

## Quadcopters over Linz

Weather permitting: Every Thursday at 10 PM from June 20th to the end of July

(Linz, June 19, 2013) The Ars Electronica Futurelab's quadcopters will be conjuring impressive three-dimensional formations in the night sky above Linz this summer. From now until the end of July, the high-tech swarm will take off every Thursday at 10 PM (weather permitting). The best vantage-point view of the so-called spaxels' computerized choreography is from the main entrance of the Ars Electronica Center. The quadcopters recently wowed audiences at two high-profile events: forming the Star Fleet logo to publicize the London premiere of Paramount Pictures' latest "Star Trek" film, and in Bergen, Norway starring in the gala opening of the Bergen International Festival.

## Ars Electronica Futurelab and Ascending Technologies Are World Record Holders

Since September 1, 2012, the Ars Electronica Futurelab, a Linz media art laboratory, and Munich quadcopter manufacturer Ascending Technologies have jointly held a world record as the first to orchestrate a completely automatic flight by a swarm consisting of 50 quadcopters. And they set that record outdoors, where heavy radio & WLAN traffic, gusty winds, humidity and a few drops of rain confronted both hardware and software with enormous challenges.

## Joint Research Project

The Futurelab developed software with which the flight behavior of a quadcopter formation can be very flexibly controlled, and that simultaneously makes allowance for GPS measurement errors with respect to the position of individual units. For the choreography of the swarm, the Linz crew created a 3D Studio Max grid in which any given number of points can be defined just like in a three-dimensional animated film. The computations that result are then communicated to the flight control software that pilots the swarm's aerial maneuvers.

Ascending Technologies concentrates on the hardware end. Their 100-gram, LED-studded AscTec Hummingbird quadcopter is the ideal device for this assignment. Small, responsive, robust and equipped with specially developed GPS modules, it can be steered with utmost precision. In order to allow for simultaneous control of multiple quadcopters that's as reliable as the units themselves, Ascending Technologies completely reconfigured the communication both among the quadcopters as well as with the ground control station. In order to effectuate the requisite reaction speed on the part of the quadcopters without excessive latency time delay, all communication among the swarm and ground control proceeds via a 2.4 GHz transmission channel set up especially for this purpose. Ascending Technologies' development division succeeded in optimizing the flight behavior of the individual quadcopters with respect to maneuverability, precision and reliability to a very high degree—the absolute prerequisite for orchestrating complicated flight patterns in formation. This successful collaboration by the Ars Electronica Futurelab and Ascending Technologies

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has brought out a complete system that makes it possible to implement totally innovative visualizations even at locations like Central London where it's essential to comply with very stringent safety & security provisions.

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Ars Electronica Futurelab: <http://www.aec.at/futurelab/de>

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