

## HINTS & TIPS cont'd

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### TOMAHAWK



**10.** The full size Tomahawk has a long span, short chord wing and we have scaled the model accordingly. This results in the wing have a relatively thick trailing edge where the ailerons and flaps meet the wing. In order to provide a better flow and cleaner appearance we have hinged both the flaps and the ailerons off centre. The hinges have been deliberately set more towards the top edge of the flaps and ailerons. This reduces the gap in the hinge area when viewed from the top of the wing, producing a more precise fit on the top surface of the wing, cleaner aerodynamics and reduces the chance of flutter.

**11.** On Page 10 & 11, Stages 8-12. Ensure that you read all aspects of Stages 8-12 and consult the diagram on page 19 before mounting the horizontal stabilizer.

**12.** On Page 12, Stage 15. When installing the main landing gear, (before installing the gear leg cover plates) use the mounting screws to tack the gear legs to the bottom of the wing temporarily. Install the axles and tires and then turn the wing right way up and set it on a flat surface. Check the angle of the wheels to make sure that the wheels appear angled straight up and down at approximately 90 degrees with respect to the flat surface. Adjust the angle of the gear legs by placing washers around the screws between the gear leg mounting plate and the wing plate or removing the gear leg and filing (use a course flat file) the gear leg mounting plate where it will contact the wing plate so that the angle of the gear leg mounting plate changes slightly. You can produce a wide range of gear leg angles by combining washers and filing the "high side" of the gear leg mounting plates. Work in stages and check frequently when filing. Do not overdo it. Once you've got the angles where you want them, install the gear legs firmly and attach the cover plates.

**13.** The fibreglass cowl has been sized to give a precise fit with minimal gap between the fuselage and the sides of the cowl. To loosen the fit slightly you may wish to extend the nose gear clearance slot in the bottom of the cowl slightly more forward. Don't go overboard... we prefer the snug factory fit but if you want to loosen things slightly, extend the clearance slot slightly forward a quarter of an inch at a time. Test fit frequently as you make small adjustments.

**14.** The procedure for balancing this model is described on page 17 Stage 30 of the assembly manual and the recommended location for the horizontal CG is shown in a diagram located near the top right corner of Page 19. Please note the location of the horizontal CG with respect to the leading edge of the wing when the wing has been joined to the fuselage.

The Tomahawk has a T-Tail which puts considerable mass outboard away from the centre line of the model. In effect you have a vertical CG that is not located vertically in the center of the fuselage. This in turn makes it a bit more difficult to confirm that the horizontal CG is as shown in the assembly manual.

Don't panic, it is not as confusing as you might think. The easiest way to is to drive two small pins or nails into the side of the fuselage like an axle. The pins should be located 65 mm (2.56") back from the leading edge of the wing and 1-3/4" above the top surface of the wing. Then attach a loop of string over each pin or nail and lift the model, if the model tilts forward... you have a bit too much weight in the nose... if it tilts aft and goes nose high... the tail is a bit too heavy. See Page 17 Stage 30 for how to shift weight to get the CG right. Remove the pins and apply white silicone to the small pin holes.

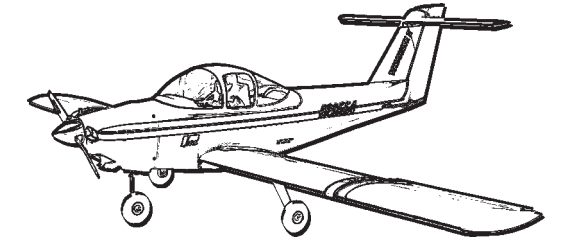
If you do not feel comfortable with inserting pins or small nails into the fuselage sides, try taping the strings to the side of the fuselage so that model can rotate about the spot where the pins or small nails would be.

**15.** Engine & Prop Size. As you might expect, you will get better performance from a .61 than a .46 size engine. If you are using a .46 size engine, we suggest using a larger diameter lower pitch prop than you might have used in other models. Check your engine manual and select a prop that is at the maximum diameter in the recommended range. We have found that a .46 works well with an 11 x 5 or 12 x 4 prop. The idea is to get the thrust out beyond the edge of the fuselage and cowl. A larger diameter prop helps accomplish this.

**16.** The VMAR Tomahawk is a semi scale rendition of the real thing. The full size Tomahawk is a great trainer and much of its stability comes from the use of a long span, short chord, high lift wing and a T-Tail. Both act to lower the roll rate and enhance stability in the full size and reduced scale model. You will not get high roll rates with a Tomahawk, full or reduced scale. Full size Tomahawks were not meant to roll 360 degrees at all... your model will roll 360 degrees at a leisurely pace and the T-Tail will induce a barrel twist to the roll.

# IMPORTANT INFORMATION ABOUT VMAR TOMAHAWK

## #VMA-T240X



### PLEASE READ THIS BEFORE ASSEMBLY!



Model airplanes, model engines, model engine fuel, propellers and related accessories, tools and equipment can be hazardous if improperly used. Be cautious and follow all safety recommendations when using your VMAR model airplane. Keep hands, tools, clothing and all foreign objects well clear of engines when they are operating. Take particular care to safeguard and protect your eyes and fingers and the eyes and fingers of other persons who may be nearby. Use only a good quality propeller that has no cracks or flaws. Stay clear of the propeller and stay clear of the plane of rotation defined by the propeller.

The Manufacturer, Distributor, Retailer and/or other suppliers of this product expressly disclaim any warranties or representations, either expressed or implied, including but not limited to implied warranties of fitness for the purposes of achieving and sustaining remotely controlled flight.

In no event will the Manufacturer, Distributor, Retailer and/or other suppliers of this product have any obligation arising from contract or tort, or for loss of revenue or profit, or for indirect, special, incidental, consequential or other damages arising from the use of this product.

In purchasing and/or using this product, the user accepts all responsibility for its use and accepts all liability associated with such use.

### Proceeding with assembly and use of this product indicates Agreement With and Acceptance of the Liability Disclaimer.

#### CAUTION

**A Remote Control Model Aircraft is not a toy. It is a flying model that functions much like a full size airplane. If you do not assemble and operate this product properly you can cause injury to yourself and others and damage property. DO NOT FLY this model if you are not qualified.**

**You are ultimately responsible for the mechanical, aeronautical and electrical integrity of this model and it's structure, control surfaces, hinges, linkages, covering, engine, radio, wiring, battery and all other components. Check all components before and after each flight. Don't fly until it's right!**



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# CARE & MAINTENANCE OF POLYCOTE™ ECS.

POLYCOTE ECS is a proprietary Enhanced Covering System engineered in Canada & available only from VMAR. With POLYCOTE ECS the graphics are inside the covering... not stuck on top. No Decals! No Layers! No Strips! No Stripes! POLYCOTE ECS utilizes ULTRA TOUGH polyester and our SURE SEAL system to ensure that the seams stay down! Best of all POLYCOTE is totally fuel proof! Quite simply... **POLYCOTE ECS leads the pack in ARF covering systems!**



By putting the graphics inside the POLYESTER covering... we've reduced the need for maintenance to a minimum. No seams to pick up, very few edges, extraordinary fuel proofing etc. With POLYCOTE ECS you will spend more time flying and less time reworking the covering! Polyester offers the best in covering performance and as with any POLYESTER covering here are a few tips to make it even easier to keep POLYCOTE ECS looking it's best!

**REMOVING & USING TAPE:** Tape may be used to hold control surfaces or other parts in place during shipping. When removing tape from POLYCOTE ECS, peel the tape back on itself so that the pulling is parallel to the surface of the covering. If the tape is near or across a seam or an edge, peel towards the edge or seam. Do NOT pull the tape up at right angles to the covering or away from a seam or edge. If you use tape during the assembly process use a low tack masking tape and remove it using the procedure noted above.

**CLEANING INITIALLY:** POLYCOTE ECS has very few seams and we use our SURE SEAL system to really lock the seams down. Upon initial inspection if you see a thin streaky film on any of the POLYCOTE ECS when looked at under bright light this is a residue from the SURE SEAL process. It is easily removed using Mineral Spirits (Paint Thinner, Varsol). If you've ever painted with oil base paints you probably have Mineral Spirits on hand already, if not, it is readily available at a paint or hardware store. **It is recommended that you work with Mineral Spirits outdoors and follow the directions on the container.** Use a paper towel and wipe a slightly wet film of Mineral Spirits over 1/4 of a wing or half a fuselage at a time. Rub gently while still wet. Change towels frequently. Use a clean towel to buff dry. If you want to accentuate the deep "clear coat" gloss of POLYCOTE ECS even more, use a bit of Armorall and buff shiny with a clean paper towel. Discard all soiled paper towels into a metal garbage can stored outdoors.

**CLEANING AFTER FLYING:** To clean POLYCOTE ECS after flying we recommend Fantastic household cleaner and disposable paper towels. You can use just about any cleaner and we are not aware of any cleaner that will damage POLYCOTE but it is a good idea to always test a small out of the way spot first. Wipe along seams, not across. To really show off your POLYCOTE ECS covering, after cleaning with Fantastic... use a bit of Armorall and buff dry & shiny.

**CARE:** Avoid puncturing. Avoid leaving your model in a closed car exposed to direct heating from the sun for lengthy periods. Temperatures under such conditions can exceed 50C (122F) and sagging may occur.

**TIGHTENING:** To tighten POLYCOTE ECS we recommend using a medium-high temperature **heat iron on the seams, edges, around perimeters and over solid surfaces.** Use a heat iron "sock" on the iron and push down firmly on the covering over solid areas to bond the covering to the underlying substrate. Work with the iron set at 250-300F. You may also work with a heat gun over solid surfaces provided that all edges and seams are set with a heat iron first. If using a heat gun over solid surfaces, make sure the edges are firmly set with a heat iron first then use the heat gun to heat about 1 square foot of area at a time, then rub the warm covering down firmly with a soft cotton cloth to bond the covering to the underlying substrate. **DO NOT USE A HEAT GUN NEAR EDGES & SEAMS.** Higher temperatures may assist with complex curved surfaces. Use a medium-high temperature **heat gun on POLYCOTE ECS applied over open bays.** Always practise on the bottom of a less noticeable section first. Be patient and work systematically... you will likely only have to tighten POLYCOTE once or twice to accommodate any shrinkage of the airframe in dry hot conditions.

**RESEALING SEAMS:** POLYCOTE ECS seams are sealed with our SURE SEAL system and will not normally lift. If you find a loose edge, clean any oil residue from the area and the edge and reseal with thin CA.

**PATCHING:** If you puncture POLYCOTE ECS, clean any oil residue from the area of the puncture. We clean using Fantastic and then a paper towel moistened Pacer De-Bonder or alcohol or water to remove any remaining residue from the surface. The patch should be 1/2" bigger than the hole on all sides. We recommend using POLYCOTE patch sheets if provided with your model or polyester covering such as POLYCOTE, ULTRACOTE or ORACOVER and the use of a heat iron and soft cloth. Monokote, SolarFilm or V-COTE covering material will also work. Cut the patch with rounded corners. Seal the patch in place with a heat iron set at 250F first and then tighten the patch and the original covering around the patch as outlined in the tightening section above. To repair larger more extensive damage areas, you may wish to obtain the appropriate POLYCOTE ECS covering set for this model.

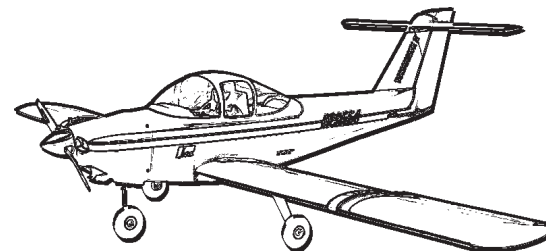
**CUTTING:** POLYCOTE ECS is made from ULTRA TOUGH POLYESTER. Where possible, use scissors to cut POLYCOTE. Scissors work well. Otherwise use a new sharp #11 Blade. **The blade must be SHARP.**

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Check for updates and more information about POLYCOTE ECS at [www.richmondrc.com/polycote.htm](http://www.richmondrc.com/polycote.htm)

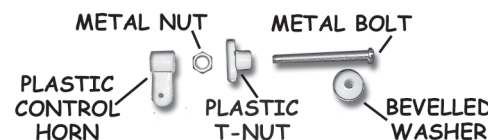
# HINTS & TIPS

## TOMAHAWK



**OUR CONTROL HORNS** are unique. They do not look like most of the control horns you have seen before and you may think they are missing. They are in the control horn parts bag inside the master bag of hardware and consist of a metal bolt, metal nut, beveled white plastic washer, a white plastic T-nut and the white plastic control horn itself that connects to a clevis or rod.

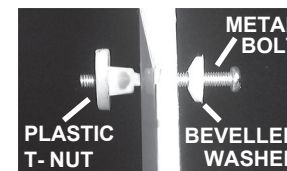
**Control Horn Set Before Installation.** Note 5 parts make up the set.



(Note: In Light Duty applications the Metal Nut may not be included)

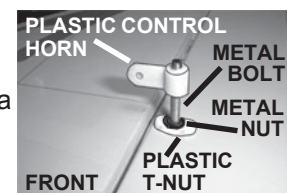
### Control Horn Set Partially Installed

Note that the bevelled washer has the bevel side facing the control surface and the flat side against the head of the metal bolt.



### Control Horn Set Fully Installed

Note that the metal nut has been tightened down snugly against the top of the T-Nut as a safety lock. Then the plastic control horn is threaded on to the metal bolt as shown.



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## ASSEMBLY MANUAL INFO

Please see the Assembly Manual for...  
Components & Parts Supplied... Page 4  
Tools & Shop Materials... Page 5  
Assembly Procedure... Page 6-18  
Setup Information... Page 19  
Cowl Installation Tips... Page 20-21  
After Market Parts for this model... Page 22

1. During construction use Low Tack Masking Tape only. The green painters masking tape works well.

2. Before beginning Stage 1 on Page 6, remove any lockdown material and/or foam pads from the wing. Be careful when removing tape. Pull tape strips back on themselves... do not pull tape away from the wing. Be very careful when removing tape that crosses a seam or edge in the covering. Remove any Tape Residue with alcohol or other not abrasive solvent. Test small area first.

3. On Page 7 Stage 4 in pictures 4.2 & 4.3 you can see the wing bolt holes cleared of covering. Before clearing the holes. wick a bit of ZAP (thin) CA into the covering area from inside the hole, externally press the covering around the hole, let the CA dry, cut with sharp #11 blade.

4. On Page 8 Stage 5, some servos have a rubber boot strain relief around the wire coming from the servo. Notch the bottom of the servo rails shown in pictures 5.2 to clear the rubber boot or wire if required.

5. On Page 8 Stage 5, you can open up clearance slots in the aileron servo cover plates using a narrow drum sander and a dremel tool. Work carefully from the inside of the plate.

6. On Page 8 Stage 5, Use a long servo arm and mount the servo as close to the servo cover plate as possible to maximize the length of the servo arm protruding from the bottom of the wing.

9. Please note that this model has ailerons located outboard on the wings and flaps located inboard on the wings. The ailerons are activated by a servo in the bottom of each wing. The flaps are optional and will require two servos located in the more inboard wing cavities. **(More Tips Next Page)**