World Record: Intel and Ars Electronica Futurelab Send 100 Drones Aloft at Night

(Linz/Austria, January 12, 2016) "One rarely experiences moments in which it becomes crystal clear how important and rewarding it can be to defy all the naysayers, to steadfastly pursue a vision and to work unwaveringly for years to bring it to fruition." That's how Horst Hörtner, director of the Ars Electronica Futurelab, summarized what was going through his head when 100 drones took off in pursuit of a world record in November 2015. "Everything had come together—an idea that was crazy in the best sense of the word, a crew that brought tremendous zeal and long-term commitment to the task and, in collaboration with Intel, wanted to make the supposedly impossible a reality and went all out to achieve success." "Drone 100 was a crazy idea that came out of a hallway conversation inside Intel, and now it has become a reality. Working with Ars Electronica Futurelab, we were able to create a formation of 100 UAVs in the sky, creating amazing images and ending with the Intel logo," says Anil Nanduri, GM of New Markets, Perceptual Computing, Intel. Following years of R&D work and appearances in London, Brisbane, Dubai, Hannover and other cities that garnered global media coverage, the team effort to put a totally autonomous group of 100 drones aloft was crowned with success on November 4, 2015. An on-site adjudicator from the Guinness World Records made it official: Intel in collaboration with Ars Electronica Futurelab now hold the world record in the category Most Unmanned Aerial Vehicles (UAVs) Airborne Simultaneously.

100 Drones Form a 250-Meter-Wide Intel Logo

7 degrees Celsius, hardly any wind, no rain, not a cloud in the sky—you couldn't have asked for better conditions than what prevailed on the evening of November 4th at Ahrenlohe Airfield near Hamburg, Germany. "One of our biggest challenges is that we fly outdoors," Horst Hörtner noted. "You're struggling with wind that's incessantly and, above all, differentially buffeting the individual drones; with the cold, which can drastically reduce the batteries' output; with telecommunications signals and frequency overlapping that can severely impair the drones' communication among themselves as well as with the ground station; and other issues too." In Ahrenlohe that evening, none of them posed much of a problem. At 17:45 sharp, a drum roll by the percussionist of the orchestra that had been assembled on the runway to provide the soundtrack for a film of the event signaled in classic fashion that it was time for liftoff, and 100 drones departed on a synchronized formation flight. For starters, the approximately 700-gram, LED-equipped quadcopters manufactured in Munich by Ascending Technologies climbed to an altitude of about 120 meters. Then they began their routine of huge illuminated forms in the night sky. The culmination of this extraordinary choreography was a 250-meter-wide Intel logo painted in the sky. After approximately seven minutes aloft, all 100 drones landed at their designated positions. We had done it! Intel, in collaboration with Ars Electronica Futurelab, broke the world record in the category Most Unmanned Aerial Vehicles (UAVs) Airborne Simultaneously.

World Record, and This Is Only the Beginning

"Of course it was great to partner with Intel and set this record," Horst Hörtner exclaimed: "Especially in an R&D field in which big-name institutions such as MIT in Boston, Zürich's ETH and the GRASP Lab in Pennsylvania are working very intensively." He concluded: "Together with Intel, we've opened a door, but what lies beyond it is something we can make out only vaguely today. And nobody can tell whether we'll attain success in this endeavor, to say nothing of how we should go about it. The only way to tackle this job is to do it together with people who share a vision and bring enthusiasm to the task. And dismiss the demurrals of those who say it can't be done."

The Spaxels: From Pilot Project in Linz to World Record with Intel

Since the summer of 2012, an Ars Electronica Futurelab crew has been working on how to put aloft a large group of LED-studded quadcopters that autonomously execute preprogrammed formations. All of the many experts who were initially invited to collaborate on this project took a pass: an undertaking of these dimensions—and one to be implemented outdoors, no less—was said to be impossible to pull off in the allotted timeframe. Nevertheless, the Futurelab staffers were bound and determined, and their perseverance paid off. In September 2012 at the Linzer Klangwolke, a multimedia extravaganza spanning the Danube, a group of 50 illuminated drones ascended and formed a huge eye in the night sky. This one-of-a-kind performance created a worldwide sensation, and it wasn't long before the first prominent client came calling. In conjunction with the promotional campaign preceding the premiere of "Star Trek – Into Darkness," Paramount booked the Linz-based drone swarm to perform its aerial artistry immediately adjacent to London's high-profile landmark, the Tower Bridge. By this point at the very latest, the Spaxels Project had taken off. There followed airborne performances in Bergen, Norway (International Bergen Festival, 2013), Ljubljana, Slovenia (Ljubljana Festival, 2013), Brisbane, Australia (QUT Robotronica Event 2013), Umea, Sweden (official opening celebration of the 2014 European Capital of Culture), Sharjah, United Arab Emirates (official opening celebration of the 2014 Islamic Capital of Culture), Hannover (official celebration of the 25th anniversary of German unification, 2014), Dubai (The UAE's National Day festivities in 2014) and Linz (2015 Eurovision Song Contest). These commercial appearances made it possible to finance the ongoing enhancement and tweaking of the spaxels. Then, in autumn 2014, the Ars Electronica Futurelab received mail from Intel for something they called Drone 100. And the rest is history.

The Spaxels: www.aec.at/spaxels
Photos: https://www.flickr.com/photos/arselectronica/sets/72157633333343247/
Videos: https://www.youtube.com/playlist?list=PLKrmQr-thTw5kB1sqiEf4_XihIGfbB8XG
Interviews, background info, features: http://www.aec.at/aeblog/en/tag/spaxels/
Intel / CES: http://www.intel.com/content/www/us/en/events/intel-ces.html
Making Of Drone 100: http://www.intel.com/content/www/us/en/events/videos/making-of-drone-100.html

Drone 100

The Intel Team

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And others

The Ars Electronica Futurelab Team

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Benjamin Olsen / Drone Firmware and Ground Control Development
Michael Mayr / 3D Animation and Show Design
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Special Thanks to Ascending Technologies

The Ars Electronica Futurelab

Founded in 1996, the Ars Electronica Futurelab focuses on the future of art, technology and society. This media art lab, as an artistic-experimental facility, also defines itself very much in the sense of an atelier for the design of potential future scenarios. Using the methods and

strategies of applied research, staffers come up with developments that open up novel experiences and innovative insights to both art and science, and are simultaneously characterized by a high level of social relevance. The Futurelab's approach to assignments is based on transdisciplinary research and development, which manifests itself not least of all in the diversity of the disciplines represented. Artists, scientists and scholars from all over the world who collaborate with the Ars Electronica Futurelab and work on site as Residency recipients are essential to this approach. The spectrum of activities the Ars Electronica Futurelab engages in concentrates on expertise developed over the years in specialized fields such as media art, architecture, design, interactive exhibitions, virtual reality and real-time graphics.

The Ars Electronica Futurelab is a division of Ars Electronica Linz GmbH, which, in turn, is part of the Unternehmensgruppe Stadt Linz, a wholly-owned subsidiary of the City of Linz.

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