Press Information

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IEEE ICC 2009

Communication systems of tomorrow: Highly connected, intelligent and energy efficient

Dresden (Germany), April 1, 2009 – This year's "International Conference on Communications (IEEE ICC) 2009", one of the flagship conferences in the field of Information and Communications Technology, is coming to the capital of Saxony: between June 14th and 18th, 2009 experts from academia and industry are meeting at the International Congress Center in Dresden to discuss current innovations and future trends in communications. 1,500 top executives and scientists are expected to attend. Of the more than 3.500 papers submitted to the scientific committee, about 1,000 will be presented.

Hamid Akhavan, CEO of T-Mobile International AG and chair of the conference's organizing committee, and Thomas Jurk, Saxony State Minister for Economic Affairs and Labor will open the ICC. Other key speakers include Botaro Hirosaki, Senior Executive Vice President of NEC Corporation, and Viviane Reding, Commissioner for Information Society and Media at the European Commission.

Important topic: Power efficiency

At the large number of workshops, breakout sessions, and forums participants will have the opportunity to discuss current industry topics of particular concern to them. For the first time the conference will also include a workshop on "Green Communications", as well as a high-profile plenary session on the same topic. This illustrates the industry's increasing awareness of new energy-saving technologies, as energy costs have become an important factor for communications network operators. Therefore, research is necessary to find ways to reduce energy consumption. Starting with smart power solutions for devices in standby mode, the goal must be a complete reduction of energy consumption when electronics are idle.

At the workshop engineers will also discuss new ideas for energy efficient data transmission and smart energy management of communications networks. One future option could be gearing data transmission toward optimum energy usage rather than maximum data rate. Through intelligent, and capacity efficient network management, power consumption could decrease drastically. Yet experts agree, that the research in this area is still in its early stages.

The Next Generation of Wireless Communication Systems

Another workshop deals with the further improvement of the mobile communication standard LTE (Long Term Evolution), which is expected to be released beginning in 2011.

The Internet is becoming increasingly mobile, and the demand for high bandwidth Internet access at any place and any time is growing constantly. For this reason device manufacturers and network operators are being challenged to develop faster networks with higher data rates, and to make them available to end-users. Since only limited numbers of frequencies are available for data transmission, future communications systems must make use of the available spectrum in a more efficient way. The goals of current research are to lower costs of capital and operation while increasing reliability. Another important aspect is the idea of fairness: „Mobile communications systems of the future must offer any user the same high quality service at any place and any

time," explains Prof. Dr. Gerhard Fettweis of Vodafone Chair Mobile Communications Systems at the Dresden Technical University.

Together with his team Prof. Dr. Fettweis is currently working on the next generation technology, called "LTE-Advanced". During the ICC the Dresden scientists will for the first time present their EASY-C-Demonstrator. The future standard EASY-C – standing for "**E**nablers for **A**mbient **S**ervices and s**Y**stems – Part **C**: Wide Area Coverage" – shall help manage not only the industrialized nation's increased data flow. It shall, for the first time, also enable those living in rural areas and emerging markets to access the Internet.

EASY-C is the first project where these advanced techniques are implemented and tested in two large-scale mobile communication test beds in Dresden and Berlin under representative signal propagation scenarios. The results allow to precisely assess the net gains of various cooperation schemes", says Fettweis. The real-time demonstration of these models of cooperative communications developed by the Dresden engineers is widely anticipated by the research community and is without doubt one of ICC's highlights.

Another area of focus of ICC is the so-called "Cognitive Radio". "Cognitive Radio" stands for dynamic high-capacity and "intelligent" end-devices and infrastructures, which shall critically improve spectrum bandwidth utilization. Joseph Mitola III and Gerald Q Maguire Jr. initially presented the concept in a publication in 1999. The idea is based on the fact that end-users are generally not interested in technology, but in its service. Cognitive Radio is a software-defined radio platform evolving into a fully reconfigurable wireless black box that automatically changes its communication variables in response to network and user demands.

To meet these conditions a number of innovations are necessary. Service categories, for instance need to be defined in order to establish "rules of the road" within network usage. They will define some events to have priority over others, e.g. a phone call will rank higher than an email, which can be forwarded at a later point. TV and video on demand require greater stability of data transmission than 'normal' uploading of data.

The network grows together. But in order for it to continue working in the future, communications systems must change. Another important topic at ICC therefore is the field of "Self-X". With increasing challenges the complexity of communications systems also grows. In order to handle this increased complexity new concepts are necessary: the networks of the future need to be far more intelligent. Communications networks should become self-organizing systems. Engineers want to enable them to self-plan, self-configure, self-optimize, self-adjust to changes, and self-correct by automatically responding to errors. But before this can be achieved more research must be done.

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