

MIT researchers develop new display system with flying pixels

-- Remote controlled "micro helicopters" generate unique, free-form display

Photo and Video Available

Imagine that pixels could fly out of your computer screen and create an immersive, luminous cloud capable of displaying digital information in three-dimensional space. This is the vision beyond Flyfire, a new project put together by researchers at MIT's SENSEable City Lab and Aerospace Robotics and Embedded Systems Laboratory (ARES Lab).

Flyfire uses a large number of remotely controlled, self-organizing "micro helicopters". Each helicopter contains small LEDs and acts as a smart pixel. Through digitally controlled movements, the helicopters perform elaborate and synchronized choreographies, generating a unique free-form display in three-dimensional space.

"It's like when Winnie the Pooh hits a beehive: a swarm of bees comes out and chases him while changing its configuration to resemble a beast," said E Roon Kang, a research fellow at the SENSEable City Lab who is leading the project. "In Flyfire, each bee is essentially a pixel that emits colored light and reconfigures itself into different forms."

Using the self-stabilizing and precise controlling technology developed by the ARES Lab, the motion of the pixels is adaptable in real time. The Flyfire canvas can transform itself from one shape to another or bring a two-dimensional photographic image into an articulated shape.

"Today we are able to simultaneously control a handful of micro helicopters, but with Flyfire we are aiming to scale up and reach very large numbers," said Emilio Frazzoli, head of the ARES Lab.

"Flyfire opens up exciting possibilities: as on a conventional screen, pixels can change color, but now they can also move, creating a transient trace of light in three-dimensional space," said team member Carnaven Chiu. "Unlike traditional displays that can only be seen from the front, Flyfire becomes a three dimensional immersive display that can be experienced from all directions."

Flyfire is conceived as a public space installation, in which the pixels recharge every few minutes and then perform in space. "In general, there are two ways to increase the resolution of a display," said Carlo Ratti, director of the SENSEable City Lab. "One is to use smaller pixels. The other one is to look at it from farther away. Flyfire adopts the second approach to create a unique visual experience in large public spaces."

Flyfire is made possible by recent advances in battery technology and wireless control. It aims to be a step towards 'smart dust' -- the idea that computing is becoming increasingly smaller, addressable, pervasive - and persuasive.

The Flyfire project was developed by E Roon Kang, Carnaven Chiu, Caitlin Zacharias, Shaocong Zhou, Assaf Biderman and Carlo Ratti of SENSEable City Lab in collaboration with Erich Mueller and Emilio Frazzoli of ARES Lab.

<http://senseable.mit.edu/flyfire>