Special Articles on User-centric Mobile Communications Technologies

Research Activities at DoCoMo Euro-Labs —Shaping the Future through "Mobile Adventure"—

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Technical innovations in mobile communications and their widespread diffusion in recent years have been truly remarkable. During this time, the mobile terminal has undergone a transformation from a simple communication tool to a part of our social infrastructure extending deeply into everyday life. This technical revolution has been accompanied, however, by a multitude of functions and large volumes of information that have become a new source of stress among people who are not able to make full use of it. As broadband mobile communications continue to advance in Third-Generation (3G) systems and beyond, determining how to match abundant information and services with real user and business needs will be of prime importance. In Europe, a transition is taking place from technology development emphasizing sophisticated functions to that of "user-centric" systems providing services designed especially for individual users.

At DoCoMo Communications Laboratories Europe GmbH (DoCoMo Euro-Labs), user-centric ideas provide the basis for research on Fourth-Generation (4G) mobile communication platforms in the three fields of networks, security, and wireless communications.

First, in the field of next-generation networks, we are aiming at service support platforms that accurately reflect the user's profile and context to provide user-centric services; IP-protocol-based enhancements for achieving ideal mobile/personal services; and self-organized networks that can add capabilities and improve the performance of new services and functions in a flexible manner and that can grow in an autonomous fashion.

Next, in the field of security, we are looking at protocols and interfaces to achieve sufficient levels of security in next-generation networks that are expected to accommodate diversified wireless-access systems and packet-based transmission. Furthermore, by researching security-support mechanisms that will be required by specific mobile applications, we aim to establish security technologies that network operators can provide to service providers.

Finally, in the field of wireless communications, we are promoting the research of baseband signal-processing technologies for enhancing the transmission characteristics of 4G wireless access systems. These include multi-carrier access systems like Orthogonal Frequency Division Multiplexing (OFDM) plus Multiple Input Multiple Output (MIMO) systems that enable large-capacity transmission through the use of multiple antennas.

Europe has been expending much effort in standardization activities not only within the European region but on a global basis as well, although it is composed of a number of countries whose individual economies are different in scale. Large European research projects overseen by European communities play a major role even in research activities that serve as a prior stage to standardization. DoCoMo Euro-Labs desires to participate in these projects actively to deepen its relationship through joint research work with Europe heading towards a new generation of mobile communications.