To Be the First into the Future

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We are now in a technologically rich environment with tools such as the broadband Internet, mobile phones, high-performance personal computers, and digital televisions. It seems that we cannot live without ICT (information and communication technology). However, the rapid changes in our environment and the underlying technologies are not without risk. Cyberspace poses unexpected risks because our actions become divorced from reality. With just one click, we can trigger an unexpectedly large impact on our lives. We think that this phenomenon is the result of the common industry-and-economy-oriented approach to developing technology: we emphasize functionality and ease of use. We might have lost the perspective of providing the key benefits to society. Hot words such as *safe* and *secure* reflect this kind of issue. Now is the time to understand what is truly important for humans and society and apply it when developing technology.

NTT Communication Science Laboratories is tackling the issues through the research theme of seeking the ideal communication environment. In order to proceed in the right direction, we set up a macro-to-micro research management strategy with three layers: vision, fusion, and specialty. In the vision layer, we establish the concept of where we should be heading. The current concept is "environment of intellect," which means that the environment around us works in an intellectual manner. Our surroundings should know the characteristics of humans and society, understand the current situation, maintain and respect our humanity, utilize implicit human capabilities, expand human creativity, and keep society balanced. In the fusion layer, emergent areas are exploited by fusing expert technologies as steps toward the implementation of the vision. The discovery of new research issues is expected to create new expert research areas in the specialty layer. We are currently developing a communication environment called the "t-Room," where we can feel a sense of sharing space and time with others even though they actually do not share the same location and/or time. The "s-room" is a platform for recording and scripting events in the real world through various kinds of sensors; it allows us to retrieve specific events that occurred in the real world. In the project called "Mushroom," various species of interface agents provide us with a peaceful daily life by helping us in the right place, at the right time, and in the right manner. In the specialty layer, we are conducting scientific research in expert areas such as human information processing, computation science, and media processing. In each area, we are not only challenging the world leaders, but also taking up the challenge of creating innovative and robust technologies that will contribute to the realization of the fusion layer goals. In the area of human information processing, we have made important findings concerning human reactions to moving scenes and invented unique interaction devices based on human sensory organs; both have attracted worldwide attention. In the areas of computation science and media processing, our hot topics include an original visual data mining method for handling the huge amounts of data on the Internet, robust media search algorithms usable in noisy situations, a next-generation search engine based on semantic-oriented language analysis, an acoustic signal processing technology that separates sound sources from a mixture of signals, a very fast and concise speech recognition algorithm with a vocabulary of almost two million words, and a quantum compiler for large-scale quantum computers.

Our mission is to discover new worlds in communication and seek out new principles and new technologies in order to be the first into the future.