NiCT National Institute of Information and Communications Technology

Towards Intellectually Creative Society

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Introduction

The National Institute of Information and Communications Technology (NICT) is an Incorporated Administrative Agency conducting Research and Development (R&D) into Information and Communication Technology (ICT) with the consistent and comprehensive objective of supporting the future ubiquitous network society. NICT supports national ICT policies from a technological standpoint and cooperates with industry, academia and overseas research institutes, while also having the function of funding and promoting R&D projects carried out by industry and academia. In its activities aimed at realizing the intellectually creative society, NICT has three principal domains: 1) New Generation Networks for the creation of convenience and comfort; 2) Universal Communications for the enhancement of fun and creativity; and 3) ICT for Safety and Security laying the cornerstone for societal and economic activities.

Japan has been and is experiencing the effects of being an aging society including the effects of having a low birth rate being, and is still in the recession which started from the financial crisis in 2008. As a result, the country's economy is in a difficult situation. However, these circumstances offer us a good opportunity to reform anew our societal structure. In our R&D, there are several examples of embryonic research which may in the future help us to fulfill our dreams for Japan. NICT will play a role in nurturing these projects carefully to realize their fruitful results, developing them into the ICT needed in Japan, and promoting their utilization in the society, and will, at the same time, offer basic visions and roadmaps for the future.

Our principal research activities are as follows:

1. New Generation Network

Regarding NICT's R&D fields, I am personally busily engaged in helping to realize the "New Generation Network" for which the development targets and research themes were summarized at the end of last year as part of the vision "Diversity & Inclusion: Networking the Future" which was announced in 2008. We have plans for conducting R&D focusing on a network environment that will enable the exchange of information anytime, anywhere and anyhow and we plan to establish an infrastructure so that everyone can live a convenient and comfortable life. Based on this vision, we initiate discussions about themes and our international strategy, and this will be done in collaboration with industry-academia-government, other R&D organizations, and with various countries.

2. Brain Information and Communications

We have, as part of the joint-research involving industry-academia-government, established the important NICT research theme entitled "Brain Information and Communications Convergence" which mainly involves collaboration with other R&D organizations aimed at clarifying brain research issues that will affect the advancement of ICT and related problems by studying the relationship between communication and human beings.

3. Non-Destructive Inspection Using Terahertz Bands

We are striving to develop certain frequency bands such as the terahertz band which hasn't seen much development in the past. By utilizing such frequencies, we achieved non-destructive internal observation of classical art. We are also investigating whether or not it is possible to analyze the interior of various materials such as food items using terahertz bands.

4. Pi-SAR: Polarimetric and interferometric Synthetic Aperture Radar

As far as our remote sensing technology is concerned, NICT has developed an aircraft-mounted Pi-SAR that is able to create high-precision ground images taken at the highest resolution level in the world not only in the daytime but also during the night. Dr. Harunobu Masuko, Executive Research Supervisor of NICT was decorated with the Medal with Purple Ribbon as its developer. This may prove that the societal significance of R&D by NICT has been generally recognized, and it has also been a great encouragement to other NICT researchers. Only we can develop and maintain this important remote sensing technology for measuring the earth's environment regarding issues like the distribution of rain and cloud.

5. Japan Standard Time

NICT operates and maintains Japan Standard Time (JST) and it attracted a lot of public attention throughout Japan when it inserted a leap second in JST on January 1, 2009, at the same time as other international organizations were adjusting their local time. This insertion of a leap second was to keep the difference between Coordinated Universal Time (UTC), based on the atomic time, and Universal Time (UT) relating to the earth's rotation, to less than ±0.9 seconds.

6. Total Solar Eclipse

We recorded video of the total solar eclipse observed from the Amami-Oshima and transmitted them great distances across Japan via high-speed networks including the JGN2plus testbed network to four event halls using the Whole-Sky Image Transmission System with 4K Ultra-High Definition. In those event halls, the images were projected so clearly that it was as if the spectators were actually watching the eclipse-spot on Amami-Oshima. We also conducted experiments featuring the transmission of video of the total solar eclipse from the Island of Iwo-Tou via the so called "Kizuna" satellite, which is our Wideband InterNetworking engineering, test and Demonstration Satellite (WINDS). A lot of people really enjoyed watching our contribution on TV.

We hope that NICT's research results in the information and communications field will encourage the nurturing of the future growth of Japan and that they will be useful in the promotion of interest in societal themes such as the global environment, as well as interest finding use as countermeasures to problems such as overpopulation and the shortage of food in the world.