

AVHS

# EXTRA NG

Fully 3D Capable Semi-Scale  
Aerobatic Plane



PNF  
PLUG N FLY

## INSTRUCTION MANUAL

### Specifications:

- **Wingspan:** 1600mm
- **Length:** 1510mm
- **All Up Weight:** 2560g
- **Wing Area:** 48.6sq.dm
- **Motor:** SK3 5055-500KV
- **ESC:** Aerostar G2 80A

- **Servos:** 5 x 30g high torque MG
- **Prop:** 16x6 2-blade

### Recommended Battery:

- 6 S (3300~5000mAh) LiPo/LiHV
- 60C minimum (not included)



## CONTENTS OF MANUAL

|                                    |       |
|------------------------------------|-------|
| Introduction -----                 | 1     |
| Warnings & Safety Precautions----- | 2     |
| Contents of Kit -----              | 3     |
| Assembly Instructions-----         | 1-8   |
| Control Directions-----            | 9     |
| Control Throws-----                | 10    |
| CG Location -----                  | 10    |
| ESC Setup-----                     | 11    |
| Pre-Flight Checks-----             | 12    |
| Flying Notes & Tips -----          | 12-13 |
| Troubleshooting -----              | 14    |
| Spare Parts -----                  | 15    |
| Recommended Accessories-----       | 16    |



## INTRODUCTION

The Avios Extra NG (Next Generation) is a semi-scale model of the latest state-of-the-art airplane in the Extra series. The full size offers improved aerodynamics, an even higher degree of manoeuvrability, and precise handling. The Avios version of this incredible airplane inherits all these features to make it a great-looking, highly aerobatic, 3D-capable machine.

The powerful 6S setup includes a SK3 5055-500KV motor, Aerostar 80A RVS G2 ESC, and 16x6 propeller, this setup gives an incredible high power-to-weight ratio. This allows for continuous vertical manoeuvres and the capability of other extreme 3D aerobatics, including hovering, harriers, tumbling, torque rolls, and fast and precise tip spins.

Hi-torque, hi-voltage, metal-gear 30g Turnigy 30/7-DHV digital servos are used throughout. These have excellent resolution and centering so that your exact transmitter inputs are conveyed directly to the control surfaces for precise control in all types of extreme manoeuvres.

Included are a pair of bolt on "Side Force Generators" for increased side area, which makes for enhanced and easier knife-edge flying, including knife-edge loops, knife-edge figure of 8s, etc. A large canopy hatch allows for quick battery changes, and easy access to the RC equipment and quick assembly wing fixings. Also included are a set of day-bright LED lights for realism and added visibility in low-light conditions, and a set of optional wing tip "Dogs Teeth" (Turbulators). These increase drag and also the amount of lift over the wing tips and the outboard ends of the ailerons. This increases the effectiveness of the ailerons, particularly at low speeds when performing certain 3D manoeuvres.

The Avios Extra NG is manufactured in tough EPO foam which is finished to an exceptionally high standard. The model has a very low parts count which means it can be assembled very quickly, and it can also be assembled and disassembled at the airfield easily for transportation. Being PNF (Plug-N-Fly) it is supplied with the motor, ESC, servos, and pushrods, etc. The servos and the ESC are pre-installed, but the motor does require installation and connecting to the ESC.

We at Avios hope you enjoy building and flying this very impressive, and fully 3D capable aerobatic plane that can be enjoyed by both intermediate, and experienced pilots alike. It is also ideal as a first-time 3D plane due to its excellent power-to-weight ratio and precision controllability.

Please also check out the full range of unique, and high quality scale models manufactured by Avios at [hobbyking.com](http://hobbyking.com). This range is being added to all the time, so watch out for more, exciting models from this premium brand.



## WARNING

Please read this instruction manual fully and become completely familiar with the features of this product before operating. Failure to operate this product correctly could result in damage to the product, personal property and cause serious injury. This is a sophisticated hobby product and is NOT a toy. It must always be operated with caution, common sense and some basic mechanical ability. This manual provides instructions as to the assembly, safe operation and maintenance of this hobby product. It is highly recommended that you follow and read fully the instructions and warnings stated in this manual including safety, assembly, set-up and flying guidelines in order to operate this product correctly and avoid damage or serious injury.

## SAFETY PRECAUTIONS

As the user of this product you and you alone are responsible for operating it in a manner that does not endanger yourself and others around you or result in damage to the product or property of others. This product is operated via a radio controlled system that in some cases can be subject to interference from sources outside of your control. Interference may result in a momentary loss of control so it is always recommended that this product be used in a suitably open outdoors space.

- This is a radio controlled flying model and as such must always be flown with caution and care. This is not a toy.
- The Super Tucano is designed for intermediate to advanced pilots.
- Always exercise great caution when using the recommended battery to power this product. For full safety notes and operating procedures, please see information provided by your battery supplier.
- Take great care when connecting/disconnecting the battery. See battery supplier for full safety procedures.
- Never power up the model in confined spaces and always keep the prop clear of obstructions.
- This product is not a toy. Children must be accompanied by an adult at all times if operating this product.
- Only fly this model in an open area away from crowds, people, buildings, trees, power lines and obstructions.
- Always put safety first when operating this model and consider the warnings stated above.
- The supplier/manufacture accepts no responsibility for damage or injury caused through the use of the product. Not suitable for children under the age of 14. **THIS IS NOT A TOY.**





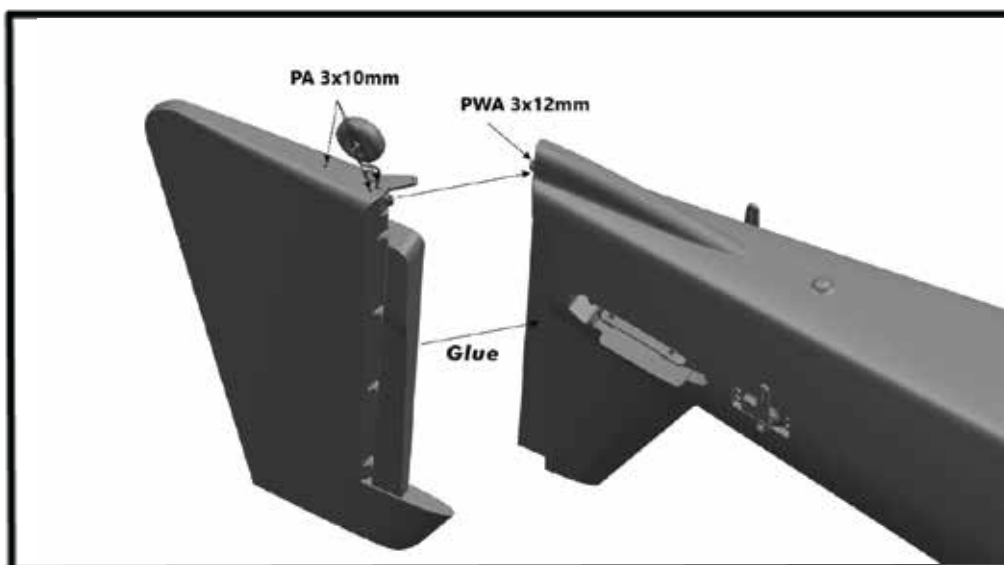
## INTRODUCTION



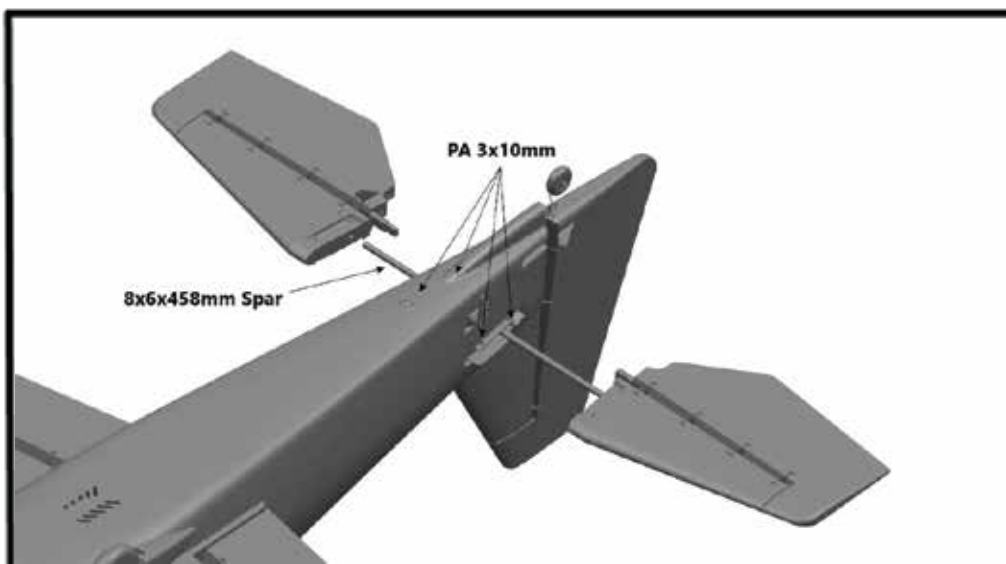
- |                                 |  |
|---------------------------------|--|
| 1. Fuselage                     | 8. Main landing gear                   |
| 2. Right wing                   | 9. Side-force generators               |
| 3. Left wing                    | 10. Hardware pack                      |
| 4. Horizontal stabilizers       | 11. Wing tip dog's teeth (turbulators) |
| 5. Rudder                       | 12. Motor                              |
| 6. Wing & horizontal stab spars | 13. Spinner                            |
| 7. Cowling                      | 14. Propeller                          |



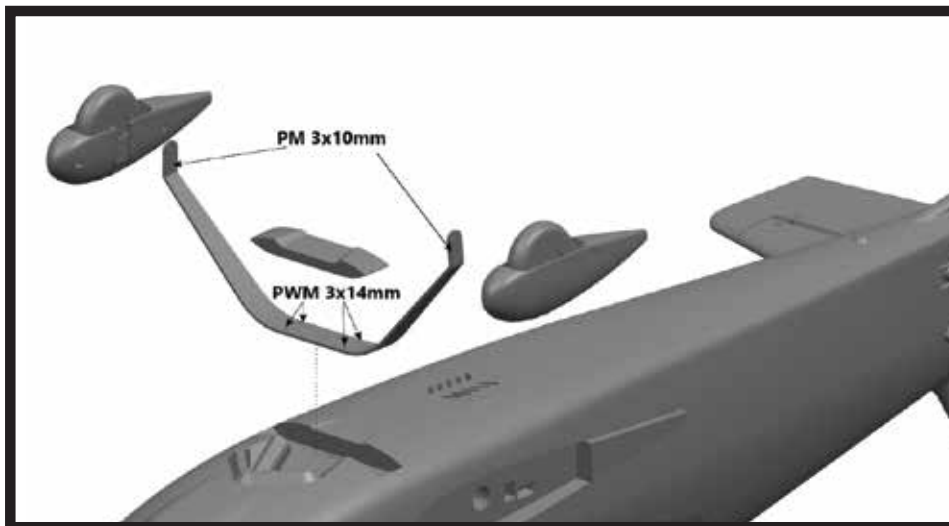
## ASSEMBLY INSTRUCTIONS



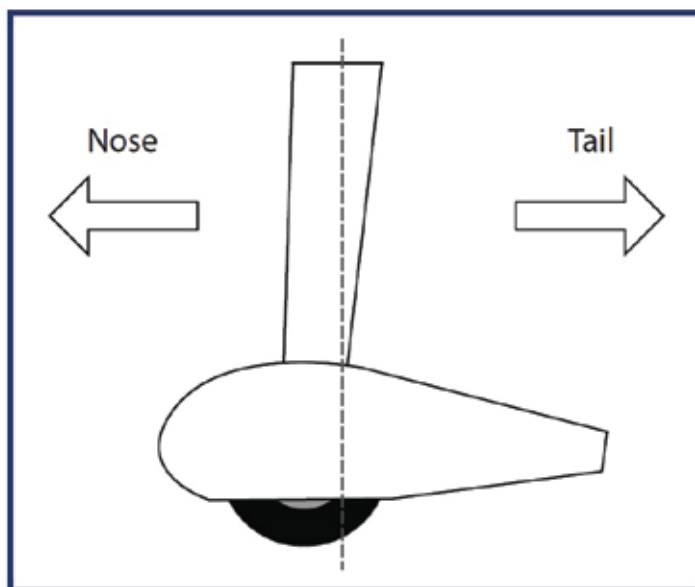
1. The rudder hinge is pre-assembled to a small section of the vertical stabilizer. Glue this small section to the corresponding cut-out in the horizontal stabilizer. Once the glue has cured, secure the bottom of the rudder using the supplied M3x12mm self-tapping. Do not over-tighten, otherwise the rudder will bind.



2. Insert roughly center, the carbon fiber horizontal stabilizer spar through the rear of the fuselage. Slide onto the spar one of the horizontal stabilizer halves, and secure to the fuselage using two M3x10mm self-tapping screws. Repeat this process with the other horizontal stabilizer half.



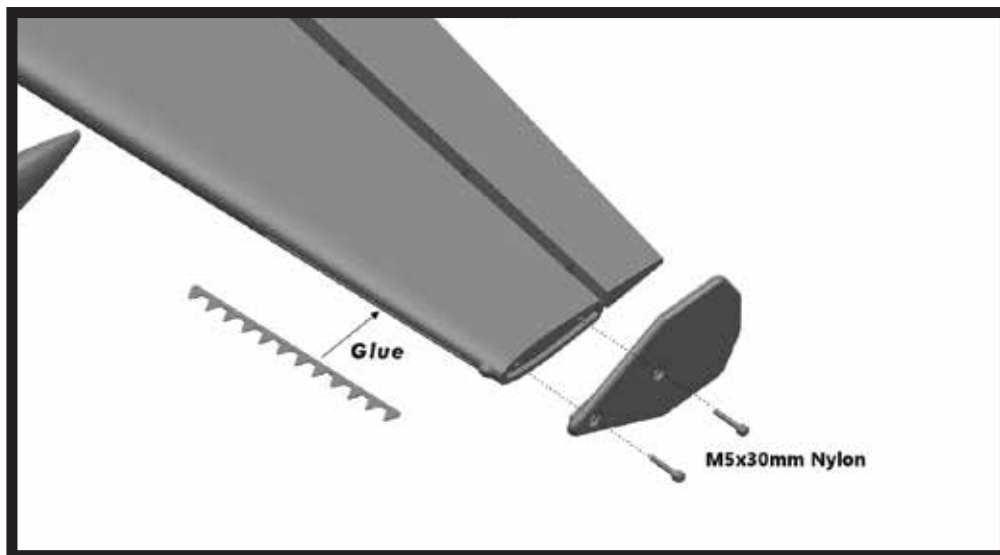
3. Take apart the wheel pants. Slide the inside wheel pant down over the wheel and shaft and mount them to the landing gear using the two M4 nuts and washers supplied. Use some thread locker to stop these nuts from loosening. Secure the outside of the wheel pants to the inside using the M3x10mm selftapping screws supplied, two per side. Please note the orientation of the wheel pants as shown below. Repeat this process with the other wheel pant.



4. Mount the landing gear to the fuselage using four M3x14mm screws, once again, add a little thread-locker to the threads. Also note the orientation of the landing gear assembly as shown above. Glue the landing gear infill fairing in place.



5. Mount the motor to the motor mount using the M4x10mm screws provided, then then the motor assembly to the firewall using 4 off M4x18mm screws. Next is to attach the cowling using the M3x25mm self-tappers through the front. Once this is done, attach the propeller to the motor shaft with the nut and washer supplied, followed by the spinner using the M3x8mm screw. However, we do recommend that you leave the propeller off until you have completed your radio setup.

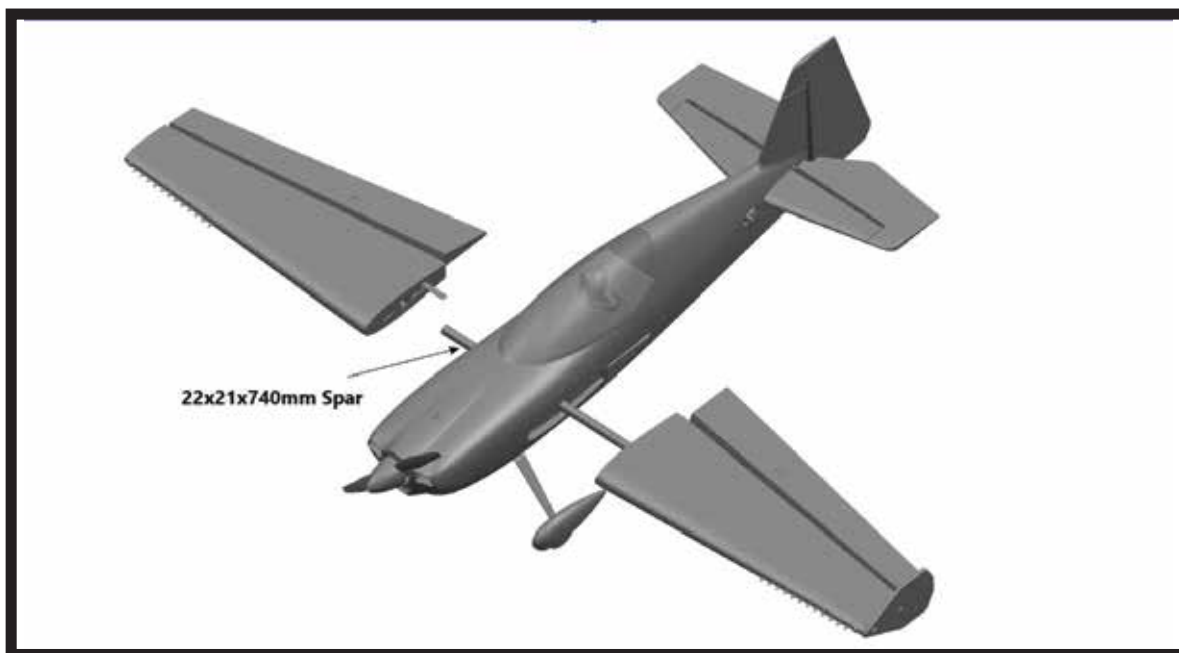


#### Option Parts:

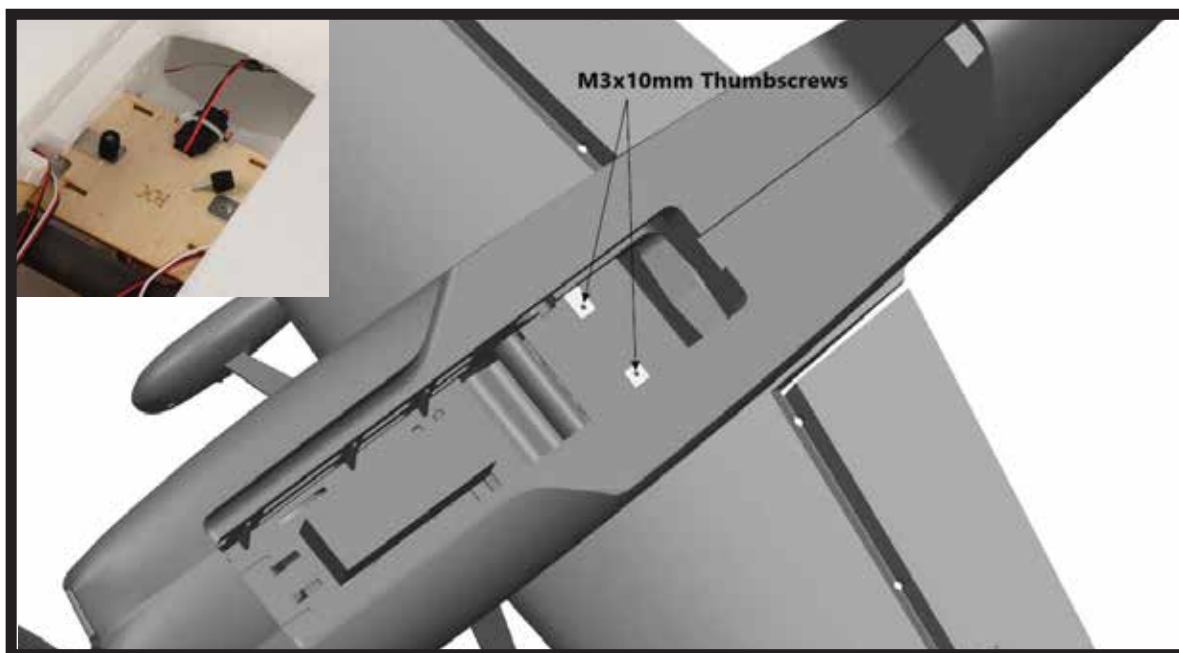
6. A set of "wing tip "Dog's Teeth" (Turbulators") are supplied. These increase drag and also the amount of lift over the wing tips and the outboard ends of the ailerons. This increases the effectiveness of the ailerons, particularly at low speeds when performing certain 3D manoeuvres.

If you choose to fit them, you will need to cut away some of the decal at the tips to reveal the slot these are glued into. The other option is the side-force generators, these are fitted to the wing tips using the supplied M5x30mm nylon screws.

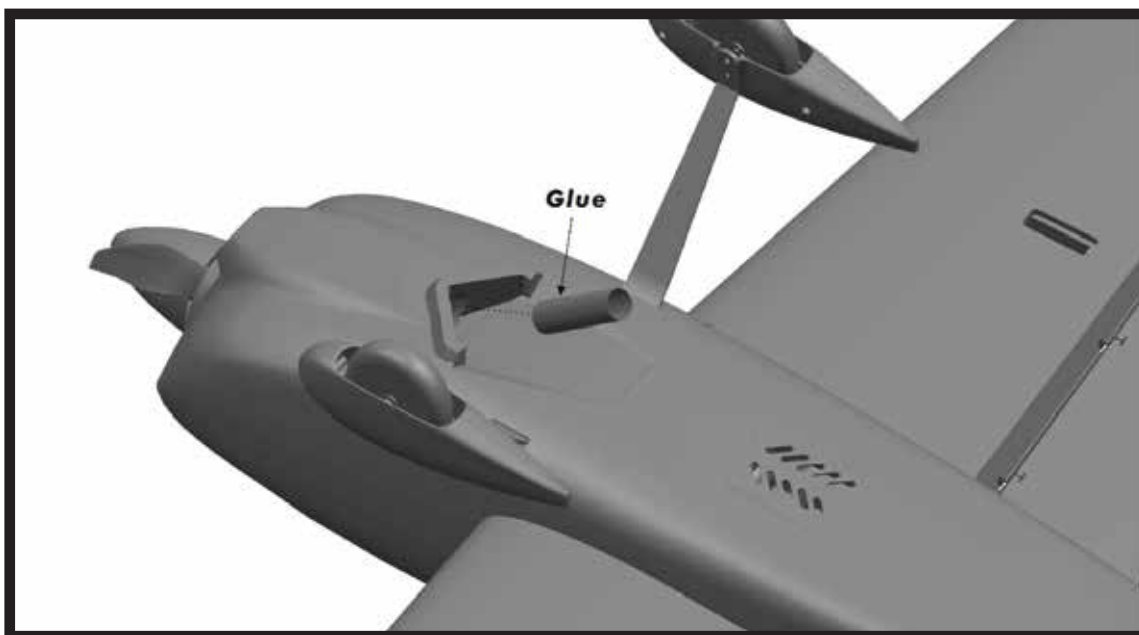




7. Slide the 22x21x740mm carbon wing joining spar through the fuselage and ensure it is centered.



8. Secure the wings using the 2 M3x10mm thumbscrews provided.



9. Glue into place the dummy exhaust stub as shown.




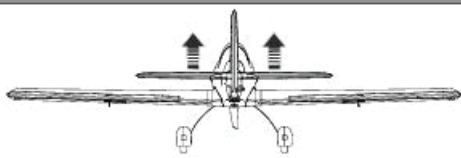
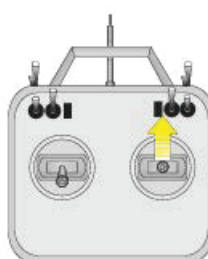
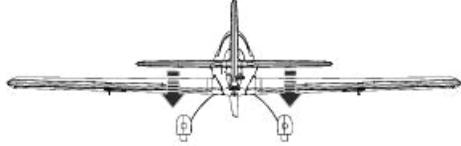
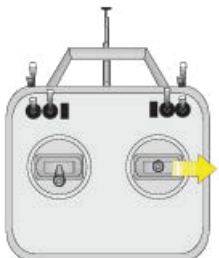
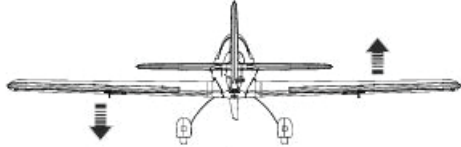
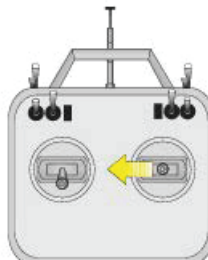
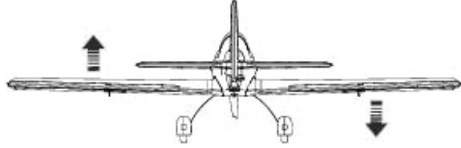
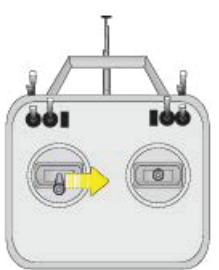
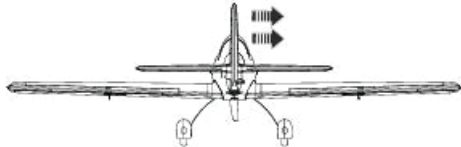
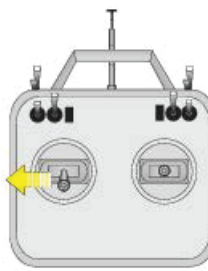
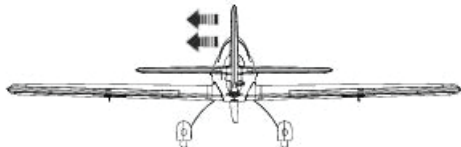
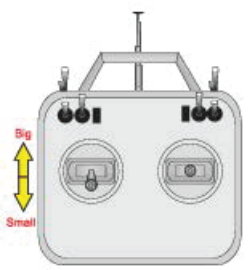
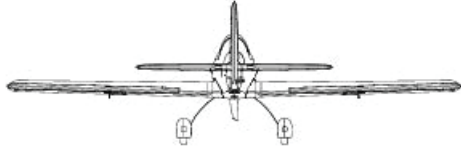
The basic assembly of your Avios Extra NG 3D is finished.



## CONTROL DIRECTIONS TESTS:

Switch on your Tx, connect your battery and set the trims and sub-trims to 0, then adjust the clevises to center all the control surfaces.

Move the control sticks on the transmitter and make sure the aircraft control surfaces move in the correct direction to the control inputs.

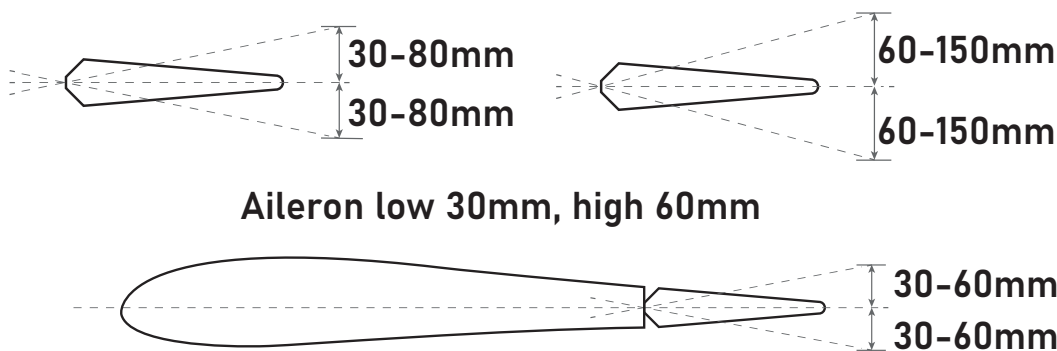
|   | Transmitter Command             | Aircraft Reaction  |   |
|---|---------------------------------|--|---|
|    | Elevator<br>Up Elevator Command |    |   |
|   | Down Elevator Command           |   |   |
|   | Aileron<br>Stick Right          |  |  |
|   | Stick Left                      |  |   |
|  | Rudder<br>Stick Right           |  |  |
|   | Stick Left                      |  |   |
|   | the Throttle                    |  |   |

**Important note:** To achieve the best possible power and performance from the power train as well as ensuring you reduce the vibration on the airframe, always balance the propeller and spinner properly before flying.

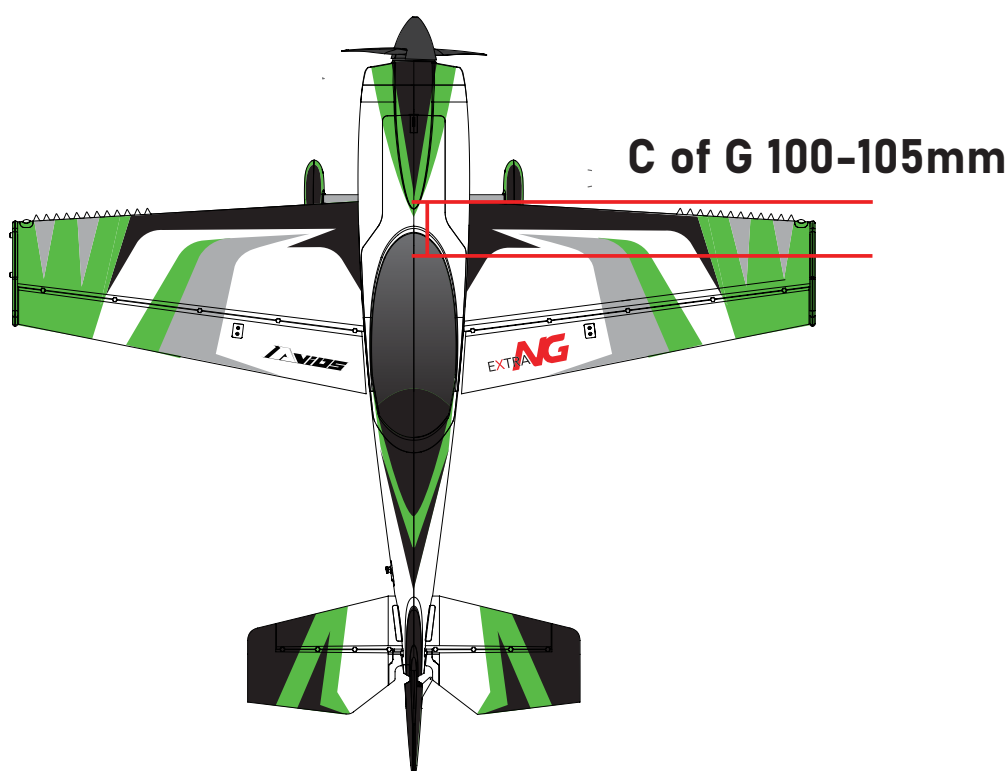


## CONTROL THROWS LOW - HIGH:

Elevator low 30mm, high 80mm Rudder low 60mm high 150mm



## CG LOCATION



The recommended CG is: 100-105mm measured from the leading edge of the wing as shown above. Perform the check with the model inverted and your fingers supporting the model on the CG point underneath on the top surface of the wing. We recommend for your initial flights you balance the model at the 100mm point, this can then be adjusted later to suit your personal preferences.





## AEROSTAR G2 ESC SETUP

1. It is important that you manually calibrate the throttle range when using the ESC for the first time, this should always be done with the propeller removed. Move the throttle stick to the full throttle position and switch on the transmitter (ensure the end points are set to 100%, and the throttle trim is in the middle). Connect your battery pack to the ESC and wait for 2 seconds, your motor will now give 2 quick beeps (Beep-Beep), as soon as you hear these beeps, lower your throttle to the fully closed position, the ESC is now calibrated and ready for use.
2. When you switch on your transmitter each time to fly, you need to make sure the throttle stick is in the low/off position, then when you connect the flight battery the motor will emit a series of beeps. When using a 6S pack, 6 beeps with the same tune means the ESC has detected the 6 cells of the battery. The motor is now armed and will start when the throttle is opened.
3. The motor and ESC are not pre-connected, so please ensure the motor rotation is correctly set, clockwise when looking from the rear of the plane. If the motor is rotating in the wrong direction, simply swap over any two of the three motor to ESC wires to change the direction of rotation.



With assembly and set-up now complete, your Avios Extra NG should be ready for flight. However, we recommend you read and follow the advice given in the pages further on in this manual before flying your model.



## PRE-FLIGHT CHECKS

1. Always range check your model before any flight (especially when flying a new model for the first time). Follow your radio manufacturers guidelines for performing this check.
2. Check all screw bolts and mounting points are firmly secure, including control horns and clevises.
3. Only fly with fully charged batteries (both in your radio and model). Failure to do so could result in loss of control, damage to the model and/or persons/property around you. Check your batteries are fully charged.
4. With the model powered up (transmitter on first, then receiver/model) check that all surfaces are free from damage/obstructions, moving freely and in the correct directions with the stick inputs.
5. Inspect the model, and propeller for any damage that may have occurred during transit and listen for any unusual sounds from the electronics when powered up. If in doubt, do not fly.
6. With the model held securely and the prop free of obstructions, increase the throttle just slightly to confirm the rotation of the prop is correct. The model should want to pull straight forward with throttle.

## FLYING NOTES AND TIPS

This is not a beginner's airplane, but a very capable 3D machine, so we will not go into a lot of detail concerning the flying. Pilots who have purchased this plane should already be capable of flying these types.

Once all the above is done, you should be ready for your first flight. Line the Extra NG up on your take-off strip into wind. Ideally, the take-off strip should be a smooth hard surface or a smooth patch of short grass. Once ready and you have double-checked the flight controls and their directions, smoothly open the throttle up to just over halfway while holding in a small amount of up elevator. Correct any swing on take-off by using the rudder, and as the model accelerates, ease off the elevator so that the Extra NG is running on the main wheels only. Once you have sufficient flying speed (this will come very quickly with the power available), ease in a small amount of up elevator and perform a normal climb-out to a safe height before turning.



The Extra NG is not short of power, so for normal flying, something around half-throttle is more than enough, with full power then being used at times when performing all the extreme 3D maneuvers. These include hovering, torque rolls, and fast and precise tip spins. Due to the side-force generators, the Extra NG is neutrally stable in knife-edge, and full rudder can be used to exit a knife-edge loop without any tendency to roll or snap roll. One of the other strengths of the Extra NG is its ability to perform very aggressive tumbling while still being able to perform stable Harrier manoeuvres. Our test pilots tried a variety of battery packs, but they all agreed that the Turnigy BoltX LiHV 6S 4500mAh performed the best in the Extra NG.

The Extra NG is very straightforward to land, once you are ready, throttle back to about quarter throttle and fly a nice square circuit. Once you are lined up on the final approach, throttle back some more, and the Extra NG will settle into a nice sink rate for a perfect 3-point landing every time. Your maiden flight is now over, check the model's linkages, etc, in case anything has vibrated loose, if all is ok, recharge the battery and enjoy another flight.

Below are some general notes for setting the Extra NG up for 3D flying. These notes are not specific to the Avios Extra NG, they are just a guide to help the setup. You will also need to experiment with the CG to get the feel of the model just right for your own personal flying technique.

### Travel Settings:

Each flight control must be set to its physical limits. This means as far as it will go, but no farther than it has to. You set this by selecting the servo, fully deflect the surface with the transmitter, then increase (or occasionally decrease) the percentage to where the flight surface will not travel any further. Then simply back off a click or two and you are done. Then, deflect it in the opposite direction and repeat the process. This must always be done for rudder, ailerons, and elevators. Your travel/end point settings must be above 100% to achieve full performance from each servo.

### Rates and Exponential:

All rates at 100% for full 3D flying. Put the stick at one third and set to where when you switch between rates the surface hardly changes. Obviously at the end points it is an enormous difference.

Our recommended expo settings for low rates is in the 20% range for an aerobatic plane, and expo in the 60% to 70% range for high rates for 3D.



## TROUBLE SHOOTING:

### • **Motor does not run:**

1. Battery is not fully charged (Charge the battery).
2. Transmitter battery is low (Charge or install a fully charged battery).
3. Motor is not connected properly (Check the motor to ESC connections and the ESC to battery connections).
4. Receiver is not bound to the transmitter (Consult your radio manual and go through the binding procedure).
5. ESC is in set-up mode (Hold model and move throttle up to full then back to idle, or reverse the throttle channel on your transmitter. Switch everything off before doing this).

### • **Model moves backwards:**

1. Propeller is installed backwards or motor is running the wrong way (Turn the propeller around or swap any 2 wires on the motor to ESC connection).

### • **Control surfaces not moving with stick input:**

1. The servo leads are not connected properly (Check the servo connections).
2. The servo is damaged (Replace the servo).

### • **The model does not fly straight:**

1. Control surfaces are not at neutral (Adjust the trims/sub trim on your transmitter).
2. C of G is not correct (Re-position the battery to achieve correct balance).

### • **Model does not climb well:**

1. The battery is not fully charged (Charge the battery).
2. The elevator servo is reversed (Change the direction via your transmitter settings).
3. C of G to far forwards making it nose heavy (move battery backwards or add weight to tail).







## SPARE PARTS



**Avios Extra NG Fuselage**  
SKU: 9447790081



**Avios Extra NG Left Wing**  
SKU: 9447790082



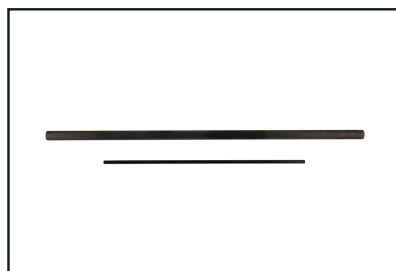
**Avios Extra NG Right Wing**  
SKU: 9447790083



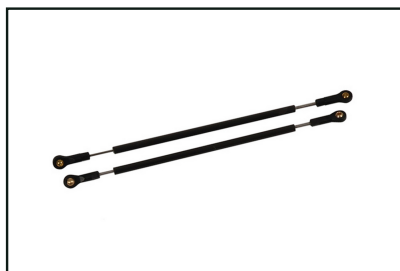
**Avios Extra NG Stabilizer & Rudder**  
SKU: 9447790084



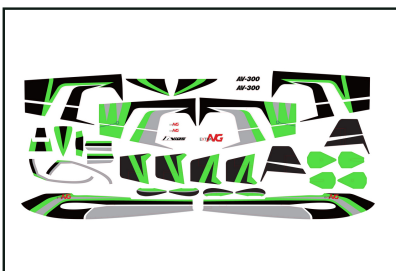
**Avios Extra NG Canopy Hatch**  
SKU: 9447790085



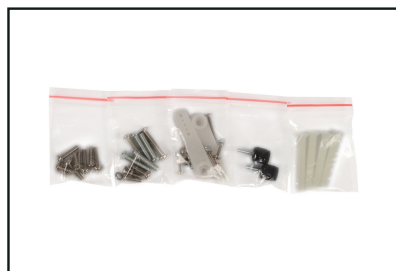
**Avios Extra NG Spar Set**  
SKU: 9447790086



**Avios Extra NG Pushrod Set**  
SKU: 9447790087



**Avios Extra NG Decal Set**  
SKU: 9447790088



**Avios Extra NG Hardware Set**  
SKU: 9447790089



**Avios Extra NG SFG Set**  
SKU: 9447790091



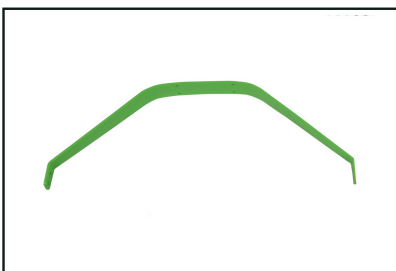
**Avios Extra NG Spinner**  
SKU: 9447790092



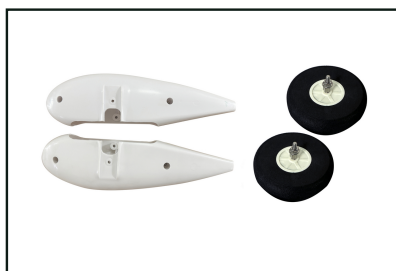
**Avios Extra NG Cowling Set**  
SKU: 9447790093



**Avios Extra NG Tail Wheel**  
SKU: 9447790094



**Avios Extra NG Landing Gear**  
SKU: 9447790095



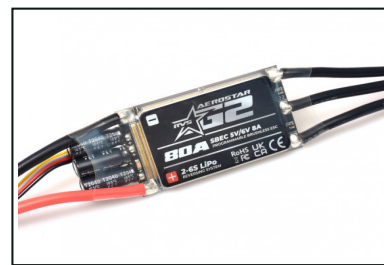
**Avios Extra NG Wheel Pants Set**  
SKU: 9447790096



**Avios Extra NG Pilot Figure**  
SKU: 9447790090



**Aerodrive SK3 F5055-500KV w/X-Mount**  
SKU: 9912790065



**Aerostar 80A RVS G2 32bit ESC**  
SKU: 9164790058

## RECOMMENDED ACCESSORIES



**FrSky R6 Dual 2.4GHz 6ch TW Protocol Receiver**  
SKU: 9236720013



**FrSky R8 Dual 2.4GHz 8ch TW Protocol Receiver**  
SKU: 9236720012



**Turnigy Heavy Duty 4000mAh 6S 60C Lipo Battery Pack w/XT90**  
SKU: 9067000386-0



**Turnigy BoltX LiHV 6S 4500mAh 80C LiPo Pack w/XT90**  
SKU: 90671600490



**Turnigy TWIN X14 ACCESS**  
SKU: 9236720209



**ISDT Air8 BattAir 500W 20A 1-8S Smart Charger**  
SKU: 1042400143

Thank you for buying yet another amazing plane from Avios. If you have enjoyed assembling and flying the Extra NG 3D, then please tell your friends; if not, please tell us. Please regularly visit [hobbyking.com](http://hobbyking.com) as we have loads more exciting planes and products coming out soon.



**APEX CE SPECIALISTS LIMITED**

89 Princess Street, Manchester,  
M1 4HT, UK



**APEX CE SPECIALISTS LIMITED**

Unit 3D North Point House,  
North Point Business Park,  
New Mallow Road, Cork, T23 AT2P, Ireland



Made in China