

Using haptic feedback joysticks to fly drones

January 19 2018, by Cécilia Carron

A new joystick developed by startup MotionPilot lets users fly drones with just one hand in a fun, intuitive way. One version of this device includes a haptic feedback mechanism that gives users a sense of the drone's position as it moves through the air. Drone aficionados were recently impressed by a prototype, and the device could hit the market soon.

Drones are already used in a wide range of applications, such as monitoring crops, taking camera shots, racing, and, of course, just having fun. But the method for flying them hasn't changed much in the 50 years since drones were invented – they all basically involve a handheld control device or, more recently, a smartphone app. Users press one button to adjust the drone's altitude and direction, and another to tilt it along either of two axes. However, using such a system to take off, stabilize and land a drone is harder than it looks. "We found that people need a few hours to get the hang of standard systems for flying drones," says Timothée Peter, one of MotionPilot's four founders.

The [joystick](#) was designed by Peter and his business partners, who are all in the last year of their Master's degree in Microengineering at EPFL. It is a seamless, intuitive control device that fits neatly into a single hand – users simply have to lean it forward or sideways to guide the drone. And a trigger on the handle can be used to change the drone's altitude. "It's so simple that even beginners can start having fun right away," says Julien Perroud, a seasoned drone pilot and member of the Aéropoly committee, an association that promotes aeronautic sports on campus.

Three modes, each corresponding to a different ability level

The system has three modes, each corresponding to a different ability level, so even experienced users can enjoy a challenge. "In the beginner mode, the system will automatically control the drone's trajectory to make the flying experience as easy as possible," says Peter. The intermediate and advanced modes allow for increasing user control and freedom. Users can select the flight mode from an app on their smartphone.

Perroud tested the drone's intermediate mode and was pleasantly surprised by what he could do – especially in terms of aerial acrobatics. "Switching from the old controller to the joystick was a snap. The joystick becomes second nature – you forget you're piloting a drone. It's a major improvement," says Perroud. "I'll be curious to see how the founders incorporate all the features of a handheld control device in this new design."

Giving drone users the sensation of flying

MotionPilot's founders didn't want to wait until graduation to launch their company and start moving towards their ultimate goal: revolutionizing the relationship between humans and drones. Until now, flying drones was largely a mechanical exercise that lacked the sensation of flying. But thanks to the company's new joystick – and more specifically, the haptic feedback mechanism integrated into its handle – drone pilots are in for an exciting, holistic experience.

While other engineers have toyed with the idea of using joysticks to fly [drones](#), they employ completely different technology and – unlike MotionPilot – do not use a haptic feedback mechanism. The startup's

system combines sensors installed on the drone with haptic technology integrated into the joystick handle to pinpoint the drone's position in the air and relay the forces it is exposed to. The system also includes goggles that users can wear for a first-person view (FPV) experience.

MotionPilot's four entrepreneurs – all under 25 – bring complementary skills to the table, enabling them to methodically design, engineer and fabricate their system. For now they prefer to keep their trade secrets under wraps.

MotionPilot has already won several entrepreneurship awards and grants, including funding from Venture Kick and European Student Startups, and the top prize in the START competition. Their next step will be to launch a complete kit on the market consisting of a drone, a joystick and FPV goggles, giving users a fully immersive flying experience. The firm is already in talks with drone manufacturers and is aiming for a market launch, although initially without the haptic feedback mechanism, before the end of 2018.

Provided by Ecole Polytechnique Federale de Lausanne

Citation: Using haptic feedback joysticks to fly drones (2018, January 19) retrieved 5 August 2024 from <https://phys.org/news/2018-01-haptic-feedback-joysticks-drones.html>

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