Jason flies his Exhila 3D electric, available from Jason's Model Concepts (JMC). JMC offers innovative aircraft optimized for aerobatics and 3D flying. For more information, visit: ***www.jasonshulman.com/jasonsmodelconcepts.***

their thumb/finger prefer not to have so much Expo. It's all in how it feels to you, the pilot.

Power. The general rule of thumb is that you need a 2:1 power-to-weight ratio. This gives you the ability to hover at a throttle setting of less than full power and leaves you with reserve to get out of those bad situations. Generally when I am hovering it is at 1/4 to 1/3 throttle. When hovering down low, there isn't much room for error, so having the ability to punch out of a bad situation is a must. This extra power also allows for variances in the type of hovering you do.

Focus. There are 2 things I focus on when hovering, one is visual visual and the other is mental. The visual portion is just that, where are my eyes looking? I personally look at the canopy area of the plane when hovering. This way I can see the whole airplane. I also know that if the rear of the canopy is below my eye level, I am about to touch the rudder to the ground. But generally I try to see the whole plane, this gives me the best idea of the actual attitude of the plane and the control inputs I need to give it. The mental aspect of hovering is to think ahead of what the airplane is going to do. While torque rolling, I try to think at least 1/2 rotation ahead of the plane. So if I am looking at the bottom of the plane, I visualize, in advance, what is going to happen when the plane rotates to the point that I can see the top side—and I begin to make any needed corrections while still looking at the bottom. Good luck to all who choose to explore this exciting maneuver!

Jason Shulman, among the top RC aerobatic and 3D pilots in the world, has been flying since he was three and competing since 1981. Jason has won several top-5 finishes at the Tournament of Champions (TOC) and has taken 4th at the FAI World's competition. For more detail on Jason's life as a top RC pilot, checkout a fascinating interview with Jason at RCUniverse.com.

Note

VMAR - EASY 3D
FUN SPORT MODEL

VMAR - EASY 3D

Assembly
and
Operations Manual

Please review this manual throughly
Before assembling or Operating
the
VMAR-EASY 3D
FUN SPORT MODEL

Before proceeding please check for additional information related to this model at *www.richmondrc.com*

POLYCOTE™ ECS
ENHANCED COVERING SYSTEM

WARNING

- **This model is designed and constructed to be very light for 3D maneuvers at low to moderate speed and light to moderate stress.**
- **This model is not designed or manufactured for high speed flight.**
- **Do NOT fly at high speeds under full throttle. The model may break up suddenly if flown at high speeds under full throttle.**
- **Do NOT fly on horizontal straight line at full throttle as sudden brake up during flight is possible.**
- **Full throttle should only be used for climbing vertically, loops and rolls or in the case of an emergency where power is needed.**
- **When descending, reduce your power setting immediately. Do not allow the model to accelerate to high speeds in a dive.**
- **Do NOT overpower this model. Normal operation requires only half throttle.**
- **Careful use of the throttle is required to prevent breakup of this model in flight. Do not overpower or overstress this model.**
- **This model is for intermediate and advanced RC model pilots. It is NOT suitable for beginners.**
- **This model has been flight tested with snap-rolls and other aerobatic maneuvers. Do NOT over-stress the airframe with repetitive, violent, extreme or high speed maneuvers.**
- **Inspect this model thoroughly before and after each and every flight. Watch for stress cracks, loose joints or other abnormalities. Repair any defects before flying.**
- **Be alert for unexpected and/or irregular responses during flight. Slow down, reduce stress on the airframe and land immediately if flight response is compromised in any way.**
- **Check all linkages, hinges, components and control surfaces before and after each flight. Although this model may be partially pre-assembled you are solely responsible for the integrity and flight worthiness.**
- **Do NOT overpower this model. This model is designed for 2 stroke .46-.52 sized glow fueled engines OR similar power four stroke engines or similar output electric motors. Overpowering this model will result in airframe failure.**

Liability Disclaimer
It is important that the following liability disclaimer be

READ BEFORE ASSEMBLING OR USING THIS PRODUCT.

Model airplanes, model engines, model engine fuel, propellers and products such as the EASY 3D semi scale sport model can be hazardous if improperly used. Be cautious and follow all safety recommendations when using your Model . 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 solely 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. Do not fly until it's right!

THRUST TO WEIGHT RATIO

The engine must be able to lift the plane vertically, which is a combination of propeller selection and fuel. You need a power to weight ratio of at least 1.5 to 1. We do not want to hover at full throttle, we want to ideally hover at half throttle. We need the reserve power because we are vectoring propwash off the ailerons to generate the high degree of roll, and this robs lift and requires the increase in throttle. A high speed torque roll requires the most power, in the order of 2:1 just to maintain altitude! Suffice to say that this is a very advanced hovering maneuver! You need a very reliable engine. Hovering is great until the noise stops!

Do not use an engine that has a history of running hot or lean. On the average .40 powered ship, look to configure your plane with a "heli-like" setup. By this I mean, choose a prop with the biggest diameter and lowest pitch which will function with the landing gear and flight envelope of your plane. I have found that the 11x4 prop is outstanding for hovering with most .40 powered planes. The engines swing it easily, (you do not want to over heat), and the four inch pitch generates gobs of thrust at lower flight speeds.

Fuel selection is important. Since we are trying to hover at half of our available throttle, consider using a higher nitro fuel. The more nitro, the cooler the engine runs. This is because the nitro brings more oxygen into the engine and this is where the power boost and substantial cooling takes place. High Nitro causes harm when you are at high throttle settings and at rpm's that overcome the cooling effects of the nitromethane.

The closer you are to the ground, the faster you detect, and can react to, which way you are drifting. Note that the tail feathers and the servo gears that push them are a bit fragile and not used to contacting the ground before more rugged parts of the plane do!

FLYING

You might think that heli experience is helpful, but there are conflicts with that logic. When you stand your plane on its tail, the yaw axis is controlled by your ailerons, not the rudder. The rudder, (left stick) controls the roll axis! Heli pilots need to teach their fingers some new tricks or they will find themselves in trouble!

The throttle, of course, is no longer fast and slow, it is now for rising and decending. There is no "chopping the throttle" when you get in trouble here! Try that, and you will find that tail first impacts break things on your plane that you have never seen broken before.

Start with transitioning to hover by practicing holding higher and higher angles of attack and learning how much throttle to add to compensate for the lost lift, no longer generated by the wings. As you pass through the 45 degree angle point, you will find that your speed drops almost to zero very quickly. You'll need the most right rudder at around 45 degrees. As you approach vertical, you'll find that most planes still want some right rudder, even when hanging vertically. I believe this has more to do with countering torque than any other factor, whereas the rudder compensation at the 45 degree angle is almost all due to "P" factor. (more on "P" factor in a future column).

If your plane needs too much throttle to make the transition and you constantly end up gaining altitude in order to get the plane into the vertical position, this suggests that you are nose heavy, or lacking in elevator authority needed to swing the tail under the plane. Running the CG aft of the recommended area is tricky business, but it can make all the difference in a stable transition. Practice is the key, but keep a careful eye on the fuel tank and the air/fuel mixture feeding the engine. You can't afford for the engine to go lean now!

Flying into and out of a stable hover requires power. If your plane does not have a low wing loading, you may find that it belly flops when you go to exit the hover. This is due to the rapid transition back to "wing-borne" flight—this transition may leave you at such a low airspeed that the wings won't to hold the plane up. Expect that the plane will need a boost of power to get it back to "horizontal" flying speed! Give it this boost just as it starts to pitch over.

Like your first landings, a quality performance takes practice. Start a bit on the high side to see how your plane behaves and stick with it. Soon you will be hanging in space. One thing that hovering teaches you is to be a master of your left hand!

Good Luck-Dave Baron

HOVERING TIPS FROM THE MASTER

by Jason Shulman

Editor's note: we asked noted TOC pilot Jason Shulman whether hovering smaller models was different from hovering large TOC-size aircraft, and also for his views on the basics of hovering, from setup to pilot focus.

Jason Shulman: I recently had a great opportunity to judge this first hand at the Joe-Nall giant scale fly-in. I was hovering my Exhila (one pound all up weight) on both calm days and windy days. I was also hovering a few 30% and larger planes during these same conditions. The first thing I noticed is that in calm conditions, there was really no difference. Everything was smooth and predictable. But the windy conditions posed a few differences. The small plane was very sensitive to the wind in hover. Not so much in terms of drift, because even the large planes drifted. But the slight variances in the wind would throw the Exhila around, while not really bothering the larger planes.

I also noticed that the smaller plane would hover, at times, at a 45-degree angle (leaning into the wind), whereas the larger planes would hover at about a 15-20 degree angle in the same winds. This made the smaller plane much harder to hover. Once you start pushing to a 45-degree angle, you are entering a kind of forward flight with the associated flight characteristics. So not only are you trying to balance the plane on its tail, but you are also trying to keep it from flying forward.

Although both large and small hovering planes will drift in the wind, one of the most apparent differences is the speed of the drift. When I hovered the large planes, drift was relatively slow, and smooth looking. The Exhila was a different story: it scooted across the field like it was flying level at 1/3 power.

SETUP

When setting up a plane to hover, regardless of size, you follow the same principles.

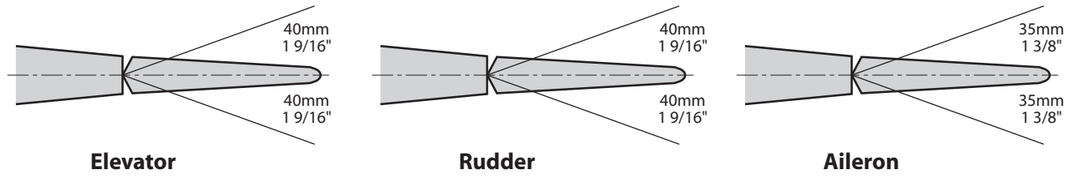
Center of Gravity (CG). The CG should be slightly aft so that the plane is slightly tail heavy as compared to the normal, or recommended, flying CG position. The larger the plane, the larger the CG range is. On my Exhila, moving the CG back 1 inch can cause it to be very unstable and almost impossible to fly. On my TOC planes, I can move the CG back 3-4 inches and they will still be controllable. Generally, I move the CG back 1/2 in. at a time on the larger planes, and 1/8 in. on the smaller planes. There is also a point where you can have the CG back too far and hovering becomes harder to perform.

Control Throws. I have found it best to fly with dual-rates. I set a low rate, which is good for general or pattern flying and then max out all of the surfaces for a high rate of roughly 45-degrees of deflection for hovering. I fly thumbs, so I like a little bite of Exponential on my low rates and a much higher setting on my high rates. My set-up on Expo is for a "soft-center" feel on both rates. Pilots that fly with

Step 28 C.G. AND THROW SPECIFICATION

Control Surface Movement

ELEVATOR	40mm (1-9/16") up 40mm (1-9/16") down
RUDDER	40 mm (1-9/16") right 40 mm (1-9/16") left
AILERON	35 mm (1-3/8") up 35 mm (1-3/8") down



REPLACEMENT PARTS & ACCESSORIES:
In the event that you require replacement parts or accessories for this model please contact your retailer or order On-Line at ***www.richmondrc.com***

MORE INFORMATION:
For other information related to this product please see ***www.richmondrc.com***

FREESTYLE

by Dave Baron daveb@flyrcmag.com

Hovering explained!

I am really glad to be writing this new column and especially to be a contributor to Fly RC Magazine! This magazine is going to be the place to discover and learn about the best and coolest gear, and this column is where you will learn to sharpen your piloting skills! It is a special interest group within the AMA that is dedicated to hyper maneuverable flight and pitting you and your plane against the top-watch! If you have ever considered yourself a hot pilot, show up at one of their contests and prepare to be amazed. Check them out at www.ncffafunfly.org

My Minus is a great hovering plane that transitions easily to hover without gaining altitude. It is light, with an aft center of gravity that is at 35% of the wing chord (from wing leading edge to aileron trailing edge). The Minus is a Skipp Turner design. You can reach Skipp at airworthy@aol.com.

HOVERING

What is the attraction to hanging your plane on its nose and holding it otionless and in full control? Simple answer, it's cool! I am going to explore the phenomenon, the kinds of planes that hover best and what you need to know to teach yourself this great flying skill.

PLANES, ENGINES AND PROPS

The most important aspect of your selecting a plane to hover is its weight. Your plane must be light. Secondly, you need to have substantial control surfaces on the rudder, elevator and ailerons that are in the prop blast of the engine. Planes that have ailerons only on the outboard section of the wing are unsuitable, because with no airflow over the ailerons, there is no control in hover no matter how far you deflect them!

I have found that planes with longer fuselages, while more stable in pitch, are not necessarily good for hovering. This is because the rudder and elevator are too far from the slipstream of the prop. You need a strong slipstream over the tail feathers for control.

There are several ways to improve an airplane's ability to hover. One is to move the CG aft incrementally—a little at time so that you can test the result. An aft CG helps a lot in the transition from normal flight to hover and back, but use care, as you do not want to go so far that you give up your stability in normal flight! Another concern is flaperons that are coupled to the elevator. While this gives the tightest loops on most fun-fly planes, it does not help in hovering. In hover, flap deflection on most models sends the plane in the opposite direction (in pitch) than you desire. I advise that you turn off this function, or turn it down so less than 10 percent of flap throw is mixed into elevator throw.

INDEX

INTRODUCTION

Thank you for purchasing a VMAR product. VMAR Manufacturing is committed to delivering superior value to the RC modeler. Your new EASY 3D is the market leader in features, ease of use and flexibility. Please review these instructions before beginning the simple assembly procedure.

We've used metric measurements throughout these instructions. We know that some of you like metric while others think that furlongs per fortnight makes a nifty velocity indicator. If you are in the furlong camp, bear with us….

It's not a big deal…3 millimeters is stated as 3mm and 3mm is about 1/8 of an inch. Fire up your calculator and you will find that 25.4 mm makes an inch. In places where you have to actually set up something according to a recommended measurement, we've listed an approximate imperial measurement in inches in brackets.

Whenever we've used the directional terms left or right , they are with respect to the model when viewed as you would when sitting in the cockpit…that is when viewed from the back looking forward.

REVIEW PACKING LIST, GATHER YOUR TOOLS & SHOP MATERIALS.

You've taken the lid off the box and grabbed the instruction booklet…you are about 6-8 hours away being ready to go flying! Now is the time to look over what's in the box. Please see the included Packing List and review the contents and make sure nothing has been damaged in shipping. Damage or missing components must be reported to your vendor BEFORE any assembly begins.

Please DO NOT START if something is damaged or missing. As you can imagine, once you join the wing halves attach the stabilizers or install your radio or engine your options for returns are very limited. Your vendor will not be able to provide you with exchanges or replacements of parts that have been assembled. DO NOT START UNLESS IT'S RIGHT!

CHECK OFF OPTIONAL EQUIPMENT AND ACCESSORIES.

- These items are not included and are not required but make the operation of your EASY 3D and most other remote control aircraft easier & more enjoyable.
- Power Tote Deluxe field box # VMA-PT109D
- Fuel pump and connecting tubing
- Fueling valve
- Chicken stick or electric starter
- Stick on weights
- Battery to power electric starter
- Battery charger
- Power Panel to manage starter and pump if electric.
- Extra propellers
- Extra Glow Plugs
- Misc Tools
- Engine test stand # VMA – ETS120

CHECK OFF COMPONENTS AND PARTS INCLUDED.

Major components and sub-assemblies
- ❑ - 01 Fuselage (pre-installed engine mount)
- ❑ - 02 Wing halves (left and right)
- ❑ - 01 Vertical stabilizer with pre-installed rudder.
- ❑ - 01 Horizontal stabilizer with pre-installed elevator .
- ❑ - 01 Fiberglass cowl
- ❑ - 01 Landing gear (6061 T6 Aluminum)
- ❑ - 01 Documentation set including instruction booklet
- ❑ - 01 Set of patch and/or trim sheets if required
- ❑ - 01 Master bag

Contents of master bag
- ❑ - 02 Ultralight threaded wheels
- ❑ - 01 Landing gear (6061 T6 Aluminum)
- ❑ - 01 Spinner parts bag
- ❑ - 01 Control horn parts bag
- ❑ - 01 Tail wheel parts bag
- ❑ - 01 Miscellaneous parts bag
- ❑ - 01 Spare parts bag

Contents of main landing gear parts bag
- ❑ - 04 Mounting screws
- ❑ - 02 Axle assemblies with wheel collars

Contents of wing parts bag
- ❑ - 02 Aluminum tube wing joiners
- ❑ - 02 Aileron control rod assemblies with clevises
- ❑ - 02 Wing mounting butterfly nuts (or nuts) & washer.

Contents of spinner parts bag
- ❑ - 01 Spinner with allen screws
- ❑ - 01 Allen wrench
- ❑ - 01 Spinner shaft collet set

Contents of control horn parts bag
- ❑ - 04 Metal bolts 3mm x 35-40mm
- ❑ - 04 Metal nuts 3mm
- ❑ - 04 Plastic control horns
- ❑ - 04 Plastic T - nuts
- ❑ - 04 Plastic beveled washers

Contents of tail wheel parts bag
- ❑ - 01 Pre-assembled wire, wheel and bracket assembly
- ❑ - 02 Mounting screws

Contents of miscellaneous parts bag
- ❑ - 01 Allen wrench for control rod EZ connector if fitted

Contents of spare parts bag

Assortment of extra spare parts that are not required but may come in handy in service

In addition to the items in the parts bags the following items have been pre-installed or placed into the fuselage at the factory.
- ❑ - 01 Fuel tank assembly with stopper, clunk and pre-bent metal tubing.

CHECK OFF TOOLS AND SHOP MATERIALS NEEDED.

These tools and shop materials are not included and are required to complete and operate your EASY 3D and most other remote control aircraft.

- Clean and flat table or work surface approximately 600 x 1800 mm (24 x 72 in)
- 2.5 mm ball socket screw driver or Allen wrench
- 3.0 mm ball socket screw driver or Allen wrench
- 4.0 mm ball socket screw driver or Allen wrench
- Phillips (cross head) screw driver small size
- Phillips (cross head) screw driver medium size
- Flat blade screw diver medium size
- Low tack masking tape.
- Ruler or tape measure
- Side (“wire”) cutters
- Pencil, pliers and hobby knife with #11 blade
- 30 minute Epoxy and 240 grit sandpaper
- Silicon Based Sealant (Dap – A – Goo)
- Epoxy mixing dishes, brushes and sticks
- Paper towels
- Rubbing alcohol
- Crescent wrench (optional)
- Heat gun and heat iron for covering (optional for covering touch up)

CHECK OFF OTHER ITEMS NEEDED TO COMPLETE EASY 3D FUN SPORT MODEL

- These items are not included and are required to complete and operate your VMAR MODEL and most other remote control aircraft.
- Medium fuel tubing appropriate for your choice of engine and fuel. 500 – 750 mm (24-36 in.)
- Liquid thread locker
- RC FM radio with at least four channels of control and on a frequency appropriate for your market area.
- Five servos compatible with the RC FM Radio. Servos generally are sold with new radio systems
- External Switch Actuator appropriate for your radio system (optional)
- Engine and muffler suitable for use in a remote control model aircraft. A two stroke glow fuel .40-.52 cubic inch engine is recommended
- Propeller suitable for the engine. See the engine instruction manual recommendation for diameter and pitch.
- Engine glow plug
- Engine glow plug igniter
- Engine 4 way wrench
- Fuel for the engine
- “After run” oil for engine
- RC Foam sheeting for wrapping radio receiver and battery pack.

Step 23 INSTALLING THE RECEIVER BATTERY

Step 23.1 Consult your radio manual for instructions about hooking up your receiver battery, receiver and switch harness.

Step 23.2 Wrap the battery pack securely in foam suitable for RC equipment and wrap the foam insulated pack in a plastic bag or cling wrap.

Step 23.3 Thread the battery pack connector back through from beneath the fuel tank to the radio compartment by passing the battery connector through an opening beside the fuel tank.

Step 23.4 Connect the battery connector to your radio system according to the radio manual.

Step 24 INSTALLING THE RECEIVER

Step 24.1 Consult your radio manual for instructions about hooking up your receiver.

Step 24.2 Plan where you are going to put the receiver with consideration for routing the antenna safely.

Step 24.3 Wrap the receiver securely in foam suitable for RC equipment and wrap the foam insulated receiver in a plastic bag or cling wrap.

Step 24.4 Generally in the absence of specific instructions from the radio manufacturer, it is recommended that the receiver should be placed where it is least likely to have impact during a crash. Keep the battery pack and other heavy loose items ahead of the receiver.

Step 25 CONFIRM RADIO OPERATION

Step 25.1 Consult your radio manual for instructions about testing and operating your radio system.

Step 25.2 Pay particular attention to charging your radio system batteries and range testing the system before and after each flight.

Step 25.3 Check that all controls are working correctly before and after each flight.

Step 26 BALANCING THE AIRCRAFT.

The CG for your Easy 3D is located at 130 - 140 mm (5 1/8” to 5 1/2”) back from the leading edge of the wing when the wing has been attached to the fuselage.

For the initial flight, the CG should be located at 130mm (5 1/8”) back from the leading edge of the wing when the wing has been attached to the fuselage.

The CG is measured with the engine, radio gear and all other components installed but WITH NO FUEL IN THE TANK.

Set up the CGI as it will be when you fly it BUT WITH NO FUEL IN THE TANK.

It is very important to have the CGI correct. Flying your model with the CG too far will likely lead to loss control and a crash.

If you discover that after you have assembled your model and installed your radio and engine that the CG is incorrect you must bring the CGI to the correct location by doing the following BEFORE FLYING :

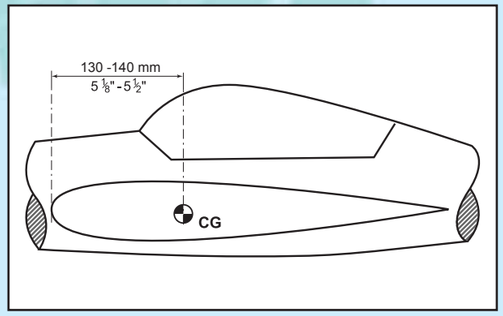
- Move the battery pack fore or aft.
- Move other components fore or aft.
- Change engine to a lighter or heavier model.
- Add weight to the nose or tail. If adding it to the nose, try to make it useful by going to a heavier duty engine or adding a spinner with a heavy metal backing plate. As a last resort, add stick on “dead” weight where appropriate.

Step 27 CONFIRM MECHANICAL INTEGRITY

27.1 Once you have confirmed that the CG is correct, you should do a thorough review of the entire model before your first flight. Check everything twice! Every hook up, every coupling, everything! Do it twice!!

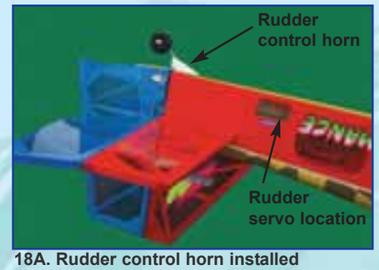
27.2 Before your first flight, have an experienced flyer review your work. Do not fly your model until it has been checked out by a third party who knows how to fly and how to set up a model aircraft

27.3 Once you have completed your first flight, get in the habit of checking your model over before and after each flight! Don’t fly if you find something that is not right!

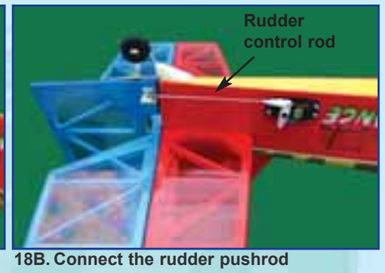


Step 18 INSTALL THE RUDDER SERVO AND PUSHROD

Install the rudder servo in its cavity (See 18A and 18B). Connect the rudder servo to the receiver and turn on your transmitter. Center the transmitter rudder trim and center the rudder (hold with low tack tape) before connecting the control rod.



18A. Rudder control horn installed and shown in position



18B. Connect the rudder pushrod to the rudder control horn

Step 19 CONNECTING THE THROTTLE CONTROL

Connect the clevis to the engine throttle arm at roughly half throttle. Look into the throat of the engine carburetor as you rotate the throttle arm and select a position where the throttle opening is about half what it is when fully open.


19A. Typical throttle control connection

Step 20 ADJUST CONTROL SURFACE THROW LIMITS.

Adjust the deflection of the control surfaces to match the specifications on page 14.

You can reduce the amount of throw by doing either or both of the following:

From the servo end, move the clevis or EZ connector to a hole in the servo arm that is closer to the servo output shaft.

From the control horn end, move the horn out further on the threaded bolts. Always confirm that the horn is still thoroughly engaged with the threaded bolt after you have adjusted it.

Step 21 FINAL R/C SET-UP

Before starting the final set-up of the model, switch on the radio and ensure that all trims are in their neutral positions. Check that the ailerons, elevator and rudder are centered. If any adjustments are needed, do these by uncoupling the relevant control and turning it clockwise to shorten the linkage or counter-clockwise to lengthen it. Only when each control surface has been centered mechanically in this way should you begin adjusting the surface movement (or throw)

Step 22 CHECKING CONTROL SURFACE MOVEMENT

Now confirm that the control surfaces are moving in the correct direction. Check the up-down of the elevator, the left-right of the rudder and the roll left-roll right of the ailerons. Use the reverse switches on your transmitter to reverse the direction of a servo if necessary. The most popular transmitter mode (with the throttle on the left, with ailerons and elevator on the right) is shown here.

Step 1 INSTALLING THE PLUG-IN WING

To install the plug-in wing of the Easy 3D you will need the following parts.

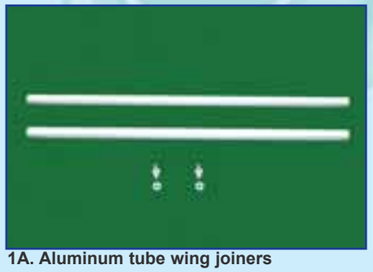
- Right & left wing panels.
- 2 aluminum tube wing joiners 370 mm (14 1/2”) long and 12mm (1/2”) diameter
- 2 metal washers 4mm
- 2 steel butterfly nuts 4mm (or nuts)

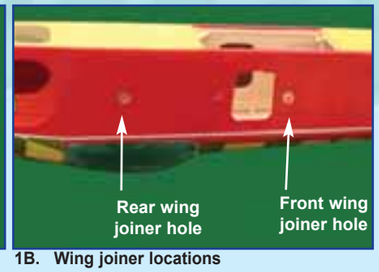
Step 1.1
Turn over the fuselage and remove the hatch cover. See 1.B.

Step 1.2
Insert the front wing joiner tube and the rear wing joiner tube. See 1C.

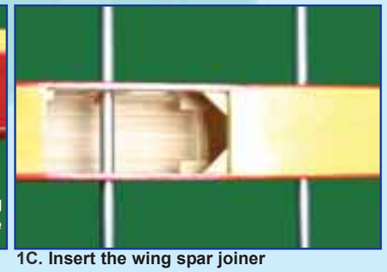
Step 1.3
Carefully slide each wing on to the wing joiner tubes while threading the servo wiring harness through the side of the fuselage.

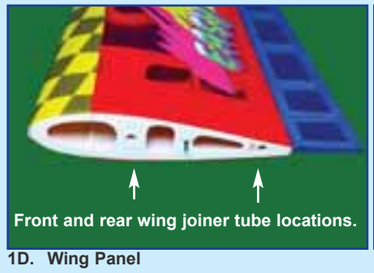
Step 1.4
Install the washer on the metal wing bolts and then the wing nuts. Tighten the wing nuts.


1A. Aluminum tube wing joiners



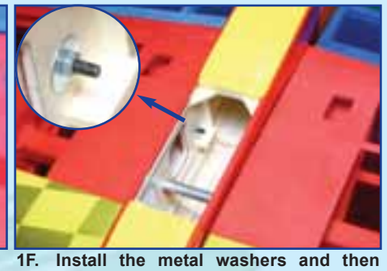
1B. Wing joiner locations


1C. Insert the wing spar joiner tubes into the fuselage.



1D. Wing Panel


1E. Plug in both wing panels


1F. Install the metal washers and then tighten the wing nuts.

Step 2 FITTING THE AILERON SERVOS

To install the aileron servos into the wing you will need the following items:

- Servos
- Servo mounting screws and grommets as supplied with the servos.
- Servo control arms as supplied with the servos.
- Two aileron control rod assemblies supplied with the kit. The assemblies consist of a metal rod with a clevis screwed onto one end.
- 2 aileron control horn assemblies

Connect aileron extension wires to each aileron servo. Install the aileron servos into their mounting cavities per figure 2D while threading the extension wires through to the wing roots.


2A. Prepare the servos by fitting the rubber grommets & ferrules supplied with your radio

2B. Easy 3D

2C. Aileron servo location

2D. Install aileron control horn

Step 3 FITTING THE SERVOS

Step 3.1

Consult your radio instruction manual and center each aileron servo by plugging it into the aileron channel of the receiver. Turn on the transmitter and then the receiver. Center the aileron trim lever on the transmitter. Remove the servo arm mounting screw and the servo arm.

Step 3.2

Mount the servo arm back on the servo. Position the arm to be parallel with the back edge of the wing. Screw the arm into place with the servo arm mounting screw supplied with the servo.

Locate the two aileron control rods in the hardware bag. Ensure the clevises are screwed well onto the threaded portion of the rod. Rotate and tug aggressively on the clevises and ensure that they are not loose on the rods.

Tape the ailerons into their neutral position so that they are even with the trailing edge of the wing and not pointing either up or down.

Step 3.3

Ensure that the aileron control horns are screwed onto the threaded aileron control horn bolts and that both control horns are in approximately the same place on their respective bolts.

Step 3.4

Connect the aileron servo rods to the aileron control horns per figure 3B. and 3C.

Step 3.5

Connect the clevis to the servo output arm

Step 3.6

Remove the masking tape holding the ailerons.

Step 3.7

In the case of computer radios couple the servos together by connecting them to the appropriate receiver channel. In the case of analog radios couple the servos together using a Y harness.

Step 3.8

Turn on your radio and activate the ailerons, using the aileron stick and ensure a smooth full motion can be achieved.

Step 3.9

With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the left raises the left aileron and lowers the right aileron. Movement of the stick to the left will roll the aircraft to the left. (Counterclockwise roll of the wing when viewed from the back).

Step 3.10

With the wing top side up and viewed from the back, ensure that moving the transmitter aileron stick to the right raises the right aileron and lowers the left aileron. Movement of the stick to the right will roll the aircraft to the right.(clockwise roll of the wing when viewed from the back).

3A. Aileron control rod assembly

3B. Aileron control horn assembly

3C. Aileron control installed

Step 15 INSTALLING THE ENGINE

To install your engine, please follow the sequence illustrated below.

15A. Engine mounts pre-installed on firewall.

15B. Clamp engine to the engine mount

15C. Engine and engine mount recommended orientation.

15D. Pre cut cowl

15E. Use scissors to cut the cowl as shown. Attach cowl with screws.

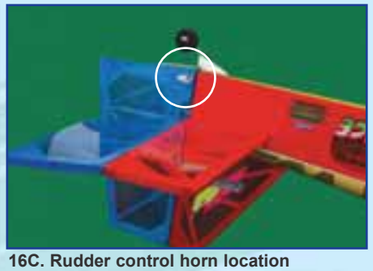
15F. Install the muffler and connect the fuel and pressure line

Step 16 FITTING ELEVATOR AND RUDDER CONTROL HORNS.

The elevator control horns are fitted to the underside to the underside of both the right and the left elevator halves. Pierce the covering over the pre-drilled holes and install the control horns as shown.

16A. Control horn assembly

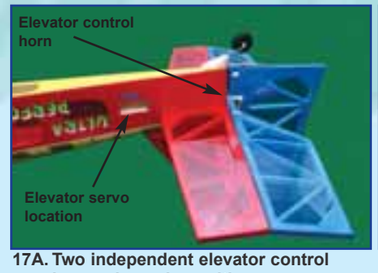
16B. Elevator control horn locations.



16C. Rudder control horn location

Step 17 CONNECTING THE PUSHRODS TO THE ELEVATOR

Install the elevator servo in its cavity (See 17A and 17B). Connect the elevator servo to the receiver and turn on your transmitter. Center the transmitter elevator trim and center the elevator (hold with low tack tape) before connecting the control rods.



17A. Two independent elevator control horns shown in position

17B. Connect the elevator pushrods to the control horns

12C. Locate the 4 pre-drilled main landing gear mounting holes on the bottom of the fuselage.

12D. Use 4 metal sheet screws (5 x 35mm) to mount the main landing gear onto the fuselage

Step 13 FITTING THE TAIL WHEEL

Install the tail wheel assembly. Note that the tail wheel assembly has a loose wire end. Slide the loose wire end into the sleeve tube that has been installed into the bottom of the rudder. Position the plastic bracket on the bottom of the fuselage. Mark the location of the screw holes. Tap the holes with the screws and then fasten the plastic bracket to the fuselage. See the illustrations below.

13A. Insert the tail wheel steering wire into the steering guide tube

13B. Screw the tail wheel assembly to the fuselage

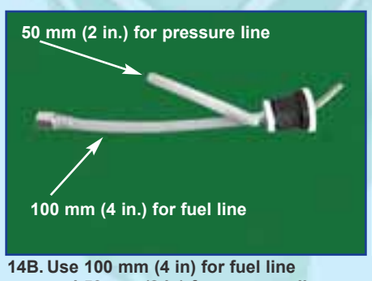
13C. Trim off the excess tail wheel steering wire with side cutters.

Step 14 FITTING THE FUEL TANK

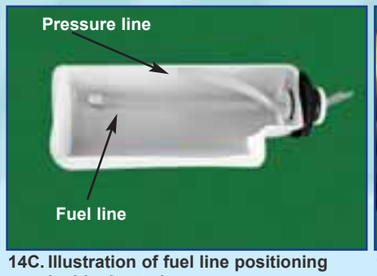
To assemble the fuel tank you will need the following items:

- The fuel tank and fuel stopper assembly (supplied)
- The clunk (supplied)
- About 20cm (7") of medium ID silicone fuel line (DUB 197 or similar)
- Cross head Philips screw driver
- Silicone sealer or Pacer Dap-A-Goo.

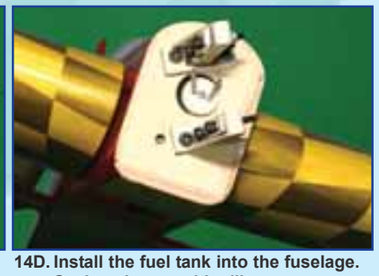
14A. Fuel tank



14B. Use 100 mm (4 in) for fuel line and 50 mm (2 in) for pressure line



14C. Illustration of fuel line positioning inside the tank

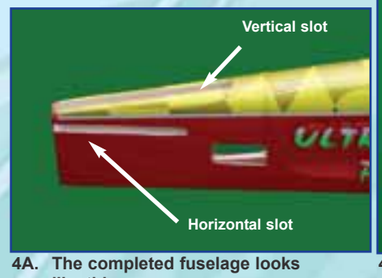


14D. Install the fuel tank into the fuselage. Seal neck area with silicone.

Step 4 FITTING THE HORIZONTAL AND VERTICAL STABILIZERS

To install the stabilizers to the fuselage you will need.

- Fuselage
- Vertical stabilizer with pre-installed rudder
- Horizontal stabilizer with pre-installed elevator

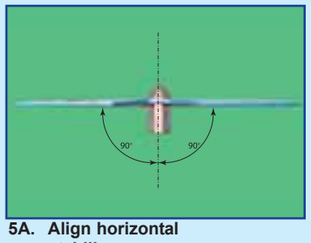


4A. The completed fuselage looks like this.

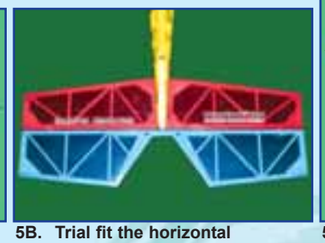
4B. Vertical stabilizer with pre-installed rudder and horizontal stabilizer with pre installed elevator

Step 5 ALIGN THE HORIZONTAL STABILIZER

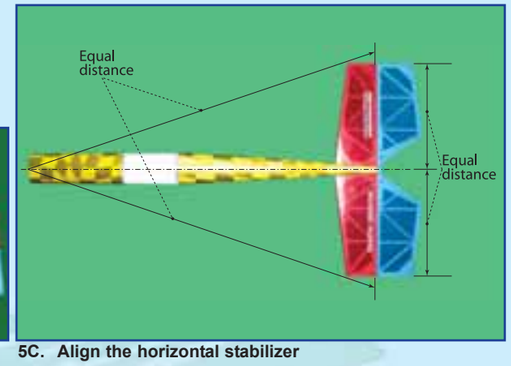
Check the fit of the horizontal stabilizer in its slot. Make sure the tail is square and centered to the fuselage by taking measurements as shown in the diagrams on the right, but don't glue anything yet.



5A. Align horizontal stabilizer



5B. Trial fit the horizontal stabilizer in its slot



5C. Align the horizontal stabilizer

Step 6 MARK THE HORIZONTAL STABILIZER

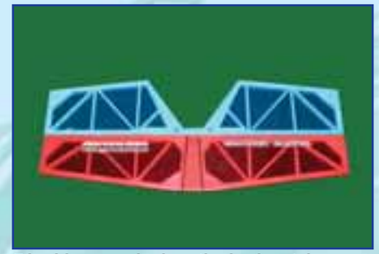
With the horizontal stabilizer correctly aligned, mark the shape of the fuselage on the top and bottom of the tailplane using a water soluble non-permanent felt tip pen as shown here.

6A. Mark the top of the horizontal stabilizer

6B. Mark the bottom of the horizontal stabilizer

Step 7 REMOVE SOME COVERING FROM THE HORIZONTAL STABILIZER.

Now remove the horizontal stabilizer and, using a sharp knife and a ruler CAREFULLY cut cut 2mm (3/32") inside the marked lines and remove the covering on the top and bottom of the tail as shown. Make sure you only cut the film and not the wood, otherwise the horizontal stabilizer will be severely weakened.



7A. Lines marked on the horizontal stabilizer

7B. Carefully cut inside the lines. Do NOT cut into the wood.

7C. Remove covering from the top surface.

7D. Remove covering from the bottom surface

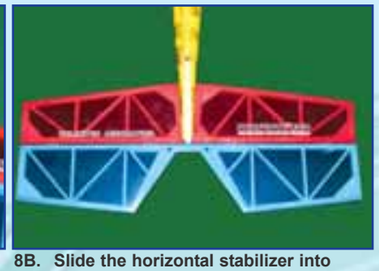
7E. Clean off any traces of pen

Step 8 INSTALL THE HORIZONTAL STABILIZER

Apply sufficient epoxy to the top and bottom of the horizontal stabilizer. Use 30 minute epoxy to ensure a strong bond and give yourself plenty of working time.

Insert the horizontal stabilizer in its slot in the fuselage and re-check the alignment as per figure 5C. Excess epoxy should be cleaned off with a rag or tissue before it cures.

8A. Apply plenty of epoxy



8B. Slide the horizontal stabilizer into place and align per Figure 5C.

8C. Wipe off excess epoxy

Step 9 TRIAL FIT THE VERTICAL STABILIZER WITH RUDDER

Check the fit of the vertical stabilizer in its slot. Make sure that it is square to the horizontal stabilizer and fuselage

9A. Trial fit the vertical stabilizer into fuselage slot.

Step 10 REMOVE SOME COVERING FROM THE VERTICAL STABILIZER.

Mark the shape of the fuselage on the left and right sides of the vertical stabilizer using a felt-tip pen. Now remove the vertical stabilizer and, using a sharp knife & ruler, CAREFULLY cut just 2mm (3/32") inside the marked lines and remove the covering on both sides of the fin, just as you did with the horizontal stabilizer, making sure you only press hard enough to cut the covering, not the vertical stabilizer.

10A. Mark both sides of the vertical stabilizer

10B. Carefully cut through the covering. Do NOT cut into the wood.

10C. Remove covering from both sides

Step 11 FITTING VERTICAL STABILIZER

Apply sufficient epoxy to both sides and the bottom of the vertical stabilizer. Use 30 minute epoxy to ensure a strong bond and give yourself plenty of working time.

Insert the vertical stabilizer in its slot in the fuselage and re-check the alignment. Excess adhesive should be cleaned off with a rag or tissue before it cures.

11A. Apply plenty of epoxy

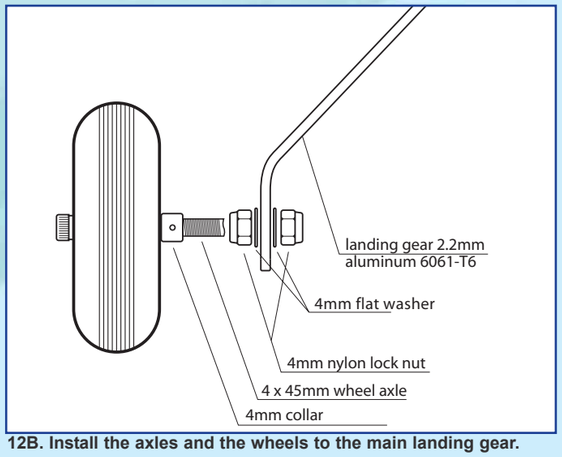
11B. Slide the fin into place

11C. Remember to insert the pre-installed hinge to the rudder

Step 12 FITTING THE MAIN LANDING GEAR

Identify the main landing gear components shown below
- 1 landing gear aluminum 6061-T6
- 2 axle assemblies
- 2 main wheels (60mm x 20mm)
- 4 sheet metal screws 5 x 35 mm with washers

12A. Main landing gear components



12B. Install the axles and the wheels to the main landing gear.