category. Models not fitting a specific category as detailed shall use those pull test requirements for Control Line Precision Aerobatics.

2. I will assure that my flying area is safely clear of all utility wires or poles.

3. I will assure that my flying area is safely clear of all non-essential participants and spectators before permitting my engine to be started.

4. I will not fly a model closer than 50 feet [15m] to any electrical power line.

CHECK LIST

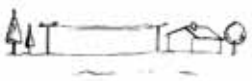
During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a check list is provided to 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!*).

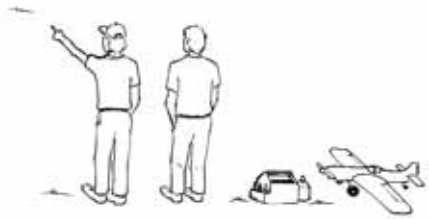
- ❏ 1. Make sure areas exposed to fuel or exhaust residue have been fuelproofed (such as the fuel tank compartment, the landing gear rail, the back of the firewall and the front of the wing belly pan).
- ❏ 2. Check the C.G. according to the measurements and procedure provided in the manual.
- ❏ 3. Use thread-locking compound on the set screws in the wheel collars that hold on the wheels.

❏ 4. Add a drop of oil to the axles so the wheels will turn freely.
❏ 5. Make sure all hinges are **securely** glued in place.
❏ 6. Use thin CA to harden the holes in the fuselage for the cowl mounting screws.
❏ 7. Confirm that the flaps and elevators operate freely and smoothly by pulling on the leadouts.
❏ 8. Make sure the fuel lines are connected and are not kinked.
❏ 9. Balance your propeller and spare propellers.
❏ 10. Tighten the propeller nut and spinner.
❏ 11. Place your name, address, AMA number and telephone number on or inside your model.
❏ 12. If you wish to photograph your model, do so before the first flight.

FLYING

Flying Precautions





Study these flying safety precautions before flying the Nobler ARF.

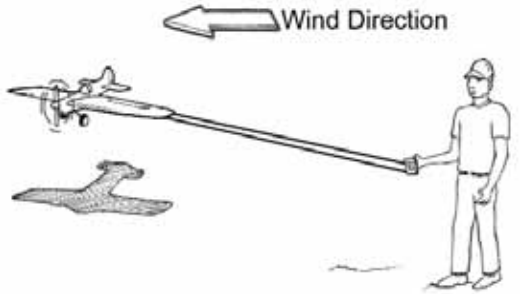
1. Always inspect your equipment before each flight. Make certain the lines, leadouts and handle are in good condition. Make sure there are no kinks in the lines.
2. Fly only in unobstructed areas free from trees, shrubs and bushes, poles, stakes, parking barriers and fences.
3. Be aware of any spectators that may wander into the flying circle. If this is a possibility, have your assistant ready to perform crowd control.
4. The model must NEVER be flown in the vicinity of high-tension lines or any other electrical lines.
5. Never fly when thunder storms or lightning are present.
6. Take any precautions necessary to insure the safety of spectators, the model and property.
7. Never touch the engine during or soon after operation.
8. Keep clear of the rotating propeller and do not let assistants or spectators get in the arc of the propeller.

Preflight

Note: The Top Flite Nobler ARF is not a beginner's model. It is intended for beginning to advanced stunt pilots who have had some previous control line experience. If you are an inexperienced pilot seek the assistance of a knowledgeable control line pilot who can help you with your first flights.

Beginning stunt pilots should make their first flights in calm or low wind conditions. Stronger winds may blow the model inward which will decrease line tension resulting in loss of control. If the lines ever do go slack, quickly step back to tighten the lines and regain control. Of course, this is most likely to happen, and should be expected, as the model approaches the upwind half of the circle.

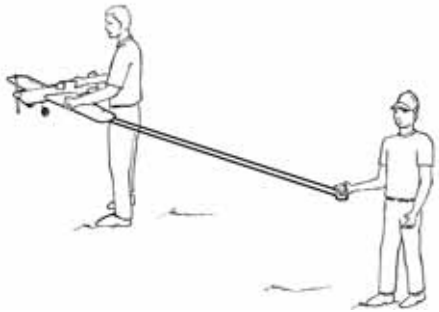
Place the model and starting equipment where the wind will be **behind** the model when it is released for takeoff.



For the first half-circle (during the brief period when the pilot has the least control before the model is "up to speed") the wind will push the model outward to maintain line tension.

Mark the center of the flying circle with paint, chalk or a suitable object (such as a shop towel) so you won't wander. This is especially important if the flying area is limited.

With your assistant holding the model, walk from the model toward the handle in the center of the circle while using your fingers to keep the lines separated. This will ensure that the lines are not twisted and are free to operate the controls.



While the pilot is holding the lines, the assistant should walk the model once around the circle to be certain the flight path is clear and to double-check that there are no obstructions that could snag the lines.

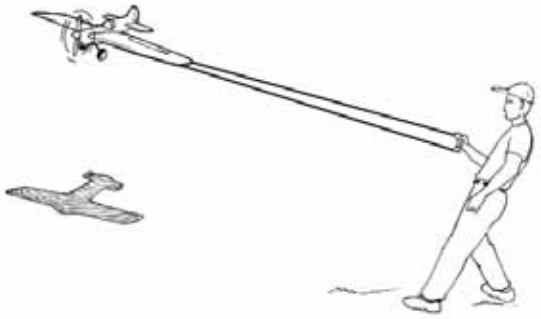
The pilot should double-check the operation of the controls by pulling and pushing on the handle and having the assistant signal what the controls are doing (“up” and “down”).

Takeoff

Note: A fully cowled engine may run at a higher temperature than an un-cowled engine. Therefore, the fuel mixture should be richened so the engine runs at least 200 RPM below peak speed. By running the engine slightly rich, you will help prevent dead-stick landings caused by overheating. Traditionally, control line pilots intentionally set their engines rich so that during vertical maneuvers, the engine will not “over lean,” thus causing overheating. Further, full RPM is usually not desired for stunt flying.

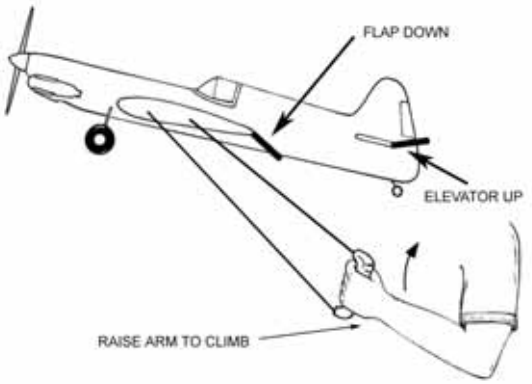
When both the pilot and assistant are ready, the model may be fueled and started. Once the engine is running and the model is ready to be released, the assistant should point the nose of the model slightly away from the circle. This will help keep the lines taut for the first few feet until the model gets going.

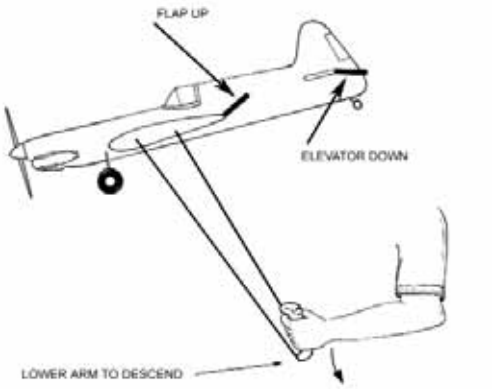
Upon the pilot’s signal, the assistant may release the model–never push the model forward as doing so may result in a crash.

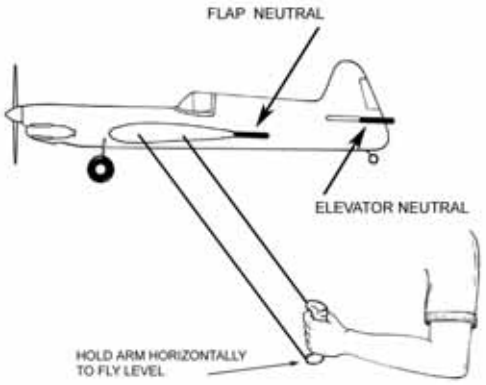


The pilot should be ready–especially during takeoff–to briefly step back to maintain line tension until the model has gained enough air speed to achieve line tension on its own. Allow the model to roll out and gain enough speed to become airborne. When enough speed has been gained the pilot may raise his arm slightly giving “up” elevator command, thus allowing the model to leave the ground.

Once the model has lifted, maintain a slow and steady climb until a comfortable altitude has been reached (usually between “eye-level” and approximately ten feet in the air). The lines must remain taut throughout the entire flight. If the lines ever do go slack the pilot will not have control of the model. During most situations the model’s factory built-in features will allow it to maintain good line tension, but on occasions when the wind blows the model inward or the model becomes too slow the modeler must anticipate or notice a decrease in “pull” and quickly step backward to tighten the lines and regain control.



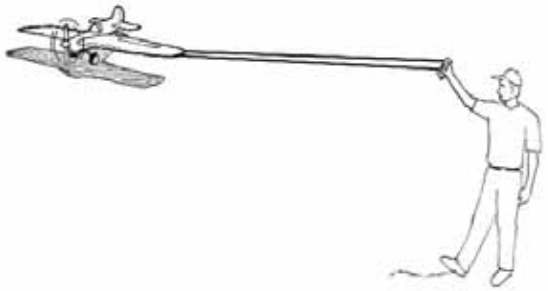




To climb, the pilot will slowly raise his arm. To descend, the pilot will slowly lower his arm. To maintain level flight the pilot will hold his arm horizontally. Beginning pilots should control the model by keeping their arm straight and bending at the elbow with little or no wrist movement. Later,

when they become more experienced, wrist movement may be increased to increase control response. All control inputs should be smooth. Continue flying the model in a level attitude, getting used to how the controls react and how the model "feels." Do this until the engine runs out of fuel. With a full tank of fuel the Nobler will fly for a little over four minutes, but actual flight time depends on several factors, such as the engine size and brand, needle valve setting, propeller size, fuel, atmospheric conditions, etc.

Landing



When the engine starts to sputter and/or speed up, this is an indication that the tank is nearly empty. Continue to fly the model in a level attitude until the engine finally quits. The same as any time the model slows, the pilot should step back to keep the lines taut and maintain control. Allow the model to descend until it is about two feet off the ground. When the model has lost nearly all flying speed and is a foot or two from the ground the pilot should raise his arm to keep the lines taut and apply full up elevator, allowing the model to gently touch down.

After the model has come to a stop the assistant may retrieve the model and return it to the starting area. In doing so the lines should be kept taut so they do not become twisted or entangled.

Clean the model using paper towels and household cleaner to wipe off exhaust residue. Inspect the model thoroughly, looking for loose fasteners and signs of damage or fatigue. Also make sure the prop has not been damaged. Perform any maintenance necessary to prepare the model for the next flight.

At the end of the flying session any residual fuel should be drained from the tank.

After you have become familiar with the way your Nobler flies and you are ready to begin performing stunts, seek the assistance of an experienced stunt pilot before attempting to learn new maneuvers on your own. Almost any control line stunt maneuvers are started with the model downwind from the pilot, i.e. wind on the pilots back. Consult the AMA Control Line section for stunt maneuvers.

One final note about flying your model. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as when testing different propellers or fuel). 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 and mind the wind direction. 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, keep the lines taut and always fly in a safe manner.

GOOD LUCK, GREAT FLYING, AND HAVE FUN!

This model belongs to:

Name

Address

City, State, Zip

Phone number

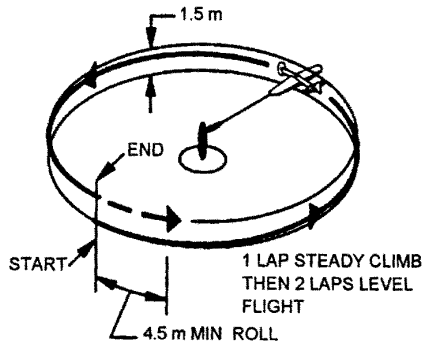
AMA number

O.S. Engines®
.40 LA-S Control Line Engine with Muffler
(OSMG1440)

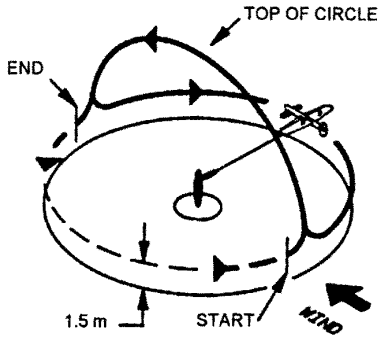
The O.S. 40 LA-S offers the proven power of LA Series R/C sport engines – but is engineered for the special requirements of control line flying, replacing the carburetor with a venturi that keeps the engine running at a constant speed. A remotely mounted needle valve keeps your hands safely distanced from the spinning prop during adjustments. An O-ring helps seal the needle against fuel and air leaks, while heavy-duty webbing reinforces the blue-finish, one-piece crankcase in high-stress areas. Includes E-3030 muffler, muffler mounting screws, #A3 glow plug, and 2-year warranty. Fuel with 10-20% nitro and 18% oil content recommended.

AMA STUNT MANEUVERS

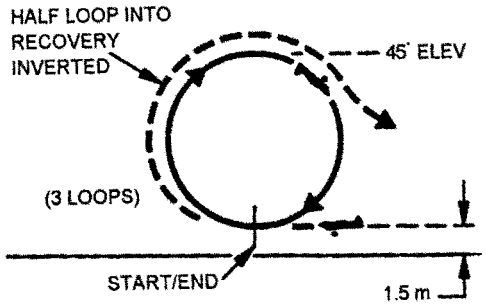
Here are some of the AMA Stunt Maneuvers. Refer to the AMA Rule Book for full descriptions.



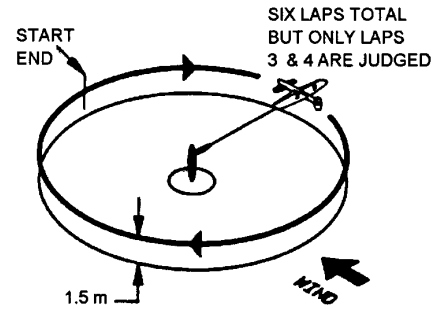
Takeoff



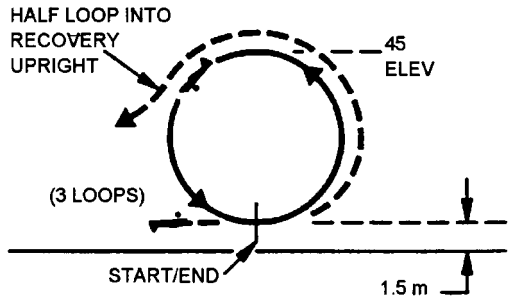
Reverse Wingovers



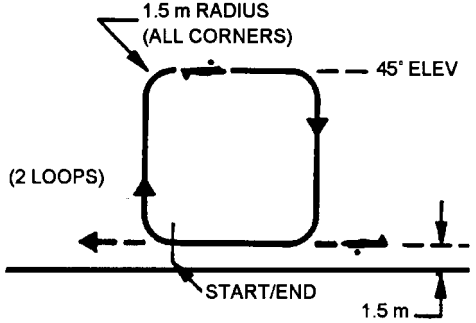
Consecutive Inside Loops



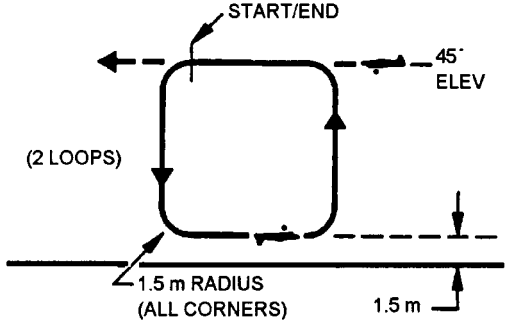
Inverted Flight



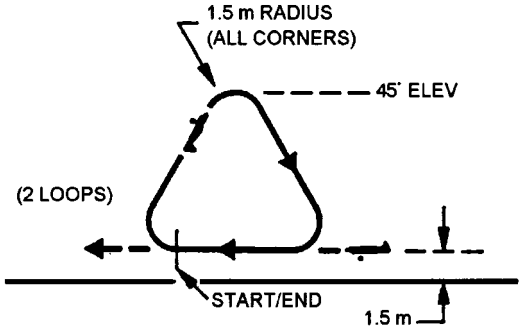
Consecutive Outside Loops



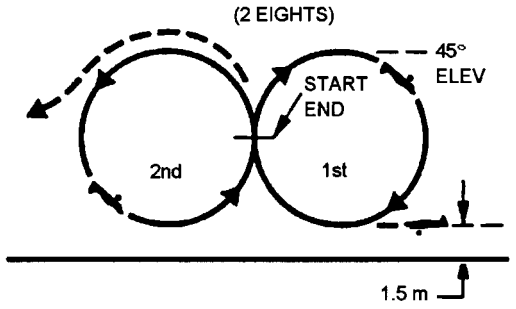
Consecutive Inside Square Loops



Consecutive Outside Square Loops



Consecutive Inside Triangular Loops



Horizontal Eights

FLIGHT LOG

DATE	COMMENTS
	Started Construction
	Finished Construction
	First Flight
	First Loop
	First Inverted Flight
	First Wingover

FLAP PUSHROD TEMPLATE