

## Huge Grant for Small Satellites

**One of the highest valued European grants was awarded 2012 first time to space engineering: computer scientist Klaus Schilling received a Euro 2.5 million research grant to study innovative technologies for cooperating, distributed pico-satellites. The grant is funded by the European Research Council.**

The field of satellite technology is facing an upheaval similar to earlier changes in computer industry: The mainframe computers of the 70ies have evolved into networks of small computers connected via Internet. "A similar paradigm change is anticipated for the satellite technology: away from the current traditional large multifunctional satellites to networked systems of distributed, cooperating pico-satellites", says Professor Klaus Schilling from the Informatics Institute of the University of Würzburg. In this context, interdisciplinary methods from telematics (= telecommunications + automation + informatics) have to be analyzed and implemented.

### Functionality at minimum space

Schilling's team is well experienced in pico-satellites: Since 2005, the team has already launched two University Würzburg's Experimental satellites (short name : UWE) into orbit, each with a mass of only one kilogram and the size of a 10 cm cube. A third UWE satellite is expected to be launched early 2013, and the team is currently working on UWE-4. UWE-1 had been the first German pico-satellite and is now on display in the national technical museum "Deutsches Museum" in Munich.

Advanced miniaturized electronics in combination with related control engineering enables realization of the satellite at minimum mass. "Each pico-satellite has due to its limited size only limited capabilities. But by cooperation of several of these satellites, an impressive integrated performance can be achieved", Schilling explains. The technology enables observation of spots on the Earth's surface from different viewing directions to generate three-dimensional images. Efficient, worldwide telecommunication networks are another goal the networked pico-satellites are expected to achieve in the future.

### The goal: world premier of a four pico-satellite formation

Over the next five years, the researchers from Würzburg will focus their research activities to find solutions to the related interdisciplinary problems. In particular integrated control and communication technologies need to be further developed. It is planned to conclude the research grant by demonstrating the efficiency of these innovative approaches by deploying a team of four pico-satellites in orbit first time worldwide: The scientific objective is to keep the satellites in formation by using advanced control technologies in order to enable an optimum flow of information in the integrated network of satellites and ground stations.

### The "ERC Advanced Grants"

Schilling's research plans are financially supported by a 2.5 million EURO "ERC Advanced Grant". With these grants the European Research Council (ERC) "allows exceptional established research leaders of

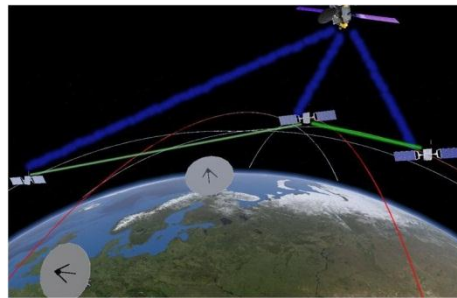
any nationality and any age to pursue ground-breaking, high-risk projects that open new directions in their respective research fields or other domains”. According to ERC criteria “proposals should rise to pioneering and far-reaching challenges at the frontiers of the field addressed. They should involve new, ground-breaking methodologies”. In the year 2012 the recipients were selected from 2304 applications for an ERC Advanced Grant.

## Contact

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## Images



Multiple satellites and ground stations are controlled to cooperate efficiently in an integrated network



The original pico-satellite UWE-1 carried by Prof. Dr. Klaus Schilling