

iGyro 3e

NEED A GYRO IN YOUR MODEL? ANDY ELLISON DIDN'T THINK SO EITHER... UNTIL HE TRIED ONE

I am not a technophobe. I'm almost the polar opposite in fact. My mechanical engineering background brings an air of curiosity, which often demands I seek out a reasonable understanding as to how things work. Our hobby constantly feeds this curiosity as its associated technology continues to develop and, recently, I had cause to undertake a little head scratching once again.

The Weston Park Model Show this year was blighted by strong and severe crosswind conditions. However, I sat with my cohorts watching some large, floaty models and heavy jets near to their stalling points, landing in rock solid, arrow-like fashion. No bouncing, no adverse yaw and no divergence from their path through the blatantly turbulent air. What was their secret?

Gyro stabilisation was the answer - electronic gimmickry providing compensatory corrections before any human brain realised compensatory correction was needed. Cheating? Well maybe in competition for sure. In the XFC Extreme Flight Championships gyros are positively banned and scrutineered for. But here, at a model show, with pilots from across Europe flying demo

models for the public? Nah, I don't think so. Any emergent technology is the future isn't it, or are you still listening to music on your 8-track and doubling your clutch when you drive your car?

I felt it was time to future proof myself a little and learn something more about gyros. I flashed some cash on the Nexus stand, coming home with a shiny, blue anodised and very blingy Powerbox System iGyro 3e to play with. PowerBox have always produced quality equipment and the iGyro 3e is essentially a dumbed down version of their full iGyro SRS system. Or if you prefer, an expanded version of the basic iGyro 1e, a single-axis gyro system.

The iGyro 3e features a triple-axis Micro Electro-Mechanical System (MEMS) sensor gyro that is enclosed in a nicely machined two-piece

aluminium case. There are five servo inputs and outputs (two each for aileron and elevator and one for the rudder), a remote gain control lead to allow programming from the transmitter and a MISC port that will be used for future expansion. A set of small status indicating LED's are provided on top of the gyro as well as a small programming button. A decal showing the orientation of the connectors is printed on the bottom of the casing and there is a USB port for connecting your new toy to a laptop or tablet device.

A terminal program can be downloaded, for free, from the PowerBox website and can be used with an optional USB lead for advanced configuration of the internal software. Use this for

Small it is, yet very clever too and supplied with connection leads and instructions.

It's a PowerBox item, so as you'd expect, it's very well made.



Heading Hold Mode is something else, and will certainly fix your 3D flying.





Noting the proper orientation, it's small enough to fit into most models.



Does it get a busy on the sticks during take off? Perhaps you need one of these too.

instance if your model has a v-tail, is a delta, if you need to mount your gyro in a different orientation or require different gain settings on a different axis. My antivirus software didn't like some aspects of the download at first and it had to be disabled to facilitate matters. Interestingly the software is now also available as an iPhone or Android App which, in conjunction with a PowerBox Bluetooth receiver, can be used to fully configure the deepest programmes of the unit down at the flying field.

Bluecom, an optional extra means gyro programming and software updates can be managed using a free smartphone App.

MODES

The iGyro 3e has been developed specifically for fixed-wing model aircraft and the software is based on

a special regulatory algorithm that ensures the flying characteristics remain natural. It has three Modes - Off (zero gain), Heading Hold Mode and Normal Mode. Normal Mode is used to dampen unwanted movements from influences such as wind gusts, while Heading Hold Mode will additionally ensure that the ailerons and elevator will maintain the model at the last inputted attitude when the sticks are returned to neutral. This makes manoeuvres such as sideslips and prop-hangs almost a one-handed affair for mode 2 fliers. When the sticks are once again moved, the Heading Hold Mode disengages and the gyro reverts to Normal Mode with progressively less gain as the sticks are moved further from the centre position. Flying a fixed-wing model in Heading Hold Mode takes a little getting used to, but the way iGyro implements it works very well.

These modes are selectable from the transmitter by use of the auxiliary channel input on the unit. This allows you to quickly set up the gyro in the air by adjusting the gains simultaneously in either the 0% to +100% (Normal Mode) or the 0% to -100% (Heading Hold Mode) servo travel range of the auxiliary function.

Also included with the gyro are male-to-male servo cables to go from

your receiver to the gyro for the channels you're stabilising, a set of basic instructions, a few stickers and two double-sided adhesive mounting pads. A further male-to-male servo cable is provided for the aux channel remote gain control. I was pleased to see that the LEDs, whose primary purpose is to guide you when setting up, have an additional function by glowing red or green to indicate whether Normal mode (green) or Heading Hold mode (red) is active for the corresponding control surface.

Despite the fact that a user can drill down into the deepest depths of the programming using an external device, the quick start guide that is provided and the out-of-the-box settings of the gyro should be all that's required for most users to get flying successfully.

INSTALLATION IS KEY

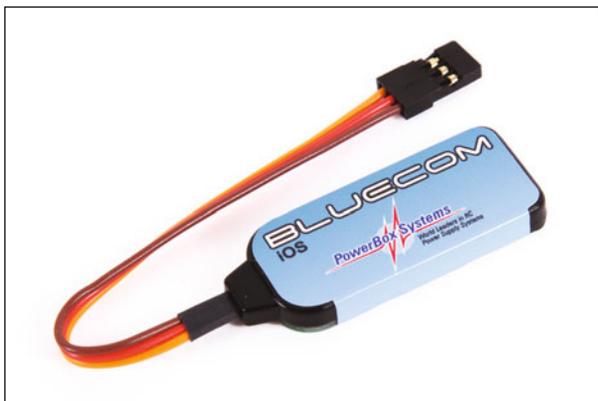
A location should be selected that permits the iGyro to be connected to the receiver and aligned parallel to the three axes of control. It should be flat and as free of vibration as practical. Mounting at or near the C of G isn't important and the direction of flight for the supplied set up is indicated in the guide.

Once the gyro is mounted you connect the gain cable to an open channel on your transmitter. Initial flight-testing should be done with the gain assigned to a dial or slider. Once you have the settings nailed down this can go onto a three-position switch with 'off' being at the centre. The elevator servo (or servos) are connected, then aileron servo or servos and finally the rudder servo. The iGyro receives its power through the receiver and only draws about 40mA but it is rated for a max of up to 20A.

IN USE

It crossed my mind to play with my new toy using something like a WOT4 Foam-e but I bit the bullet and put it straight into my Hangar 9 Carden Extra 300 aerobat. I set the auxiliary channel control to the left hand slider on my DX18 transmitter, which helpfully beeps as you are passing the central position (indicating that the gyro is turned off). One side of the travel (0% to +100%) would control Normal Mode, the other side to (0% to -100%) controlling Heading Hold Mode.

After installation and with the model fully rigged and turned on, it's important to check that the gyro is compensating in the correct direction - tilt the nose up and make sure the





gyro gives down elevator, roll right to see left aileron, yaw left and you should see right rudder. If anything is backwards simply press the setup button until all the LED lights on the gyro go out. At that point Aileron A will become lit, if that servo is correcting backwards tap the button to reverse the compensation, otherwise hold it and it will move to the next servo. Any servos that need reversing should be reversed and that setting is saved immediately. For my installation I had to reverse both ailerons and both elevators. The process took around 30 seconds although it's important not to reverse the servos at the transmitter.

Now perform a full control and gyro direction test again before getting a friend to do a double check. This may sound silly but if the gyro is correcting backwards for aileron and the plane starts rolling right, the gyro will make it roll harder, not correct it. You could be looking for a swift change of underpants or picking up model bits for the rest of the day!

I couldn't have asked for a better day to test it - the wind was blowing a gale. That may sound strange but a windy day will give it some work to do and it is under these conditions that



you'll appreciate the benefits most.

With the gain set at zero, I took off and flew high into the circuit. I had read that the gyro should be set at full throttle and understood the need to perhaps build up to this point, but, for a first pass, half power would do. With the Extra set straight and level I began to push the slider to the Normal Mode side. Almost immediately there was some oscillation on the roll axis and in a bit

of a panic I backed the gyro off but pushed past neutral and started going the other way where it oscillated again! I really did not expect the unit to be so sensitive that it would reach its gain setting so soon. Trying again, moving the slider much more slowly, I found that the oscillation began on aileron at 20% throw to the Normal Mode side. Now I landed and made the extreme setting of the Tx slider on that side 18% i.e. 0%+18% ATV. Taking off once again at neutral I repeated this exercise for the Heading Hold Mode side. This time the oscillations began noticeably at around 30% ATV. Landing again I set the travel to 28% on this side and then took another flight to confirm these settings were adequate for now. I then transferred the control to a three-position switch which would facilitate instant transition across the three modes.

PROPER PLAY

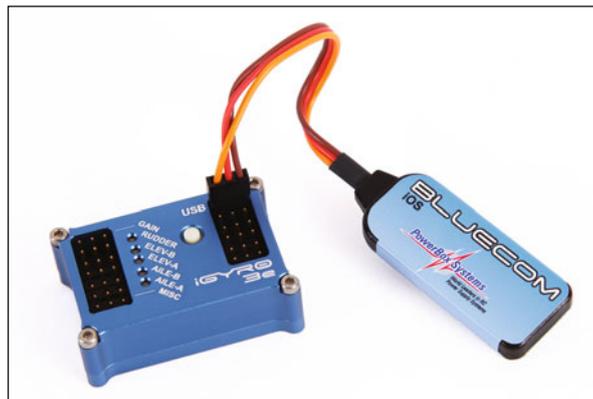
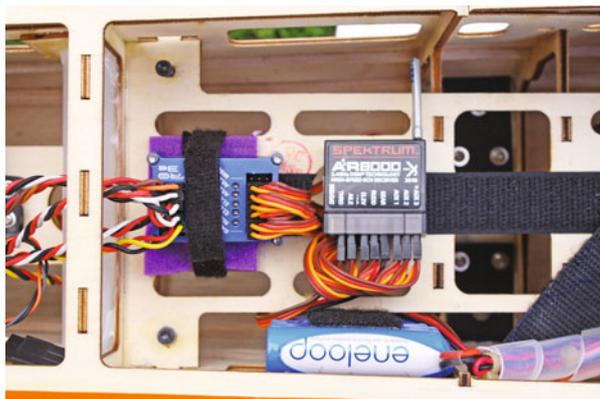
The first real insight into the gyro's capability was on the first take off with the unit active. This was a windy day remember and the previous take offs had been done with no gyro influence at all.

The turbulence on our patch had been bouncing this high-powered model around but this was in stark contrast to the flawless, arrow-straight take off possible with the gyro turned on. The rolls now had a noticeable precision to them and stopped instantly as the stick was released. They were almost bouncy and it was immediately obvious that there was no coupling of controls. The axis controls were pure - no pitch with roll, no torque swing or roll either, so it simply felt that the model was flying through perfectly still air.

Hold Mode is really something. Roll to inverted and establish your line then let go! In Normal Mode the model will slowly arc to the ground but in Hold it remains rock solid and level. Only minor rudder inputs are

It's not all about big aerobats either, scale models, particularly warbirds, will benefit.

Units like this aren't permitted at competition level but, for sport flying it's just down to the individual.



A nice neat fit in my Extra. The unit connects between the receiver and servos.

Connect the Bluecom, grab your phone and start programming!

required for knife-edge and point rolls stop exactly where you leave them. My one-handed, walking pace, sideslip while chastising my 3D flying son with my free hand brought a big smile to my face. It wasn't long before junior had the transmitter in his mitts and was performing flawless



DATAFILE

Name:	iGyro 3e
Product type:	3-axis stabiliser
Manufactured by:	PowerBox Systems powerbox-systems.com
UK distributor:	All good model shops
RRP:	£159.99 (Bluecom £36.99)
Operating voltage:	4.0 – 9.0V
Current drain:	40 mA
Signal input:	PWM
No. sensor axis:	3
Servo outputs:	5
Gyro regulation:	Heading and Normal modes
Gyro sensor type:	MEMS
Current capacity:	max. 20 A
Temperature range:	-30C – +75C
Dimensions:	40 x 30 x 15mm
Weight:	36g (inc. six patch-leads)

prop-hangs and torque rolls before walking away shaking his head muttering. Landings were equally joyful with the Extra cruising in through the turbulence as if it was a flat calm day.

SO?

What's not to like? Crosswind landings? No problem. Engine out on your twin? Don't worry; iGyro 3e will be making corrections before you know you have an issue. Let's just be clear about a few things here though.

This isn't a flight control system. Nor is it an anti-gravity device or

autopilot. It won't fly your model, add power when needed, improve your flying skills or make the model do something that's not aerodynamically possible. It will however improve how your model flies, bring smoothness, realism and grace to your scale aircraft, tracking and precision to your aerobats, and perhaps transform a model that you've struggled with into your new favourite. →

iGYRO 3e

Quality manufacturing to DIN EN ISO 9001:2008



Micro single-axis Gyro

- + Guaranteed iGyro feeling
- + Gain input for in-flight sensitivity adjustment
- + Two outputs can be set up independently

