Inside the eXom dance

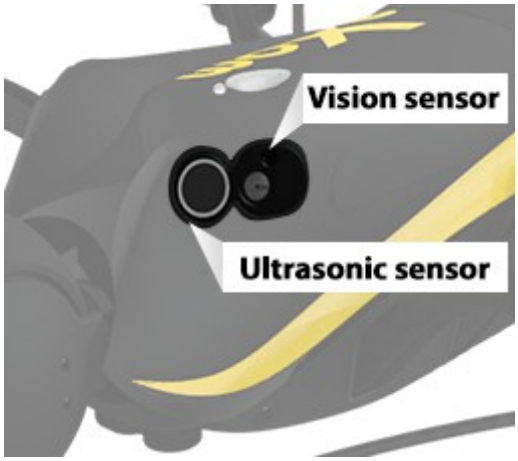
First, eXom's autopilot was pre-programmed with different dance moves - such as shimmying fast and slow - to fit our funky mashup soundtrack.

Then to ensure eXom remained 'in place' in the air, without GPS, that's where one of its five dual sensor modules came into play.

We required eXom to stay centred in its cage and not move significant distances forwards, backwards or sideways, so eXom employed its downward-facing module to keep itself stable in the air:

• This module's ultrasonic proximity sensor bounced sound waves off the floor to continually confirm eXom's vertical height (Z) above the bottom of the cage, the eXom's built-in senseFly autopilot making numerous micro-adjustments to eXom's flight parameters to keep its height constant.

• The module's visual sensor meanwhile – effectively a miniaturised video camera – ensured eXom held its X/Y position. It identified hundreds of key points on the floor, accurately estimating their perceived movement and, with the help of eXom's autopilot, performing numerous micro-adjustments to its motor thrust to correct any drift.



Two of our key goals for eXom, from day one, have been to:

• Create an autonomous quadcopter that is highly stable in the air

• Produce the safest system on the market by giving the user full situational awareness

To meet these goals, our developers knew from their experience studying bats and hovering insects, that using both cutting-edge vision and ultrasonic proximity sensors was the way to go. But no module existed containing both. So they created one.


5 vision sensors


5 ultrasonic proximity sensors

Since this fixed direction unit can naturally only point in one direction at a time, we then needed to optimise the number and position of these dual sensor modules to achieve the required 360° awareness.

The answer? Five separate sensor locations – on eXom's left side, right side, underbelly, rear, and built inside its forward/upward facing camera head – that would allow eXom to receive sensor data from every direction.