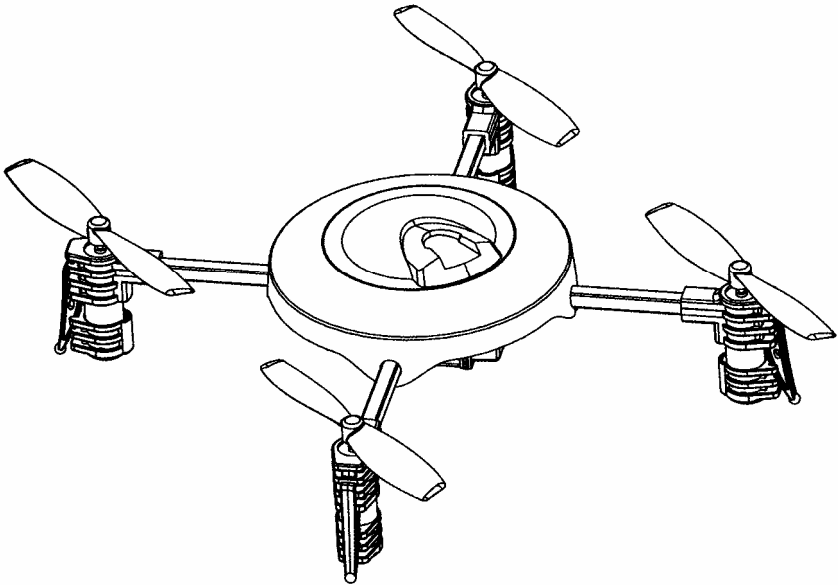# QuadPod Nano
Miniature Quadcopter

Thank you for purchasing the Snelflight QuadPod Nano, a state-of-the-art miniature quadcopter. The model comes fully assembled and ready to fly with its own dedicated 2.4GHz control transmitter.

The QuadPod Nano is extremely stable, thanks to its miniature flight computer incorporating full 6-axis gyro and accelerometer sensors with MotionFusion™ control technology. This system provides rapid self-levelling whilst still allowing agile flight. The QuadPod Nano is designed for indoor use but may be flown outside on a calm day, with flight times of around 8 minutes. The aircraft is robust, but its straightforward construction makes repairs easy using our extensive range of spares.

Please read through this manual fully before operating the aircraft, to acquaint yourself with the features and functions of your QuadPod Nano.

IMPORTANT SAFETY NOTICE

- The QuadPod Nano is not a toy. It is a precision model incorporating small but powerful motors controlled by complex electronics. It is capable of causing injury if it is not operated safely. This manual should be read carefully before the aircraft is flown.

- Always handle the QuadPod Nano carefully, and be mindful that it might start suddenly in the case of a malfunction. Sudden start-ups are fortunately rare, but take great care to avoid accidently knocking the throttle stick when the aircraft is powered up and ready to fly. It is safest to switch the transmitter off during pre-flight preparations.

- Always disconnect the battery before leaving the QuadPod Nano unattended, and after use.

- Never fly over people's heads, or near to children or pets. Make sure that others nearby know that you are flying the QuadPod Nano. The QuadPod Nano is heavy enough to cause injury if it falls on somebody from any height, and sudden stoppages can occur in the event of malfunction.

- Remember that the working parts of the QuadPod Nano can get hot during use, particularly the motors. Other parts can also get hot in the event of a malfunction.

- Do not allow the QuadPod Nano to get wet and if it does, disconnect the battery immediately and thoroughly dry everything before testing carefully.

- If a malfunction is suspected, disconnect the battery and remove the propellers before investigating.

- Always treat lithium polymer batteries with great respect, and follow the instructions for safe use. Never leave lithium batteries unattended whilst charging.

- Always disconnect the battery from the QuadPod Nano when not in use. If the battery remains connected it will be seriously damaged by over-discharge, and may overheat or catch fire when next charged.

- Examine the lithium polymer battery extremely carefully after a crash, and do not use it if crushed or if the cell envelope has been ruptured.

- Remember that lithium polymer batteries contain large amounts of energy. They can overheat, catch fire or explode if damaged, mistreated or if they fail internally. Always treat them with the greatest care.

- ALWAYS REMEMBER THAT YOU ARE RESPONSIBLE FOR THE SAFE OPERATION OF YOUR QUADPOD NANO.

Packing List

The box should contain the following items. If anything is missing then please contact us at support@snelflight.co.uk.

1) The QuadPod Nano aircraft
2) 2.4GHz control transmitter
3) Small black battery charger with 2 red indicator LEDs
4) USB power cable
5) 2 lithium polymer batteries
6) A spare set of propellers
7) An AC adapter (packed underneath the box liner).

You will Need

- Four AA batteries
- A small Philips screwdriver
- A space to fly, around 8 feet square is a sensible minimum size
- A fairly tolerant wife.

Parts Identification

Figure 1 below shows the orientation of the QuadPod Nano. If flying for the first time, please note that the handset controls act in relation to the aircraft, so it is crucial to remain aware of its orientation at all times. The orange propellers at the front of the aircraft are extremely helpful. Each propeller has its type (A or B) embossed onto the blades close to the hub.
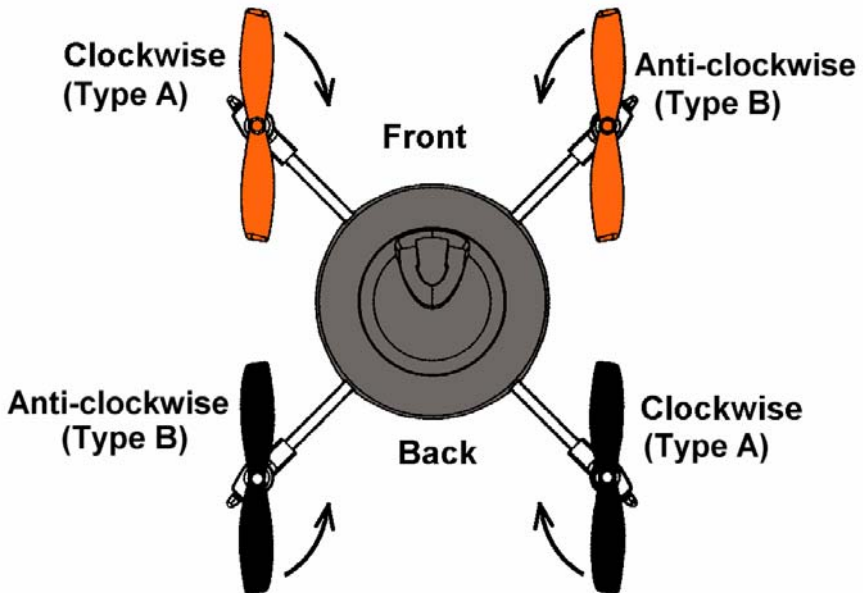

Fig. 1: QuadPod Nano Parts and Orientation

Figure 2 below identifies the various controls on the transmitter. These are arranged according to the popular Mode 2 layout.
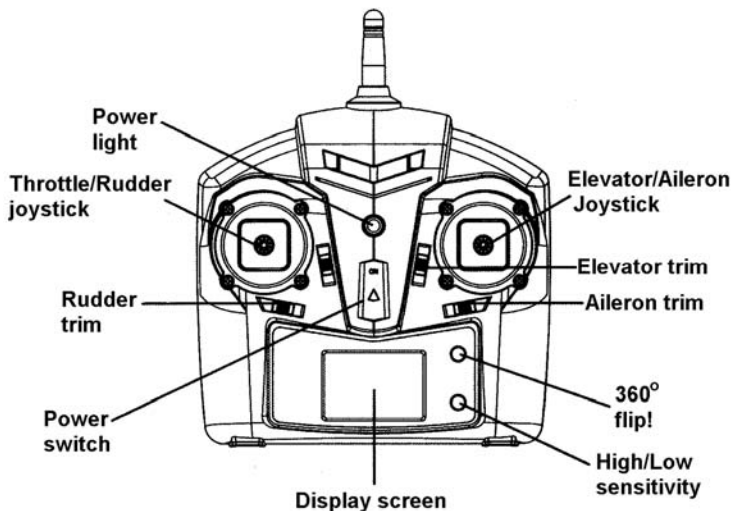

Fig. 2: QuadPod Nano Control Transmitter

Please note the following:

1) The transmitter has a clear display screen which shows;

   a) The percentage throttle level
   b) The trim positions
   c) The battery condition
   d) The Mode setting: Mode 1 = Low control sensitivity
                                       Mode 2 = High control sensitivity.

   The Mode setting does not change the layout of the controls.

2) The Mode is selected by the small button which alternates the setting between 1 and 2.

3) The trim controls are electronic, and each press of the trim tab in either direction steps the trim setting by one notch. A beep sound indicates each step, changing in pitch as the trim is advanced. A longer high pitched beep indicates the centre position, whilst a warbling sound indicates that an endpoint has been reached. The trim stepping will auto-repeat if the tab is held.

4) There is no throttle trim provided. The throttle trim tab is a dummy.

5) All settings revert to neutral when the power is switched off.

Transmitter Battery Installation

The transmitter requires 4 x AA batteries – alkaline is recommended. To install, release the rear cover using a Philips screwdriver, and insert according to the indicated "+" and "-" symbols, not the little embossed battery pictures! The usual cautions apply:

- Observe correct polarities
- Do not short circuit
- Do not mix old and new batteries
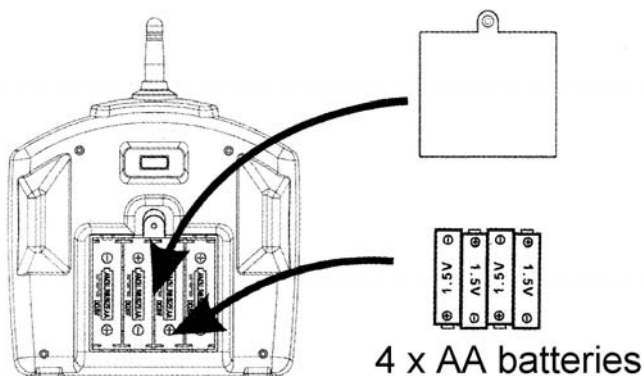- Do not mix battery types, especially rechargeable and primary varieties.

Fig. 3: Transmitter Battery Installation

Flight Battery Charging

Before the QuadPod Nano can be flown, the flight battery must be charged. Two lithium polymer batteries are supplied, together with a charger which can charge both at the same time. Two batteries are useful, because one can be charged whilst the other is flown.

To operate the charger:

1) Connect one or two batteries to the sockets on the sides of the charger.
2) Use the USB cable to connect the charger to an available USB port on a computer, or to the supplied AC adapter.
3) The red indicator light(s) will illuminate during charging, turning off when charging is complete. If either charge socket is unused, then its indicator lamp will blink.
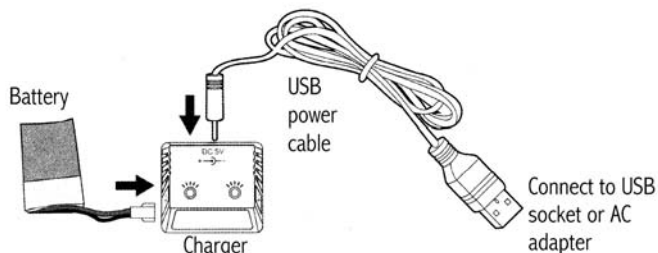4) Charging takes around 1 hour.

Fig. 4: Flight Battery Charging

Preparing to Fly

To get the QuadPod Nano ready to fly:

1) Insert a freshly charged battery into the cradle underneath the aircraft.
2) Connect it to the QuadPod Nano using the pair of white plugs, taking care to observe polarity.
3) Blue and red lights should be visible under the dome. Now turn the aircraft over and place it on a flat surface.
4) On the transmitter, make sure that the throttle lever is at minimum (left stick fully back).
5) Switch on the transmitter. It will make a single beep sound, and its red power light will blink.
6) Raise the throttle lever to maximum, and then back to minimum again. The transmitter should make three more beeps in rapid succession, indicating that it has connected to the aircraft. The red power light will illuminate solidly.
7) The QuadPod Nano is now ready to fly.

Additional Notes:

8) If you turn the transmitter off, then the aircraft battery will have to be unplugged and plugged again before control can be restored.
9) The lights under the dome illuminate and flash with various meanings:
   a) The blue light illuminates solidly to indicate good battery charge.
   b) The red light will blink rapidly until the QuadPod Nano is placed on a stable surface. When the aircraft stops moving, the onboard gyro sensors will auto-calibrate.
   c) After auto-calibration, the red light will blink in a "x x   x x   x x….." sequence, indicating that the aircraft is waiting to connect to the transmitter.
   d) After connection, the red light will illuminate solidly, indicating that the aircraft is ready to fly.
   e) During flight both lights will blink in a "xxx   xxx   xxx…." pattern, like navigation lights. This is just to look pretty.
   f) When the battery runs low, the blue light will turn off.

Flying

To fly the QuadPod Nano, proceed as follows:

1) Place the aircraft on the floor in the centre of the flying area, which should be around 8 feet square as a minimum.
2) The orange propellers indicate the front of the aircraft. You should stand three or four feet behind it.
3) Raise the throttle gradually. When the aircraft seems about ready to lift off, give a small burst of throttle to get it into the air.
4) The QuadPod Nano is powerfully self-levelling, and will generally hover without much use of the right hand joystick. If it drifts consistently in one direction, the trims may be used to correct it.
5) The right hand joystick has relatively low authority in Mode 1. Switching to Mode 2 (a single press of the button) will increase the aircraft's agility.
6) The 360º Flip button does exactly what one might hope… it causes the aircraft to perform an automated somersault. It does so by rolling rapidly to the left, and will lose 3 or 4 feet of height in the process, as well as needing horizontal manoeuvring room. It should therefore only be done in an adequately spacious flying area.
7) The QuadPod Nano may be flown with its central dome removed. This has several advantages:

   a) The lights show
   b) Flight is quieter
   c) Some weight is saved.

Please note however, that flight behaviour will be affected. The aircraft will take longer to stop when the joysticks are centred, and will tend to drift about more.

If flying hovering aircraft for the first time, please take some time to acquaint yourself with the joystick functions, shown in Figure 5 below. This diagram was originally prepared for our Hoverfly helicopter; we have used it because it shows the aircraft's orientation more clearly than a quadcopter diagram would.
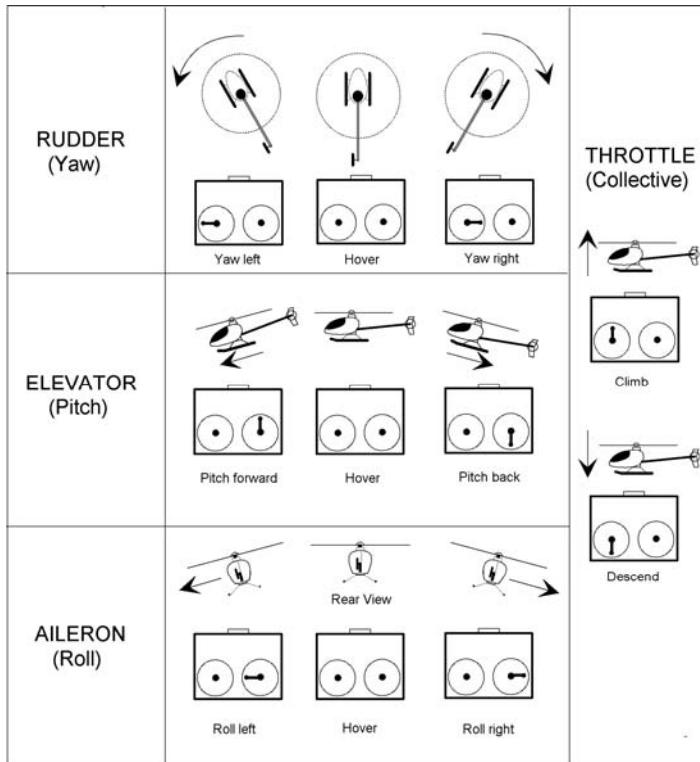

Fig. 5: Hovering Aircraft Flight Controls

Although easier to fly than "conventional" radio controlled helicopters, the QuadPod Nano will still take some practice to master. When flying a hovering aircraft, it is necessary to do three things at once:

1) **Control the height of the aircraft, using the throttle control:** This involves finding the throttle position at which the aircraft neither rises nor falls. Almost continuous tiny adjustments are then required to compensate for the aircraft's natural tendency to drift up and down in drafts, etc. Throttle control is perhaps the most difficult aspect of flying to learn.

2) **Control the aircraft's heading (the direction in which it is facing):** This is crucial, because the other direction controls act in relation to the aircraft's orientation. So it is much easier to control if the aircraft is facing away from the pilot, so that its left and right are the same as the pilot's. Heading orientation or "yaw" is adjusted by moving the left-hand joystick left or right. The pilot needs to learn to use this control without altering the throttle setting at the same time, to keep the aircraft pointing in the desired direction.

3) **Control the aircraft's position in the air using the right-hand joystick:** The aircraft will drift about by itself, and the pilot needs to make it go where desired by moving the joystick. This tilts the aircraft, causing it to fly horizontally in the corresponding direction. When the joystick is returned to the centre the aircraft will level itself, but it will not stop moving instantly. To stop quickly, the joystick must be pushed in the opposite direction for a moment. Timing is everything!

Repairs and Maintenance

The QuadPod Nano requires no routine maintenance. However if it needs repair then it can be dismantled readily; the construction is pretty self-explanatory. Parts may be replaced from our extensive range of spares.

When re-assembling, it is important to orient the receiver board correctly and to plug the motors into the right sockets – please see Figure 6 below. Please note that the motors come in clockwise and anti-clockwise types, identified by the wire colours at the motor: Blue and red wires for clockwise, black and white wires for anti-clockwise.
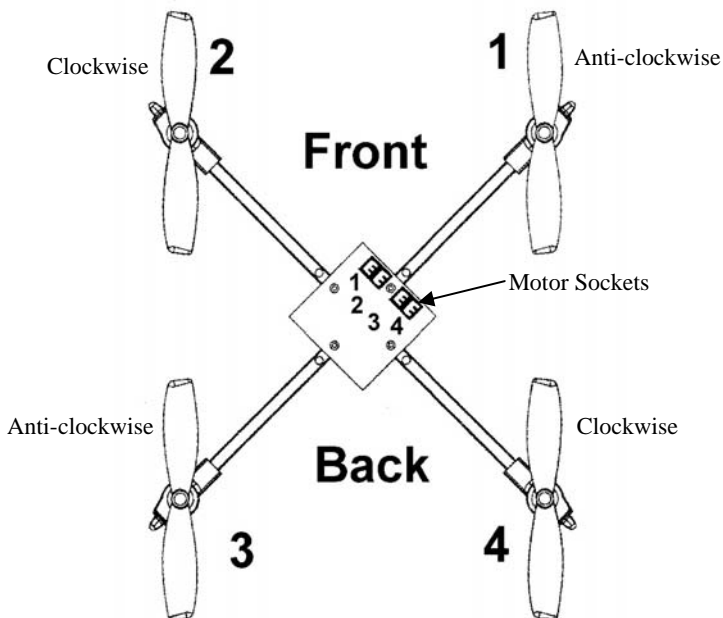
Fig. 6: Motor Connections

Specifications

Size:	4.75" (12cm) diagonal motor-to-motor
Weight:	34g including battery
Flight time:	About 8 minutes
Radio Range	Around 100 metres
Battery:	Snelflight 250mAh 1S 25C Lithium Polymer
Payload:	Up to 10g
Maximum flight weight:	44g