Drone 'space ship' app to help robots on future missions

April 20 2013, by Jan Hennop

An attendee photographs an A.R. Drone helicopter by Parrot as it flies overhead during the 2010 International Consumer Electronics Show on January 6, 2010 in Las Vegas, Nevada. European Space Agency scientists have developed a smartphone app that turns the toy drone into a virtual spacecraft on a mission, and uses crowd-sourced data from its manoeuvres to improve artificial intelligence.

European Space Agency scientists have developed a smartphone app that turns a toy drone into a virtual spacecraft on a mission to dock with the

International Space Station, and uses crowd-sourced data from its manoeuvres to improve artificial intelligence on future missions.

The free AstroDrone app for the [iPhone](#) and iPad allows owners of the French-built Parrot A.R.—an advanced mini [drone](#) that flies around with the aid of four [rotors](#)—to simulate a docking with the ISS, a task until now only done by [astronauts](#).

As the drone, which cost around 300 euros ($390), flies around, its pilot plays the game by controlling progress on the screen.

The task is to use green crosshairs to line the drone up with a virtual ISS docking port.

By tilting the phone and using finger swipes, the "astronaut" effectively controls a spacecraft similar to a [Russian Soyuz capsule](#), including the height and speed at which the simulated docking takes place.

When the real-life drone touches a pre-set point on a wall marked by a brightly coloured square representing the port, the virtual docking is completed.
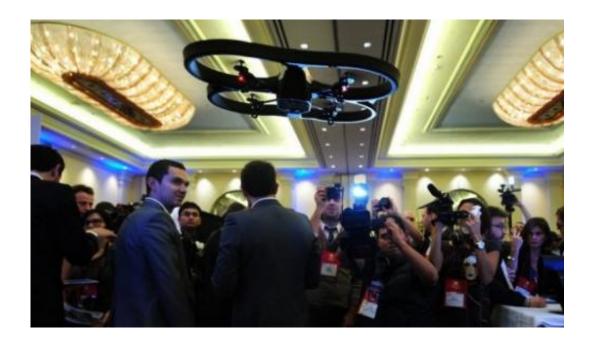
The player is then given a score, based on the speed and accuracy at which the "docking" took place.

"Playing this game turns you into a real astronaut—it feels like you are in space," said Guido de Croon, ESA's Advance Concepts Team research fellow, the project's leader.

But the game's real ingenuity lies in the fact that the movement data it gathers from the drone during the game is sent back—with players' permission—to the ESA, where scientists use it to help their [robotics research](#).

"It is one of the first ever projects of its kind which uses crowd-sourcing to glean robotic data to be used in our scientific research," said De Croon.

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Drones were once the preserve of the military, but there are now some 500,000 owners of the Parrot toys around the world—and all are potential sources of data, he said.

The data sent back to the ESA contains information on the movements drones make while humans play the game to steer the drone into its simulated docking.

"This data is then used in our own research to teach robots how to navigate by judging distances. It's the first step to reproducing these actions with artificial intelligence," De Croon said.

The implications are staggering.

"For instance, we could have autonomous spacecraft that continuously improve the way they manoeuvre, dock or land—even in completely unknown environments."

"Or imagine a group of robots arriving on Mars, where the robots help each other to quickly learn to recognise hazardous situations without any human help," said De Croon, who with team-mate Paul Gerke is working on a similar application for Android phones.

"For the ESA, this development opens up completely new ways of involving the public in scientific experiments," added Leopold Summerer, who heads the Advance Concepts Team.

"We can obtain real-life data to train our algorithms in large amounts that would be practically impossible to get in any other way," he said.

For those worried that the drone might send private information to the ESA, such as video images of the inside of people's homes, De Croon said players need not worry: "We're not interested in the places people are flying in."

"We get only the abstract mathematical image which the drone itself picks up from navigation, along with its velocity readings," he said.

In future and should time permit, the team hopes to develop several other space rendezvous scenarios including the ESA's Rosetta probe which is to meet up with a real-life comet next year.

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