

DAVIDS

TWIN OTTER

1600MM PNF SCALE STOL TWIN



ASSEMBLY MANUAL

Please read this manual carefully before operating this aircraft

TWIN OTTER

1600MM PNF SCALE STOL TWIN



Features:

- Impressive power to weight ratio and light wing loading gives exceptional low speed and STOL flying characteristics
- Fully sprung, all metal CNC nose strut with "servo saver" mechanism
- Pre-installed Aerostar G2 RVS ESCs for instant reversing option
- Magnetically held interchangeable long or short nose section
- Supplied with a set of floats so that you can have fun off of water
- Counter rotating props for improved handling and safety
- Quick connections for the wing servos and LED lights
- Scale outline with detailed surface finish and scale plastic parts
- Low bounce oversized bush wheels with soft foam tires
- Large magnetically held battery hatch
- Day bright LED lights throughout



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WARNING:

Read this instruction manual fully so as to 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 on the assembly, safe operation and maintenance of this hobby product. It is highly recommended that you read, and follow fully the instructions and warnings stated in this manual. This includes the safety, assembly, set-up, and flying guidelines in order to operate this product correctly to 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.
- This model 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 a capable and responsible adult at all times if operating this product.
- Only fly this model in an open area away from crowds of people, buildings, trees, power lines, and other obstructions.
- Always put safety first when operating this model and consider the warnings stated above.
- The supplier/manufacturer 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:

Avios continues to bring you great flying, and high-quality RC models of interesting subjects, this theme continues with the Avios Twin Otter STOL (Short Takeoff and Landing) twin-engine plane. The Avios model captures the looks and great flying characteristics of the full-size inspired Twin Otter. The impressive power-to-weight ratio and light wing loading makes for exceptional low-speed handling and STOL flight characteristics.

The Avios Twin Otter is also crammed full of outstanding features, these include a set of large barn door style flaps, counter-rotating props for improved handling, scale outline with detailed surface finish, and scale plastic parts. Other features include a fully sprung, all metal CNC nose strut with servo saver, low bounce soft foam oversized bush wheels, and day bright LED lights throughout.

The list of outstanding features goes on with a set of floats included, these are easily fitted in place of the tricycle landing gear so that you can have even more fun flying from lakes and rivers. The included Aerostar RVS speed controllers make flying from water on the floats so much easier, they allow you to maneuver and taxi even in the more challenging conditions and situations that can be found on inland waters. To further help when flying with the floats fitted are a pair of optional tail fins, these increase the yaw stability caused by the extra drag of the floats.

Avios have also included two magnetically held interchangeable nose sections, one short to emulate the "Series 100" Twin Otter, and one long so that you can quickly change the look of your Twin Otter to a "Series 200".

Supplied as a PNF (Plug-N-Fly) model made in tough EPO foam, the Avios Twin Otter includes the following factory-installed components. 2 x 3020-800KV brushless motors, 2 x Aerostar 30A G2 RVS instant reverse ESC, 2 x 9.3x6 3-blade scale looking propellers, and 7 x 9g metal geared digital servos. Pre-installed quick connections in the removable wing tips for the wing servos and LED lights make for quick assembly at the field or disassembly for transport or storage, and the battery, and radio access is also very easy courtesy of the large, magnetically held access hatch.

The initial assembly takes a little time as there are quite a number of screws used, but once assembled it can pretty much be transported in one piece with the wing tips removed. As mentioned above, once at the field, or lake, it is then just a simple matter of attaching the wing tips with the 4 supplied hex-head machine screws. Assembly is very straightforward, all the components are assembled using screws, the only glue required is for the scale detailing components.

The AVIOS team hope you enjoy putting together and flying your Twin Otter, and they look forward to bring you more exciting models in the near future.

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Contents of Kit:



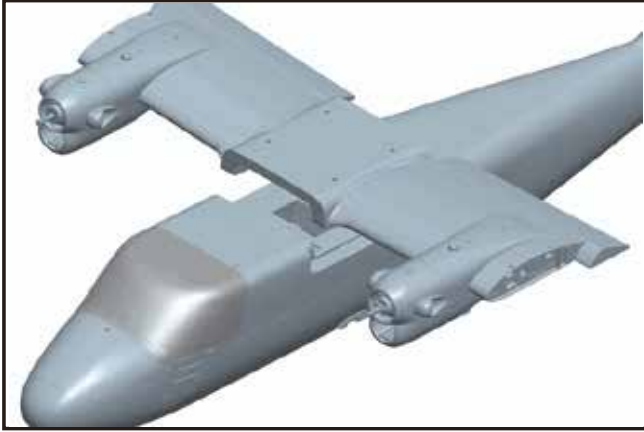
- | | |
|--------------------------|----------------------------------|
| 1. Fuselage | 9. Propeller and spinner set |
| 2. Center wing section | 10. Short nose section |
| 3. Wing tips | 11. Long nose section |
| 4. Horizontal stabilizer | 12. Wing fences |
| 5. Vertical stabilizer | 13. Wing and vertical stab spars |
| 6. Main landing gear | 14. Front struts for floats |
| 7. Wheels and noseleg | 15. Optional float tail fins |
| 8. Wing struts | 16. Float set |
| | 17. Scale details |

Specifications:

- Wingspan: 1600mm (63")
- Length: 1210mm (47.6")
- Motor: 2 x 3020-800KV
- ESC: 2 x Aerostar 30A G2 RVS
- Servo: 7 x 9g digital w/metal gears
- Propeller: 2 x 9.3x6E
- Battery: 4S (14.8V) 2200mAh (not supplied)
- All Up Weight: 2100g



General Assembly:



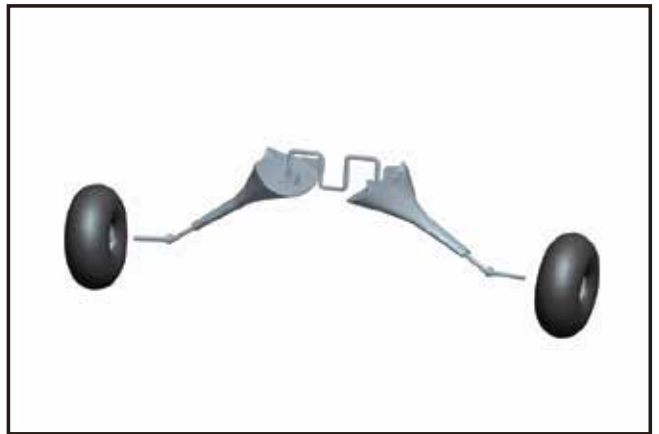
1. Position the wing onto the fuselage wing seat as shown.



2. Secure the wing with the supplied 4 M3x30mm screws.



3. Slide the tongue of the wing struts into the slots in the fuselage and secure using the M2.5x8mm machine screws. Attach the other end of the struts to the wing with 2 more M2.5x8mm machine screws.



4. Install the main wheels to the main landing using 2 M3 "E" clips supplied as shown below.



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5. Install the main landing gear to the fuselage using the 8 x M2.5x8mm machine screws supplied.



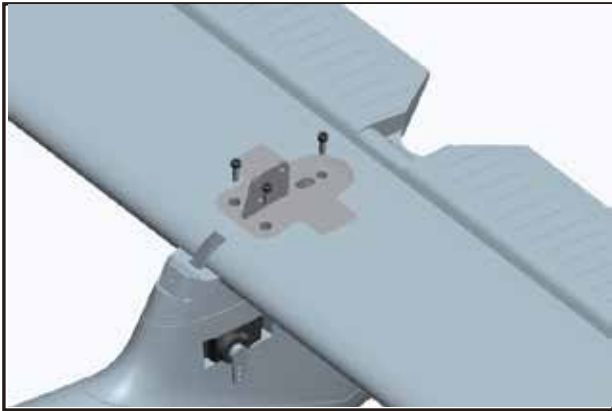
6. Insert the noseleg strut into the fuselage and secure with the M3x10mm screw provided from the top as shown, the strut has a brass threaded insert to screw into.



Noseleg installed.



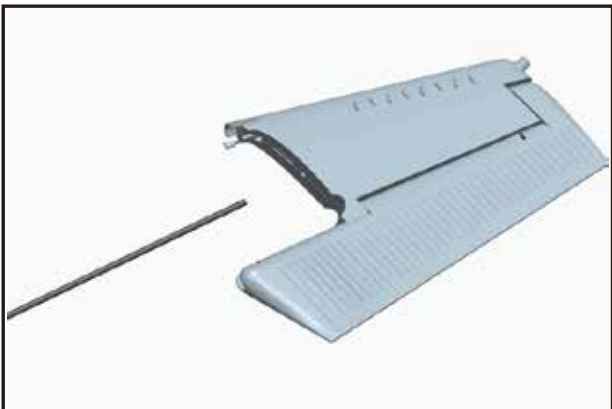
7. Position the horizontal stabilizer on to the seat at the rear of the fuselage.



8. Secure the horizontal stabilizer using 3 of the 2.3x8mm self tapping screws provided through the top surface.



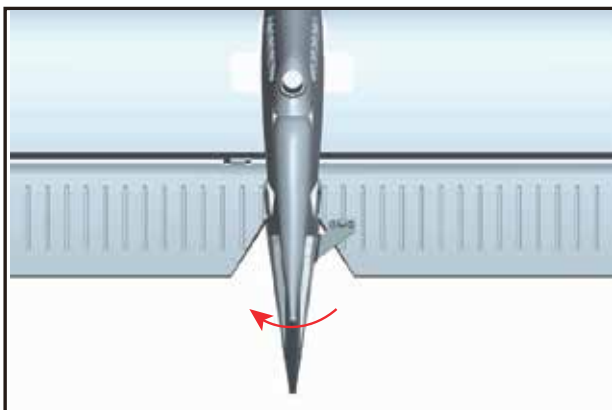
9. On the underside of the horizontal stabilizer there are 2 more 2.3x8mm self tapping screws to install as shown.



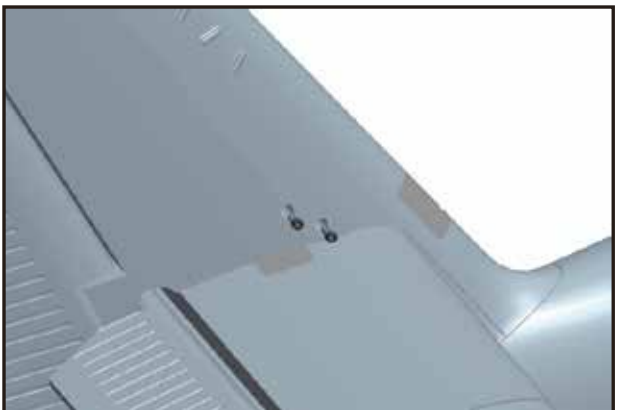
10. Install the joining spar into the vertical stabilizer.



11. Slide the joining spar into the rear of the fuselage, do not push in all the way until you have connected the LED light plug and socket.



12. The rudder control horn will interfere with elevator, you will need to move the rudder to the left as shown while sliding the horn past the elevator.



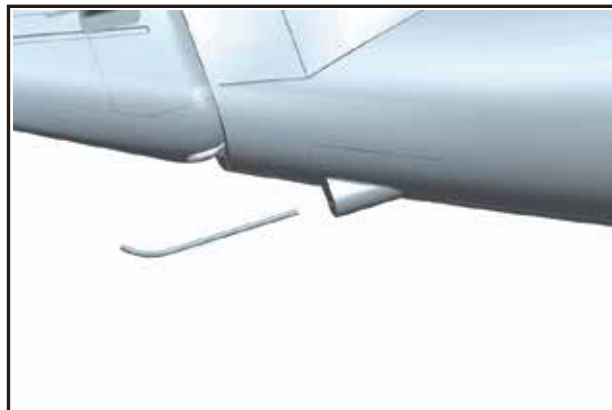
13. Using 2 more 2.3x8mm self tapping screws, complete the fixing of the vertical stabilizer.

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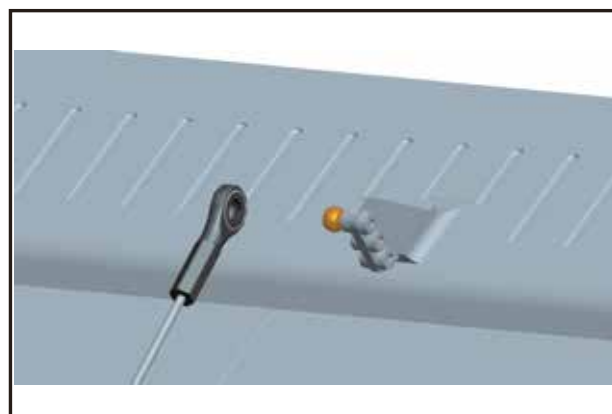


14. Finally, secure the bottom of the rudder using the 2.3 x 6mm self tapping screw provided.



15. The wire tailskid is optional, if using then secure with a small amount of CA glue.

Factory Setting	Horns	Arms
Elevator	→	→
Rudder	→	→
Aileron	→	→
Flaps	→	→



16. Use the holes indicated for the servo and control horns to ensure you can achieve the correct throws for the control surfaces.

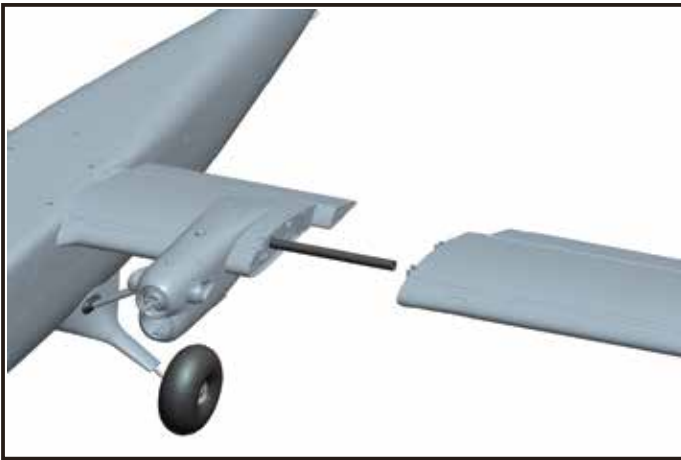
17. **Important note for the ball-link connection:**
The side of the plastic ball-link with a faint flat ring molded into it is the side that pushes onto the brass ball. These ball-links are quite firm and require a little force to connect them.



18. Install the elevator pushrod as shown, the quick-keeper end fits to the servo horn, and the ball-link to the elevator horn.



19. Repeat this process for the rudder control pushrod.



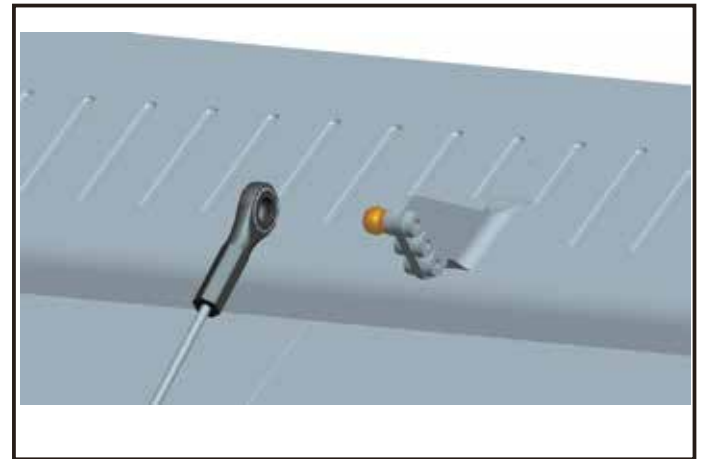
20. Slide the main wing spar through the fuselage first, this is very important, and ensure it stays central as you install the wing tips.



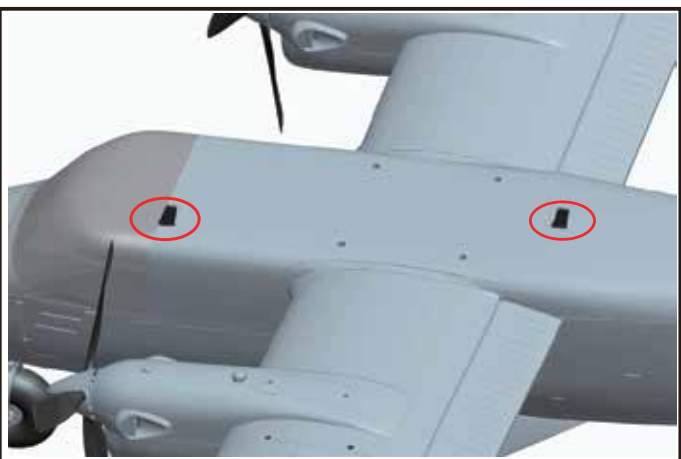
21. Secure the wing tips using the supplied M2.5x8mm machine screws.



22. Glue into position the 2 wing fences to the wing tips as shown.



23. Repeat as above the installation of the flap and aileron pushrods.



24. Using a medium CA, glue in place the 2 scale antenna on top of the fuselage.



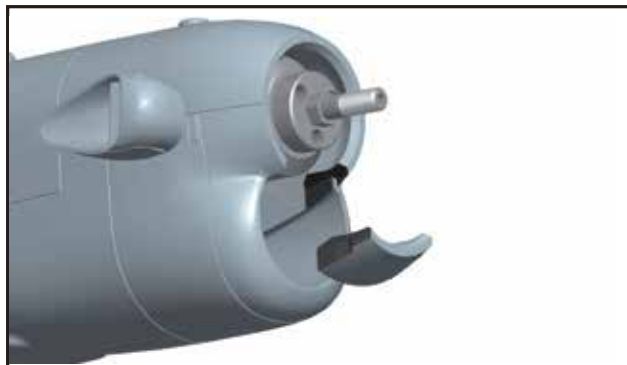
25. Glue into place the cockpit step to the right hand side of the fuselage using a medium CA.

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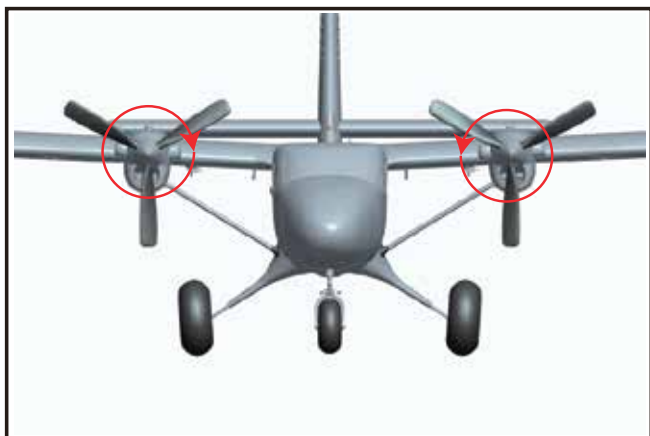
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26. To the left hand side of the fuselage, glue into place the second cockpit step and pitot tube.



27. Avios supply some infills for the cowlings, these are optional and can be glued into position as shown if you wish.



28. The final part of the basic assembly is the fitting of the props, as shown in the picture the props rotate towards the fuselage. The lefthand prop in the picture has a black CCW prop adapter with lefthand thread, and the righthand prop has a silver CW prop adapter with a righthand thread.



29. Determine which prop is which by looking at the leading edge of the blades, the picture above shows the installation of the righthand prop looking from the front of the model. Secure this prop with the silver nut, and the spinner with the supplied M2.5x20mm machine screw. Repeat for the left side prop.



For the wheeled version of the Avios Twin Otter, the assembly is now complete. Further on in the manual are the instructions for the fitting the optional floats.

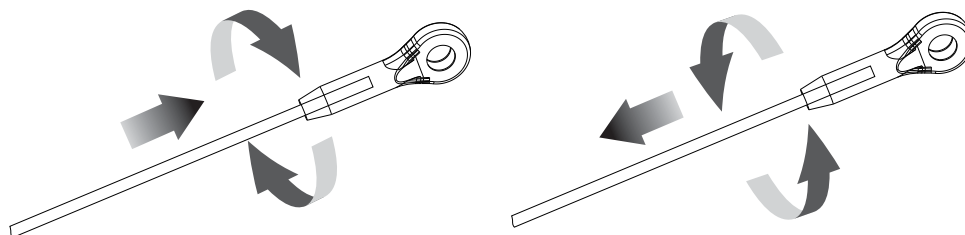


Setting Up the Twin Otter:

1. Install your receiver and connect the servos into their corresponding channels. Please note that there is a "Y" lead supplied to connect the nosewheel steering servo and the rudder servo so that they operate from one channel. Also, the Twin Otter has LED lights which will need plugging into a spare channel on your receiver or a Y-Lead.

It is also worth noting at this point that if you wish to make use of differential thrust on the twin motors then you will need to follow these steps. Remove one of the ESC servo plugs from the wing mounted distribution box and connect it to a separate channel on your receiver. Differential thrust requires the use of two separate throttle channels which are then mixed in your transmitter. There are some notes below on a basic mixing setup.

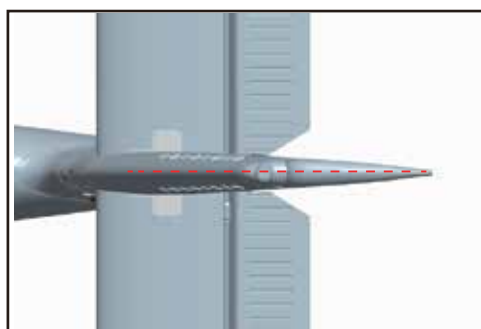
2. Connect the flight battery to the ESC to power up the electronics. With the model now armed, ensure all servos are centered and all control surfaces are level. If not, adjust by turning the ball-links by hand accordingly until the control surfaces are level as shown further down.



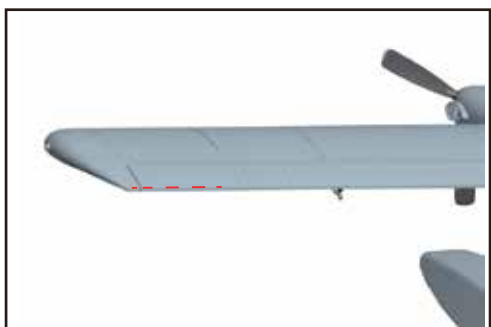
Note: For safety reasons, it is advised that this is done with the props removed from the model.



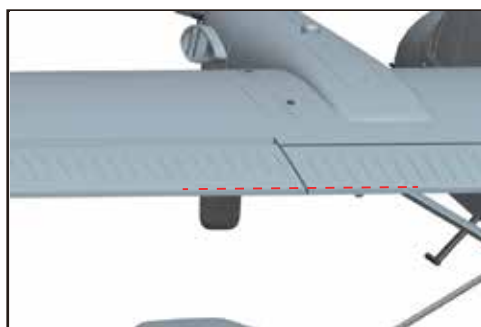
Elevator



Rudder



Ailerons






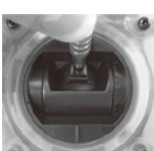








Flaps: Ensure when the flaps are in the fully closed position they are level with the ailerons. Also make sure the flap servos are not under load and making a buzzing noise.

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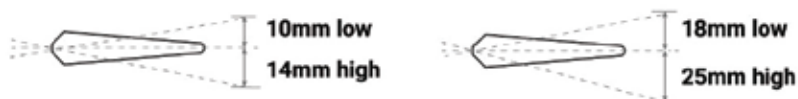
4. Check that all the control surfaces are moving in the correct direction when operated by the transmitter as shown below.

 	<p>Roll left</p> <p>Roll right</p>	 	<p>Aileron (Roll)</p>
 	<p>Pitch up</p> <p>Pitch down</p>	 	<p>Elevator (Pitch)</p>
 	<p>Yaw left</p> <p>Yaw right</p>	 	<p>Rudder (Yaw)</p>

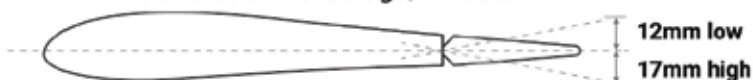
Control Throws:

The Twin Otter handles very well in flight, but that is not down to a good design alone, it requires a good pre-flight setup too. Before you fly your Twin Otter, please follow the recommended settings below for optimum handling and performance.

Elevator: +/- 14mm high, 10mm low Rudder: +/- 25mm high, 18mm low

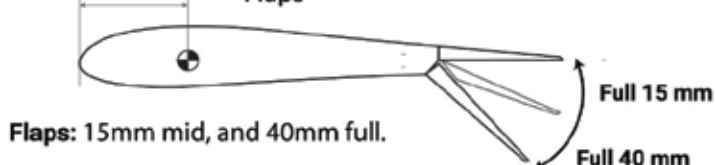


Aileron: +/- 17mm high, 12mm low



CG: 50mm

Flaps

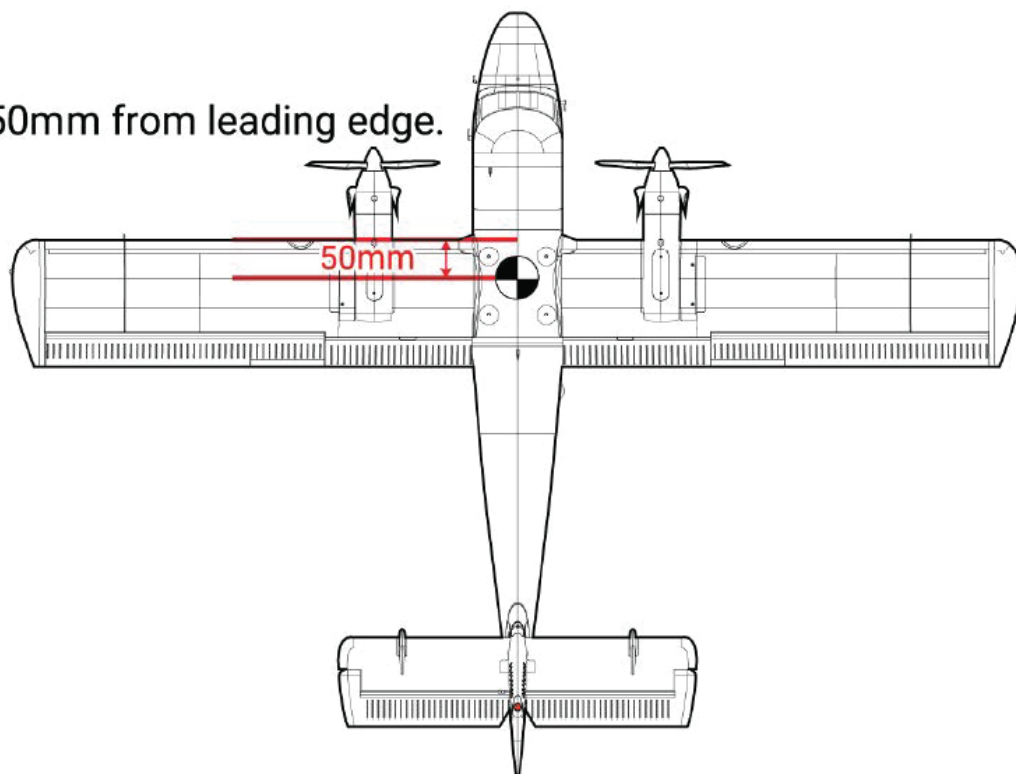




C of G Setting:

The recommended center of the gravity (CG) for the Twin Otter is approximately 50mm from the leading edge of the wing. Your Twin Otter should balance near this point with anything from a 2200mAh~3400mAh 4S LiPo installed. Adjust the position of your battery as necessary to achieve the correct C of G, then secure in the battery bay area with hook & loop tape.

CG: 50mm from leading edge.



Example of Optional Differential Thrust Setup:

For those of you with radio's that allow mixing of channels you can set-up differential thrust on the motors. This makes it even more fun to fly, but more importantly it helps immensely if you are operating of off water with the floats fitted. You need a radio that has at least 3 "Free Mixers", that is 3 mixers where you can assign which channels you want to mix rather than pre-set mixers. You will also require a minimum of a 6ch radio and receiver so that you have an AUX 1 channel available. We cannot go into all the different types of radio's and how they are mixed but we have given some guidelines below which should help.

1. First thing you need to do as mentioned above is to remove one of the ESC servo plugs from the wing mounted distribution box and connect it into AUX 1 on your receiver. You then need to plug the other lead into your throttle channel.

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2. The first mixer you need to make is "Throttle to AUX1". So Mixer 1 is THR>AUX1. Rate will be + or - 100%, Offset + or - 100%, Trim (Active) and Switch (On). If you have a display monitor on your transmitter then at this stage check that the throttle and AUX 1 channels move together. If they move in opposite directions reverse as necessary.
3. The second mixer you need to make is "Rudder to Throttle". So Mixer 2 is RUD>THR. Rate will be -25% both ways (you can use more but we have found this is more than sufficient), Offset 0%, Trim (Inhibit), Switch (Select the switch you prefer to use on your Tx such as "Gear", etc).
4. The third mixer you need to make is "Rudder to AUX1". So Mixer 3 is RUD>AUX1. Rate will be the same as you set in Mixer 2, ie: 25% each way or whatever you set, Offset 0%, Trim (Inhibit), Switch (same as you selected for Mixer 2). If you get stuck there are plenty of video's on YouTube which are very easy to follow for quite a few different makes of transmitter.

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

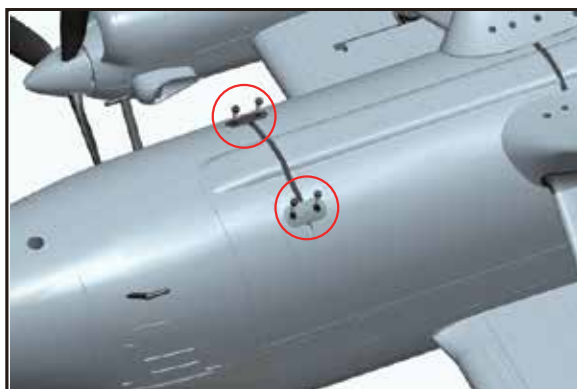




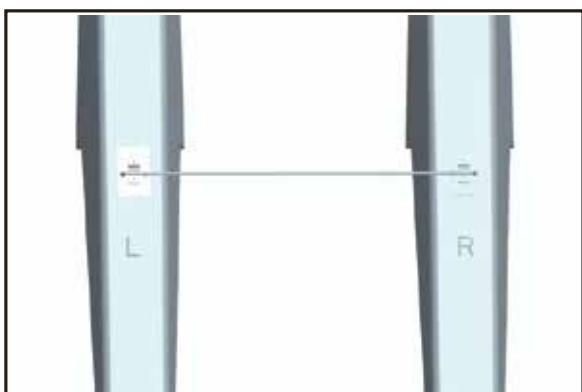
Fitting the Optional Float Set (supplied):



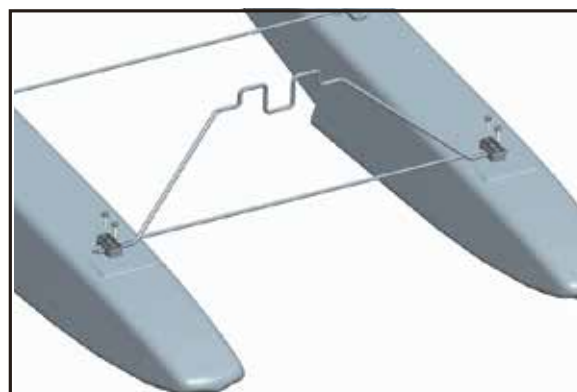
1. Remove the main wheels from the axles.



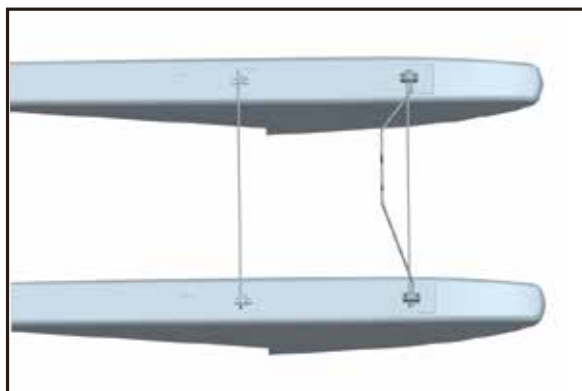
2. Remove the front float strut securing clamps, these are held in place with 2.3x8mm self tapping screws.



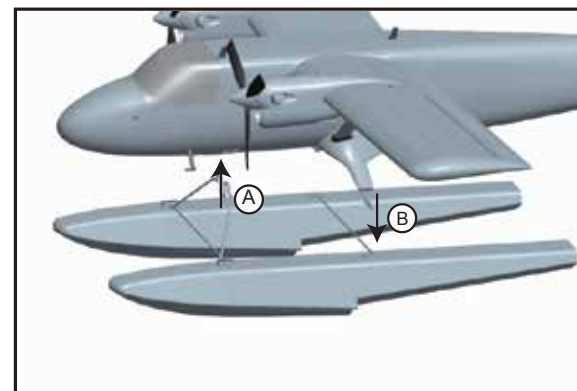
3. Clip the rear cross brace into the rear groove of the left and right float mounting point.



4. Attach the front float strut using the clamps and 4 x M3x10mm machine screws.



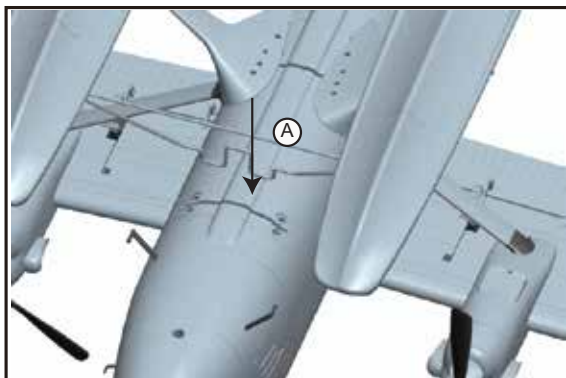
5. Finished float assembly.



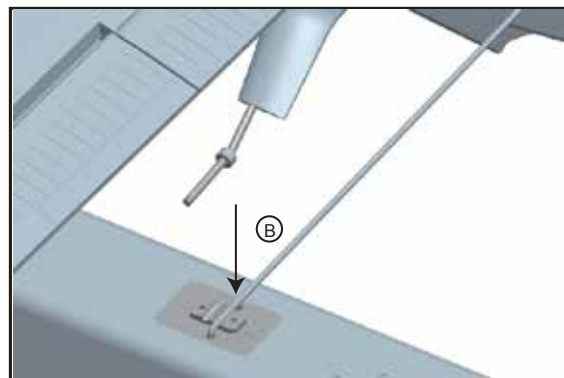
6. Position the float set onto the fuselage. The front strut "A" locates into the front slot of the fuselage, and the main wheel axles "B" locate onto the floats in front of the cross brace.

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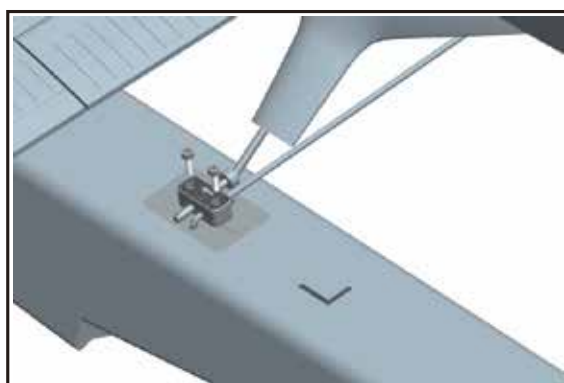
7. Locate the front strut "A" into the slot in the fuselage.



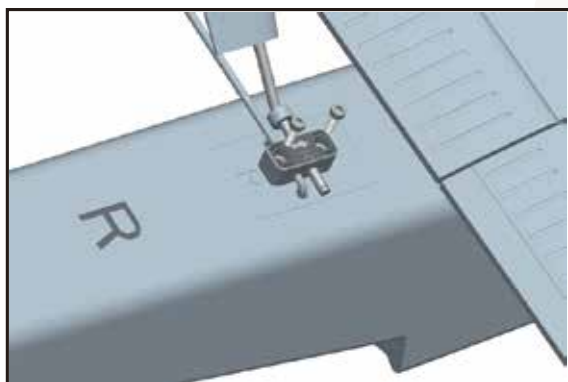
8. Locate the main gear axles "B" into the front of the rear float mount.



9. Secure the front strut with the clamps and 2.3x8mm self tapping screws previously removed from the fuselage



10. Attach the lefthand main axle and brace to the left float with the supplied clamps and 4 x M3x10mm machine screws.



11. Repeat this for the righthand float.



12. Install the tail fences to the horizontal stabilizer. These are a good push fit and do not require gluing, they can be held in place with a piece of blenderm tape or similar.

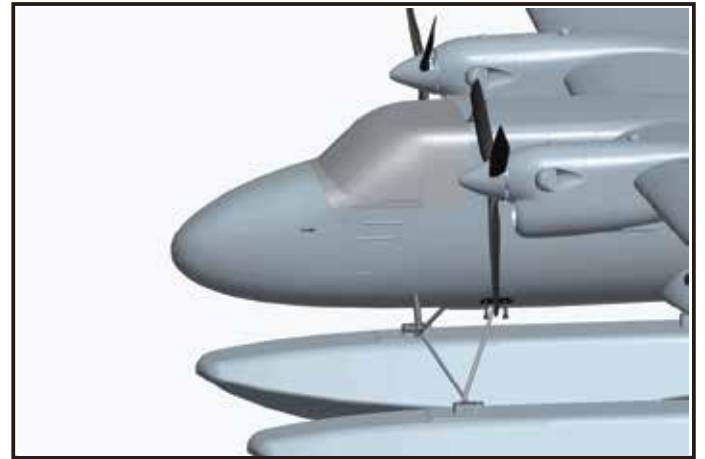


Optional Nose Cones:

Your Avios Twin Otter is supplied with two nose sections that are held on magnetically. The short nose emulates the "Series 100" Twin Otter, whilst the longer nose depicts the "Series 200" Twin Otter. Because they are held in place with magnets, they can easily be changed, this can even be done at the field or lake when you are out flying.



Long nose installed.



Short nose installed

Spare Parts:



Fuselage
SKU: 9499790612



Long & Short Nose
Sections
SKU: 9499790613



Wing Center Section
SKU: 9499790614



Motor Cowls
SKU: 9499790615



Wing Outer Panels
SKU: 9499790616



Horizontal Stabilizer
SKU: 9499790617

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Tail Fences
SKU: 9499790618



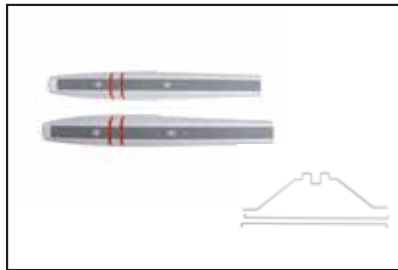
Vertical Stab w/Rudder
SKU: 9499790619



Canopy/Battery Hatch
SKU: 9499790620



Wheel Set
SKU: 9499790621



Float Set w/Struts
SKU: 9499790622



Spinner Set
SKU: 9499790623



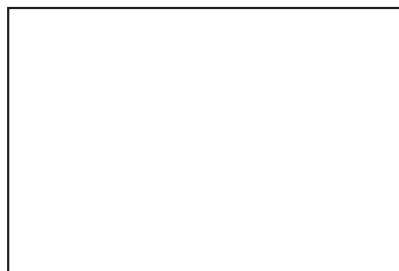
Main Landing Gear w/Strut
Covers
SKU: 9499790624



Nose Landing Gear
SKU: 9499790625



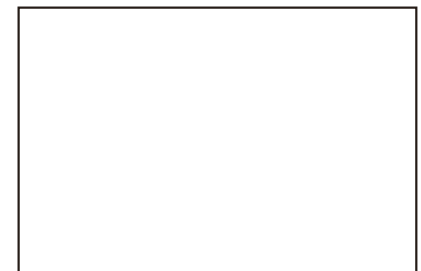
Wing Struts (1pr)
SKU: 9499790626



Linkage & Screw Set
SKU: 9499790627



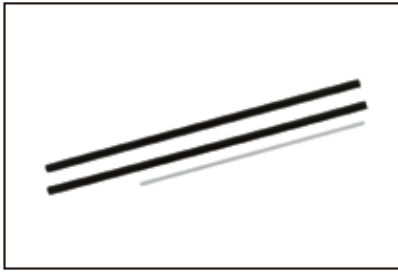
CW/CCW Prop Adapters
SKU: 9499790628



Main Landing Gear Straps
SKU: 9499790629



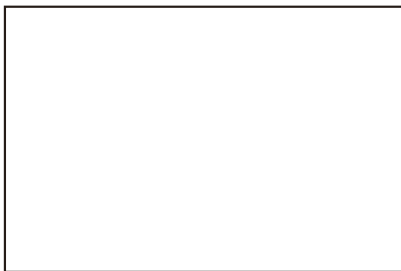
9.3x6 3-Blade Props (CW/CCW)
SKU: 9499790630



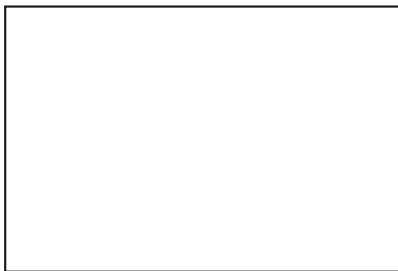
Wing & Vertical Stab Spar
SKU: 9499790631



Brushless CW Motor
SKU: 9499790632



Brushless CCW Motor
SKU: 9499790633



Aerostar 30A ESC
SKU: 9499790634



Wing Tip LED Light Connector Set
SKU: 9499790635



Decal Set
SKU: 9499790636

Recommended Accessories:



Turnigy 2200mAh 4S 40C
LiPo Pack
SKU: T2200.4S.40



Turnigy Heavy Duty 2200mAh
4S 60C LiPo Pack
SKU: 9067000194-0



Turnigy Nano-Tech 2200mah
4S 25~50C LiPo Pack
SKU: N2200.4S.25

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Turnigy Nano-Tech 2650mAh
4S 30C LiPo Pack
SKU: 9210000282-0



Turnigy Nano-Tech 2650mAh
4S 35~70C LiPo Pack
SKU: 9210000188



Turnigy Nano-Tech 2700mAh
4S 65~130C LiPo Pack
SKU: 9210000192-0



Turnigy Nano-Tech 3300mAh
4S 35C LiPo Pack
SKU: 9210000314-0



Turnigy 3300mAh 4S 30C LiPo
Pack
SKU: 9067000259-0



Turnigy 3000mAh 4S 40C
LiPo Pack
SKU: 9067000253-0



Turnigy/FrSky TWIN X14
ACCESS 2.4GHz Transmitter
SKU: 9236720209



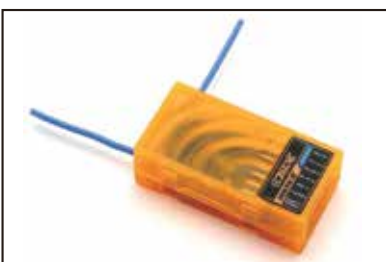
FrSky TW R6 Dual 2.4GHz 6ch
TW Protocol SBUS/FBUS/
S.Port Receiver
SKU: 9236720013



FrSky TW R8 Dual 2.4GHz
8ch TW Protocol SBUS/FBUS/
S.Port Receiver
SKU: 9236720012



Turnigy TGY-i6 Mode 2 AFHDS
Transmitter and 6CH Receiver
SKU: 9114000020-0



OrangeRx R615X DSM2/
DSMX Compatible 6Ch
2.4GHz Receiver
SKU: 9101800001-0



Turnigy Accucell C150 AC/DC
10A 150W Smart Balance
Charger
SKU: 995900001-3



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