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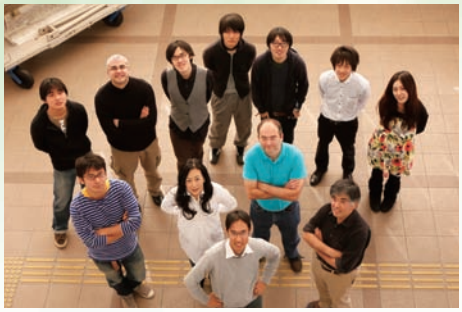
National Institute of Information and Communications Technology
2011 MAR No.402 3

NiCT

The Superconductive Submillimeter-wave Limb Emission Sounder (SMILES) Installed on the International Space Station

–Future Performance of Atmospheric Environment Variation Monitoring Supported by the SMILES–



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Professional interests are remote sensing observation from space for the earth and planetary atmosphere. Leader of the algorithm development team of Superconductive sub-millimeter limb emission sounder (SMILES) project. Ph.D.(1995) from Tokyo Institute of Technology.

Front row left: Yoshihisa Irimagiri, Hajime Ochiai
Second row left: Hideo Sagawa, Yasuko Kasai, Baron Philippe
Third row left: Tomohiro Sato, Eric DuPuy, Hiroshi Suzuki, Hisashi Onodera, Yohei Ishiyama, Takahiro Tanaka, Yukiko Kai

Introduction

The Superconducting Submillimeter Wave Limb Emission Sounder (SMILES) was launched in September 2009 and has been installed on the exposed section of the Japanese Experimental Module (JEM, shown in Figure 1). Minor atmospheric composition in the atmosphere plays a key role in such specific changes of the global atmospheric environment as ozone layer destruction, global warming, and atmospheric pollution. The substances which have been considered to be capable of performing key roles, and just a few data of them exists because of their extremely minute concentration in the atmosphere, such as bromine monoxide (BrO) and hydroperoxy radical (HO_2) in the order of trillionth and likewise the hypochlorous acid (HOCl) at the atmospheric concentration of 10 billionth, have been detected by the SMILES. We are carrying on detailed studies on the behavior of these extremely minute amounts of molecules in the atmosphere.

Objectives of the SMILES mission include the following:

1) Technological demonstration of the high-sensitivity superconducting submillimeter wave receiver system cooled with a 4K (-269℃) mechanical cooler
2) Clarification of new aspects of the global atmosphere through the super-high sensitivity observation

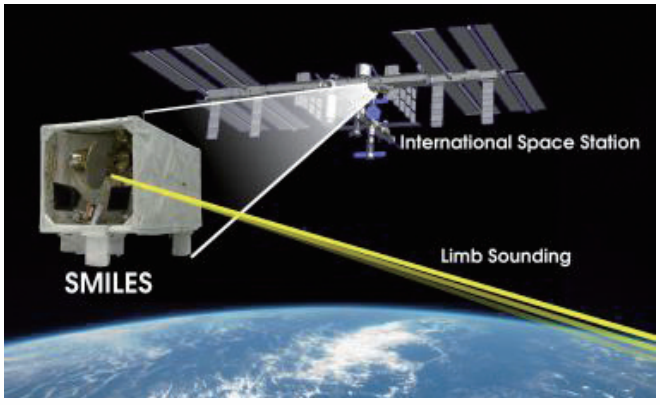

Figure1●SMILES and ISS

In the joint development mission of NICT and the Japan Aerospace Exploration Agency (JAXA), NICT started the development activities for the SMILES in 1997. SMILES observed the atmospheric emission in the submillimeter-wave region with heterodyne detection using SIS mixer and HEMT amplifier. While the design lifetime of instruments was one year, the local oscillator failed in April 2010, and since June 2010, the mechanical cooler has failed to reach 4K, and thus decision was made to discontinue the observation in January 2011. Nevertheless, the SMILES observation has revealed the new aspects of global atmosphere on account of its precision at a level 10 times or more, which is higher than that of conventional systems. Here we introduce some initial results.

SMILES Observation Spectra and Data Processing

SMILES is performing the spectroscopic observation with limb geometry; the tangent height ranges from -10 km to 100 km. Figure 2 shows example spectra of SMILES spectrum. These spectra thus obtained with complete absence of ripples were so beautiful that they led us to mistake them for some simulation results. The initial data given in October 2009 were, at every occasion when introduced at international meetings, evaluated with such words of respect and praise as "Impressive! Japanese Technology!" by associate researchers. This fact led us to be convinced of the technical capabilities at a high level of our measuring instruments team.

Besides the measuring instruments development, NICT is now working on the algorithm development and processing of Level 2 system for molecular abundance in the atmosphere, temperature, ice clouds, and the Level 3 data processing performed such as data grid formation. Main stream of the global environmental measuring fields of NICT has so far been the instrument development, and thus the processing of satellite data for global observation has been the first attempt. At the end of November

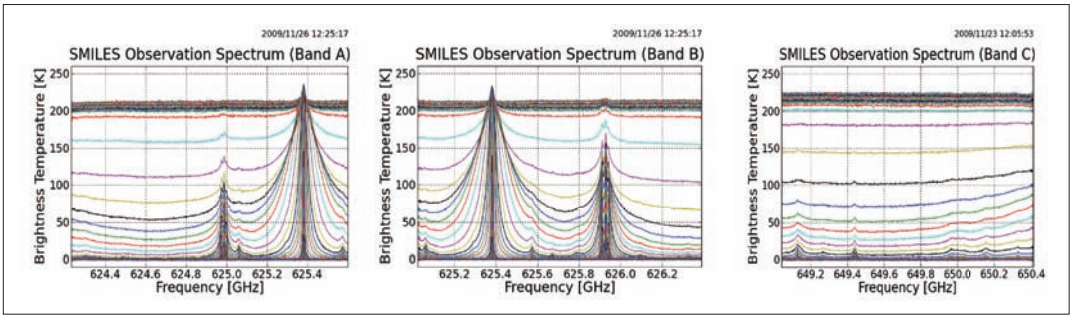

Figure2●Spectra observed by SMILES

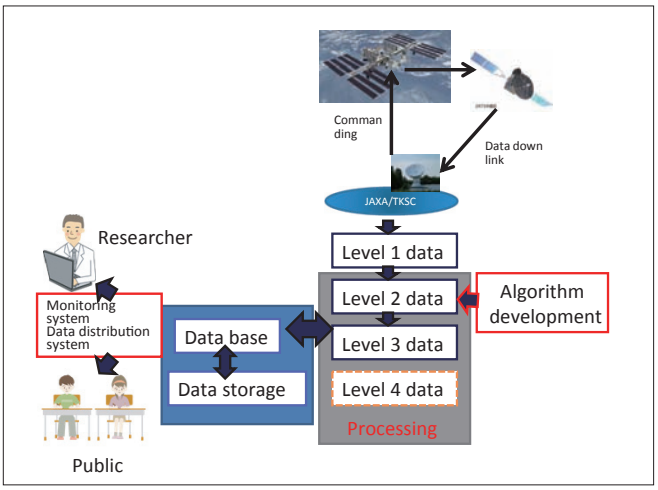

Figure3●Conceptual chart of the SMILES data processing system

Figure4●SMILES data quick look

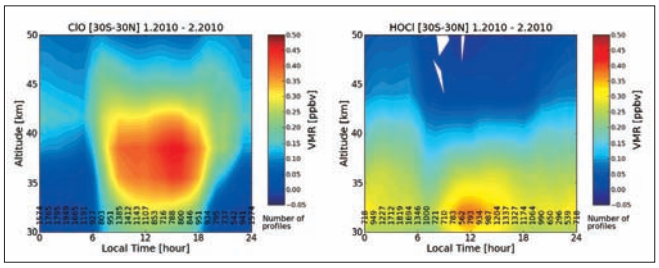

Figure5●In the upper stratosphere (at an altitude of approx. 45 km), the transformation of a Cl atom from ClO to HOCl during the night and subsequently in reverse to ClO was determined by actual measurement for the first time. [T.O.Sato, Titech, Private communication]

2009, two months after the launch, the preparatory work was completed to broadcast worldwide the information on "SMILES Observation Data Quick Look" that disseminates the results of semi-real-time processing of SMILES observation data from the International Space Station (ISS). Figure 3 shows the conceptual chart of the data processing system, and Figure 4 gives an example page of the Data Quick Look.

Recent Results

These data are currently allowing us to identify such as ozone chemistry. Figure 5 indicates the diurnal variation 24- of ClO and HOCl obtained by the SMILES observation for the first time [Tomohiro Sato, 2011]. Although these diurnal variations had been taken into consideration by theoretical calculation, the direct global observation has been clarified for the first time. Thus, SMILES observation has enabled the quantitative interpretation.

References:

Web site of SMILES: http://smiles.nict.go.jp/

Web pages of SMILES observation data: https://smiles-p6.nict.go.jp/products/research_latitude-longitude.jsf

Private communication by Tomohiro Sato, NICT Research Trainee

Acknowledgment:

The work introduced here is part of the SMILES project at NICT, where the research and development work of its data processing system was carried out in collaboration with Dr. Mr. Baron Philippe, Expert Researcher. The heartfelt acknowledgment is due to Dr. Mr. Baron Philippe, Dr. Mr. Hideo Sagawa, Dr. Ms. Jana Mendrok, Dr. Mr. Eric Dupuy, Mr. Satoshi Ochiai, Dr. Mr.Yoshihisa Irimagiri, Prof. Mr.Takeshi Manabe, and the students concerned (Mr. Hiroshi Suzuki, Mr. Tomohiro Sato, Mr. Kazutoshi Sagi, Mr. Takahiro Tanaka, Mr. Hisashi Onodera, and Ms. Yukiko Kai). The writer also extends gratitude to those who are engaged in the cooperative studies at the Chalmers University of Technology.

Terminology

∗1 Radical
Refers to such a state that a pair of electrons or more assumed to be rotating in orbit have ceased to be in pair and one of the pair has been lost because of certain unknown condition.

∗2 Heterodyne detection
A system that inputs a beat frequency obtained by mixing a local send frequency with a carrier in a heterodyne detector to extract a low-frequency signal.

Multilanguage Automatic Translation Technology

–Toward the Development of Technology for Two-Way Translation of Various Languages in the World–

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In 1982, completed the Master's Course at the Graduate School of the University of Electro-Communications and obtained the Ph.D. degree (1999) from Kyoto University. Currently serving as Group Leader, NICT Language Translation Group and Visiting Professor at the System Informatics at the Graduate School of Kobe University and is engaged in the studies of machine translation and e-learning.

Introduction

Language usage patterns on the Internet can be summarized in such a way that the 10 most used languages occupy a total market share of 84%. Japanese language ranks the 4th and has a mere 7% share. When an automatic translation system performs translation of nine languages other than Japanese into the Japanese, users of Japanese language can read 84% of information on the Internet, and thus the system allows the receiving capacity of Japanese people to increase to more than 10 times as much as they can receive now. The same applies to the transmitting capacity of the people. Then, how could we realize the automatic translation system for different combinations of these 10 languages? Since each language differs from other languages in characters, words, grammar, and various other aspects, an automatic translation technology is required that can implement translations without depending on the characteristics of each language.

Multi-Language Translation Statistical Machine Translation

Encouraged by the substantial increase in the processing speed and storage capacity of hardware and the enhanced capability of accumulating large-volume texts and dictionaries on a computer, the research efforts of automatic translation have resulted in a technology that builds up knowledge required to perform automatic translation from a corpus (a collection of pairs of a source text and a translated one, both having the same meaning), which constitutes a paradigm for research work. For example, a technology called statistical machine translation (Figure 1) first derives a translation model that maps the interrelationships between two languages form a bilingual corpus (intuitively saying, it is a corpus dictionary with conditional probability) and concurrently prepares a language model that maps the natural traits of a target language (typically in the case of English-to-Japanese translation, it forms a Japanese database comprising the probability of rendering the naturalness of the Japanese word sequence), and then performs the translation in such a way that the probability based on both is maximized. When preparing a multilanguage corpus consisting of N languages, a translation system consisting of $N(N\text{-}1)$ combinations covering all the languages can be built up. We have already constructed a multilanguage corpus (N=21) to realize a translation system (Figure 2) including a total of 420 combinations in the application field of traveling conversation and achieved a practical level of translation quality (Figure 3).

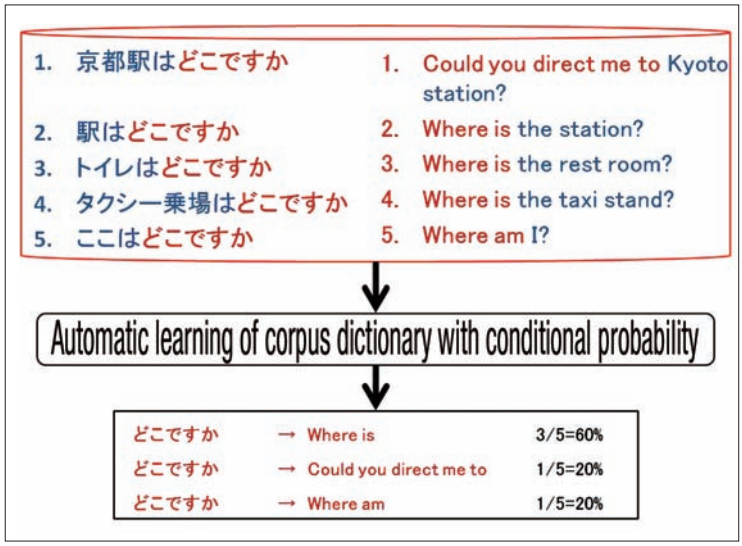


Figure1●Key concept of the statistical machine translation technology

Figure2●Output screen of multilanguage translation (In the multilanguage translation from Japanese, this screen shows the case where Vietnamese is selected.)

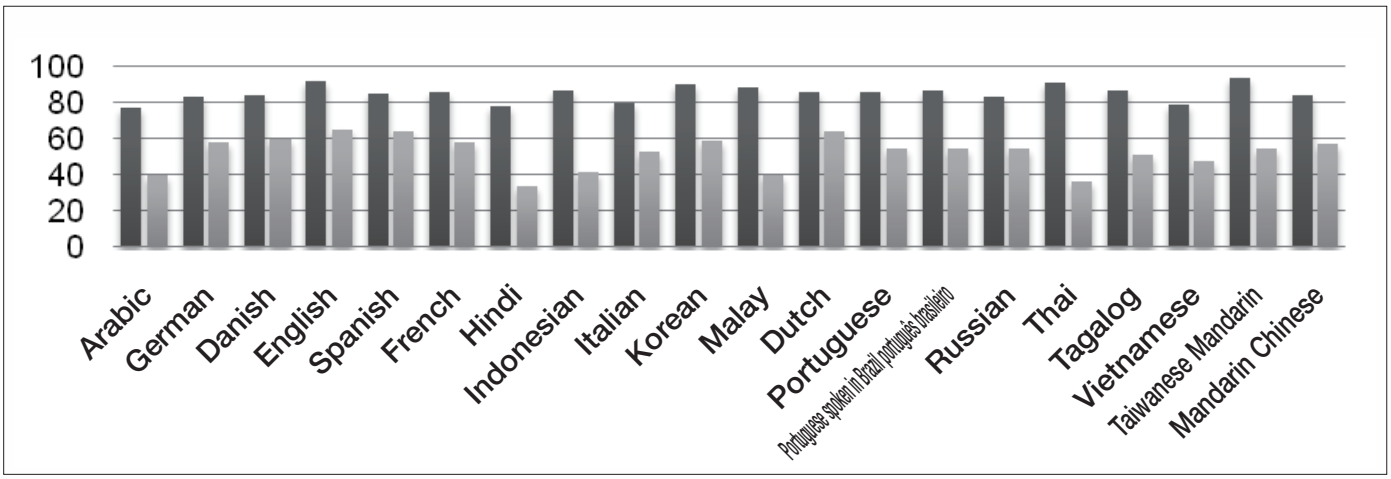


Figure3●Comparison of translation ratio (Widely used software (light-colored) is compared with NICT's software (dark-colored). Vertical axis indicates translation rates into Japanese, while horizontal axis gives the source languages.)

Two Key Points for Enhanced Statistical Machine Translation

To implement a high-precision automatic translation system, the following two major questions should be addressed:(1) Since it is known that when a certain amount of bilingual corpus is accumulated, its translation quality reaches a practical level, it is essential to establish a method that allows us to collect bilingual corpus elements in a short period of time. (2) Since it is evident that the algorithm-dependent difference in performance gives different results for the same data quantity, it is equally essential to conduct studies to yield a good algorithm to materialize high precision for a given amount of data. The following describes the subjects.

Collecting Bilingual Corpora

To collect bilingual corpora efficiently, the following two complementary approaches are available: (A) computer-centered technology of scrolling bilingual corpora on the Web sites and automatically building up the pairs at a sentence level and (B) human-centered approach of availing the hosting services for volunteers translation*1 and collaboration with external organizations. NICT Language Translation Group is energetically collecting bilingual corpora by utilizing both of these approaches in parallel. Typically, we are collecting bilingual pairs from newspapers and manuals in a variety of fields by using the automatic texts pairing technology. In particular, we have built up a Japanese-to-English bilingual corpus containing 18 million sentences. This is at a global scale, being larger than any bilingual corpus that is laid open to the public at the current stage. NICT is beginning to disclose these useful data to domestic enterprises and universities through the Advanced Language Information Forum*2.

Advancement in Translation Algorithm

The advancement in translation algorithm comprises a number of subthemes, which include the improvement of precision of word segmentation required in Japanese and Chinese, the transliteration for translating large numbers of proper nouns in accordance with their phonetic expression (in such a case of converting the term "New York" into "nyuuyooku" that is described in Japanese katakana characters) and the method for the optimum blending of two or more translations. Here, the word segmentation is described below: The current status of word segmentation programs for various languages are, when considered with the aim of efficiently implementing multilanguage translations, not altogether at the similar level due to many problems. It should also be considered that the existing programs are not necessarily best suited for translation.

Table 1●Multilanguage-dedicated word segmentation method useful for realizing high-quality translation of languages having diversified characters as well

Language	Sample text	Baseline	Proposed method
Arabic	نعم ، انه كذلك.	58.60	63.70
Thai	ใช่มันเป็นเช่นนั้น	44.41	55.00
Vietnamese	Vâng, đúng rồi.	49.91	60.56

Taking the status mentioned above into consideration, NICT has proposed an approach to enlarge the translation unit so that the translation score will be raised and verified on the performance in multilanguage systems. As indicated in Table 1, the translation ratio of Arabic, Thai, Vietnamese, and some other languages was improved, and in some of them, the NICT system gave higher translation ratio than that of existing word segmentation programs.

Conclusion

To date, we have demonstrated the feasibility of high-precision multilanguage translating technology for specialized areas. From now on, we will proliferate its applicable fields by applying the automatic translation technology to totally new areas to prove its practicability.

Further, we will place more emphasis on Chinese, Korean, and other Asian languages in order to contribute to the enhanced exchange of information with Asian nations with the aim of strengthened collaboration of Japan with the growing Asia.

Moreover, since the harmonious relation between man and machine is the trait and strength of NICT translation, we are going to reinforce our activities in this aspect.

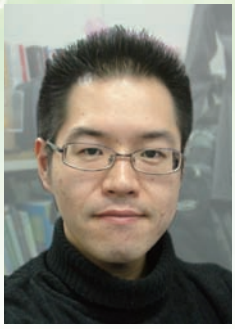
References:

*1 Masao Uchiyama, "Everyone's Translation",NICT NEWS, June 2009
http://www.nict.go.jp/publication/NICT-News/0906/04.html

*2 Advanced Language Information Forum
http://www.alagin.jp/

How to Generate Floating 3D Images on a Flat Tabletop Surface

–Research on the "fVisiOn", A Glasses-Free Tabletop 3D Display–



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After completing a master's course, served as researcher at the Telecommunications Advancement Organization of Japan (TAO) and Advanced Telecommunications Research Institute International (ATR). Since 2006, working as Expert Researcher of NICT on the studies related to industrial applications of VR technologies and 3D video media as well as their presentation technologies. Ph.D. (Human Informatics)

Communication Over Tabletop

NICT Universal Media Research Center is studying various information presenting technologies by integrating five senses in order to realize such a natural and real form of communication means as if we are in the right spot even if it is a remote place. In particular, the sight, the function of sensing the visual information, is the most frequently used one among the five senses. Thus, in order to share a high spatial, stereoscopic feeling, the method for presenting visual information in more natural, stereoscopic images (3D video images) is called for as an indispensable technology.

Among a variety of forms that are taken to implement communication, the one employed by this study is that taken by people who get together around a table. A tabletop gives a space where a group of people would share a common work. The tabletop space can equally be used to arrange papers or models and for sharing it by everyone to proceed with discussion while writing and correcting something on a pad. When using a computer to support these activities so that we can handle digital documents displayed on the tabletop or can correct a 3D video image model, not only people present in the place but also other people who are located in a remote place can exercise communication by using the tabletop as a medium.

3D Video Images Required for the Tabletop

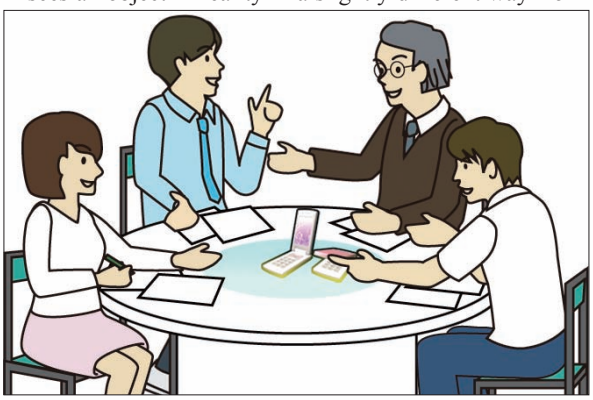
The study of the tabletop type 3D display called "fVisiOn" (pronounced "ef vision") was created from a novel idea how to share 3D video images over a tabletop with the people concerned.

The 3D video image of a model displayed in the space over tabletop must give different perspectives when observed from different directions exactly in the same way as is given by a real model that is placed on the tabletop. The conventional 3D display technology, however, has allowed the viewers to observe the 3D image of an object within a limited range on the front side of it. While a technology has been proposed that allows viewers to observe from any circumferential direction of 360 degrees, it has a mechanism that displays an object placed on a table that is contained in a glass case, and consequently it gives rise to the problem that the presence of its display unit blocks the free operation on the tabletop. Further, in order to achieve more natural communication, the 3D video images should desirably be observed by any number of people without using any special glasses.

The proposed fVisiOn system can reproduce a 3D video image having a height and allow it to float in the air over a flat table. Any number of people surrounding the table can simultaneously observe the 3D image in the respective way corresponding to each one's viewpoint. Total absence over the tabletop of any display unit that may interfere with the participants' operation allows them to carry on such operation as exchanging papers and placing a model beside each of them (Figure 1).

Technology to Materialize the fVisiOn

Since the eyes of a person are apart in left and right, each of them sees an object in reality in a slightly different way from the



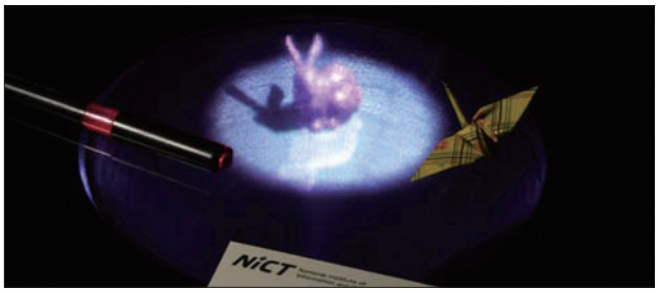


Figure1●Tabletop-type glasses-free 3D display "fVisiOn"
Top: An example case of exercising communication over tabletop
Bottom: A 3D video image created by means of a prototype fVisiOn. A tabletop on which a 3D video image of a rabbit in the middle together with such objects as a folded paper crane and a pen placed around it is displayed

other. The disparity between the views is one of the factors to sense the stereoscopy of objects. The fVisiOn generates numerous rays of light by using a number of projectors arranged to form a circle and projects them on an optical device. The optical device skillfully controls the orientations of the rays and generates a video image that gives different perspectives depending on the observing direction. This system allows a user to sense the image as a stereoscopic object through both eyes (Figure 2).

In the study of fVisiOn, we faced additional difficulties in developing the technology to implement the result of the base technology for reproducing the novel 3D video image that is suited for a tabletop (no interference with viewers' operations, responding to observing from diagonal, top direction, no need of using special glasses, and ready for simultaneous use by a number of people). The particularly difficult preparation of optical devices was overcome and the required optical performance was successfully obtained by contriving to produce a special configuration winding a thread-like lens on a conically concave core made of acrylic resin.

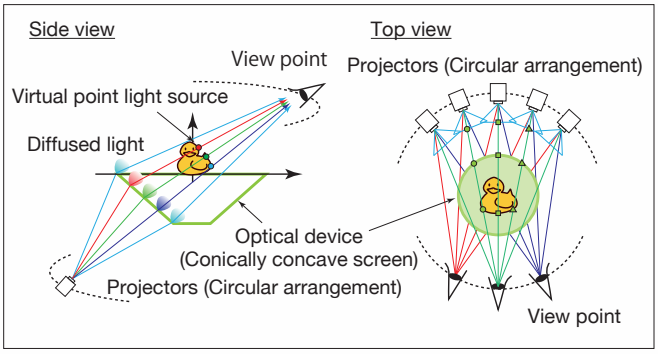


Figure2●Principle of reproducing 3D video image on the fVisiOn
- As shown in the side view sketch, the optical device diffuses the ray projected from the projector in the vertical direction and orients it to the viewpoint in the diagonal upper directions and the periphery of the table.
- On the other hand, the optical device does not diffuse the ray in the horizontal direction, but allows it to go forward.
- Thus, at a viewpoint in the periphery of the table, the portions of the video image from the multiple projectors (through slits) are joined together to be observed as a single, monolithic image.
- At another viewpoint, a different combination of portions forming a continuous image is observed, and thus different images can be seen from the different viewing directions.
- Since a viewer at any viewpoint can see an image that is different from others at different viewpoints based on the above-mentioned principle, when he or she observes the displayed virtual object with his/her both eyes, he/she can perceive the object as a 3D video image.

By using the present prototype model, a 3D video image that is protruding from the tabletop by about 5 cm can be viewed from any place around it. A rabbit in a 3D video image, for example, gives different ways in its appearance between the viewers, one seeing from its head direction and another from its tail end. One of the advantages of the fVisiOn system is that it can reproduce not only still images but also animated images, and thus it can perform information display with motions that cannot possibly be done with a real model (Figure 1).

Future Perspective

Since the prototype model is still at its newly born stage, we are about to add improvements to the quality of 3D video images. Although the range of its observation currently remains at 130 degrees because of the limited number (103 units) of available projectors, we have theoretically verified that the range can be extended to 360 degrees. Realization of all-round display of 3D images is our target for the next prototype.

The fVisiOn is a technology to produce 3D video images that are highly compatible with conventional tabletop operations. Rendering complicated body structure that is hardly understood in planar display will contribute to the medical doctors' pre-operation examination and their conversation with patients in addition to the industrial applications to tabletop discussion and operations so far described. Further, since the proposed technology optimizes the observation from the direction diagonally above the object, it is effective for disaster-prevention training with the use of 3D video maps and traffic control as well. Moreover, conceivable applications may be extended to entertainment fields such as 3D video image table games enjoyed by all the family members and, when it will be grown in size, to the screen of a soccer stadium.

Casually adding a 3D video image to a table for daily use -- that is what we aim at as the ultimate form of the fVisiOn.

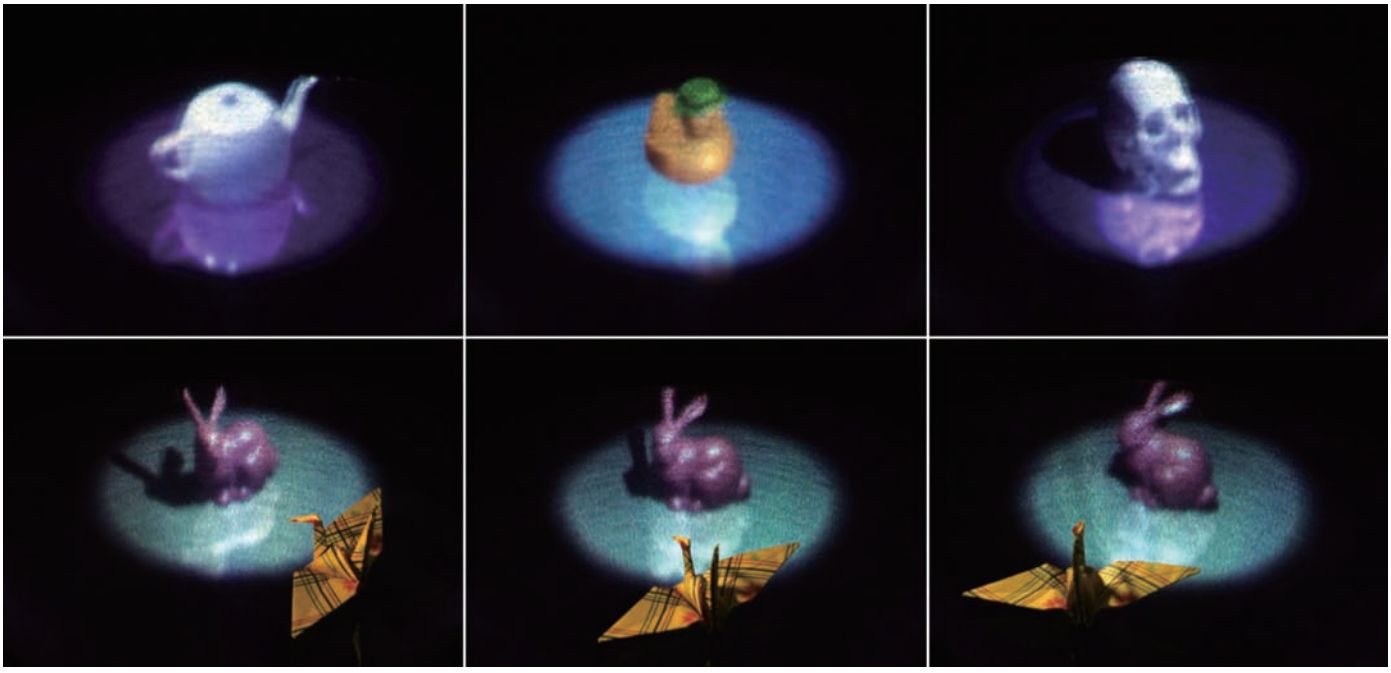


Figure3●Photographed 3D video images reproduced by fVisiOn
Top row: From left to right: A teapot, a toy duck, and a skull
Bottom row: The rabbit in 3D video image and a real folded paper crane captured from different angles

Exposure Assessment in Epidemiological Studies on Mobile Phone Use and Brain Tumors

- Effect of Heterogeneity of Tissues of the Brain on RF Energy Absorption -

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After completing the doctorate course at the Graduate School of Tokyo Metropolitan University, entered the Communications Research Laboratory, Ministry of Posts and Telecommunications (currently NICT) in 2000 and has been engaged in studies of the electromagnetic environment for live organisms. Ph.D. (Engineering)

Epidemiological Study on Mobile Phone Use and Brain Tumors

With the rapid spread of mobile phones, there are growing concerns about possible health effects of electromagnetic field (EMF) from mobile phones. The International Agency of Research on Cancer under the auspices of the World Health Organization (WHO) has initiated the International Case-Control Study of Tumors of the Brain and Salivary Glands, INTERPHONE study in collaboration with 13 nations in which Japan has participated. The INTERPHONE study is conducted in such a way that a group of patients of brain tumors are compared with another group of normal persons having the same conditions such as age and gender in the usage characteristics of mobile phones.

Exposure assessment is a key issue in those epidemiological studies. In the exposure assessment for INTERPHONE study, not only cumulative duration of mobile phone use and cumulative number of mobile phone calls, but also the specific absorption rate (SAR, W/kg) at the specific location of tumors, were used as indices of exposure. They were based on SAR measurements performed for compliance testing using a homogeneous phantom*1. This raised the question of the consistency of using measurements performed in a homogeneous phantom to estimate SAR in the brain of heterogeneous human head.

In this study, we evaluated the effect of heterogeneity of human head on SAR in the brain, which is most important in the exposure assessment of the epidemiological study using Finite-Difference Time-Domain (FDTD) simulation.

Numerical Analysis of SAR in the Head in the Vicinity Mobile Phone

SAR in the head was numerically analyzed with FDTD simulation using the head part of the Japanese numerical heterogeneous model TARO. A simple phone model consisting of a metal box and a quarter wavelength monopole antenna at 835 MHz was placed near the head model in cheek position.

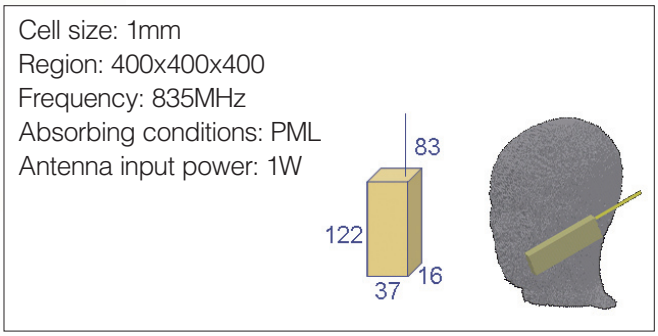


Figure 1●Calculation model

Comparison Between Heterogeneous Model and Homogeneous Model

First, we compare the values of SAR in the brain between the heterogeneous model and the homogeneous model at the resolution of 1 cm. The resolution of 1 cm was chosen because the brain tumor was identified at a resolution of 10 mm by medical doctors in the INTERPHONE study. Figure 3 compares the SAR distribution in the brain of the heterogeneous model (left) and the homogeneous model (right). The distribution pattern of each apparently resembles that of the other. The correlation factor of both is calculated to be 0.93, and the tendency in SAR in the brain of the heterogeneous model approximately matches that of homogeneous model.

Brain tumors may occur more often at some specific location in the brain. We therefore calculated correlation and regression coefficients between SAR values at different anatomical locations (cf. Figure 4) as temporal lobe, parietal lobe, frontal lobe, occipital lobe,

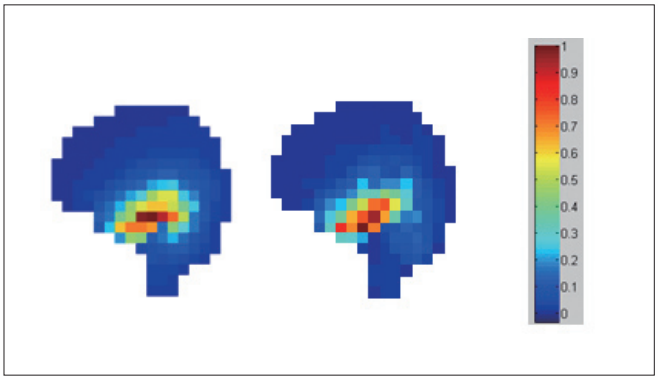


Figure 2●SAR distribution in the brain of heterogeneous model (left) and homogeneous model (right)

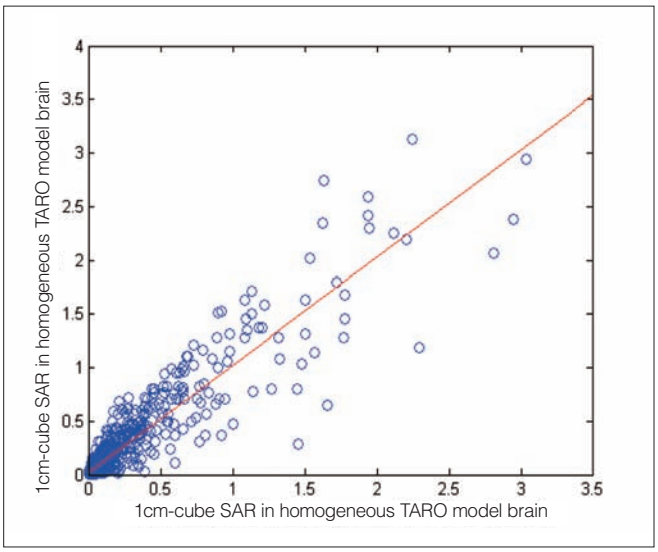


Figure 3●Scatter diagram of SAR values in the brain of heterogeneous model and homogeneous model

cerebellum, and brain stem, in the brains of heterogeneous and homogeneous TARO models (see Table 1). These results indicate that relatively higher correlations are observed in the temporal, parietal, and frontal lobes. Brain tumors arise mostly in these lobes and SAR tends to be relatively higher in temporal lobe. The fact that SAR values in these specific lobes are well correlated is therefore an important observation or exposure assessment in epidemiological studies.

Conclusion

In this study, we compared the SAR distribution in the brain of a heterogeneous model and a homogeneous model exposed to near-field from a mobile phone using FDTD simulations. We found that SAR values in the temporal, parietal, and frontal lobes are well correlated. As most of energy absorption occurs in the temporal lobe and brain tumors develop more frequently in the temporal, frontal, and parietal lobes, we proved that it was quite reasonable to use SAR values measured in a homogeneous phantom for compliance testing to estimate SAR in the brain of heterogeneous human head for exposure assessment in epidemiological studies. In the epidemiological study conducted in Japan in response to the above-mentioned findings, a series of analyses taking into consideration SAR at the specific location in the brain were performed for the first time in the world. Later in 2010, part of the results of international joint studies was published, and subsequently, subsequently, and the evaluations taking into consideration of brain SAR will be planned to be conducted. The above-mentioned study reports that no elevated risk for glioma and meningioma was observed ≥ 10 years after first phone use. Although there were suggestions of an increased risk in the highest decile of cumulative call time, biases and errors limit the strength of the conclusions that can be drawn from these analyses and prevent a causal interpretation. In consideration of these results, the IARC plans to conduct a review of potential carcinogenic potential of mobile phones in 2011. Further, in 2012, the WHO will conduct comprehensive health risk assessment including not only carcinogenicity but also possible health hazards in RF electromagnetic fields. Subsequently, the revision of the international guideline is expected to be implemented.

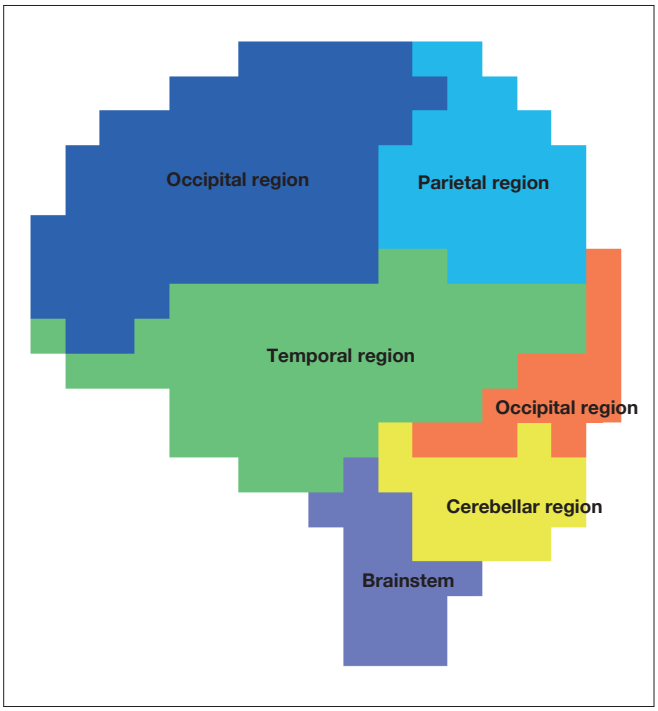


Figure 4●Surface view of left hemisphere of the brain

Table 1●Correlation and regression coefficients between SAR values in the different brain structures of heterogeneous and homogeneous models

	Correlation coefficient	Regression coefficient
Temporal lobe	0.92	0.96
Parietal lobe	0.95	1.37
Frontal lobe	0.94	1.19
Occipital lobe	0.78	0.43
Cerebellum	0.75	0.55
Brain stem	0.23	0.099

Terminology

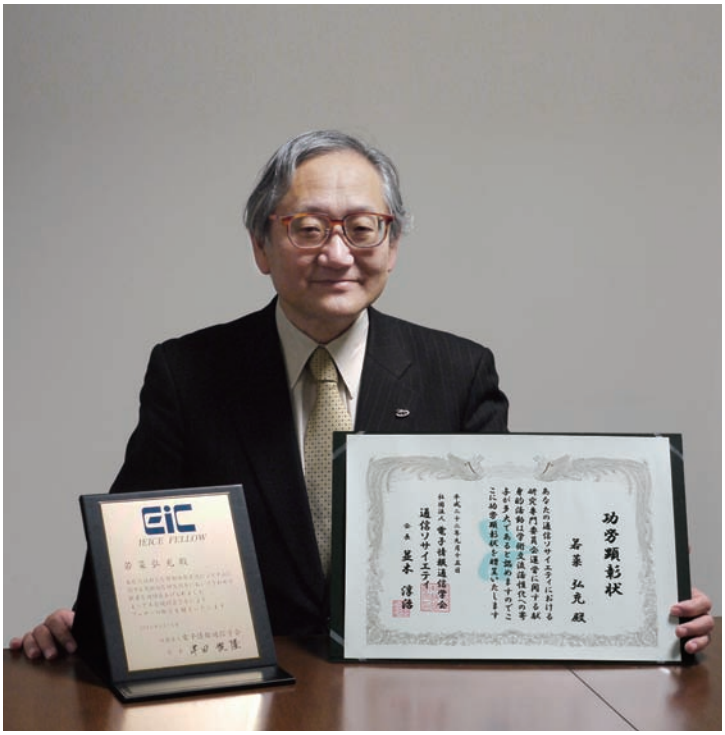
* **Phantom**
Refers to a replacement model composed of materials having the same or equivalent electrical properties as those of live bodies.

Prize Winners

Prize Winner ● Hiromitsu Wakana Distinguished Researcher

◎DATE : September 15, 2010
◎NAME OF THE PRIZE : **IEICE Fellow**
◎DETAILS OF THE PRIZE:
Pioneering research and development on new mobile satellite communication system
◎NAME OF THE AWARDING ORGANIZATION:
The Institute of Electronics, Information and Communication Engineers

◎NAME OF THE PRIZE:
Communications Society: Outstanding Contributions Award
◎DETAILS OF THE PRIZE:
Devoted activities related to steering the Technical Committee in Communications Society and contribution to activate scientific exchanges
◎NAME OF THE AWARDING ORGANIZATION:
The IEICE Communications Society



◎Comments by the Winner :
It is my great honor to receive the title of IEICE Fellow. The results of my contribution to the research and development of satellite communications technologies of our country for over 20 years have been recognized. This is indeed the fruit of guidance and support extended by many senior researchers, to which I am deeply obliged. I understand that the Outstanding Contributions Award of the Communications Society was given in recognition of my services as the chairman as well as vice chairman of the Technical Committee on Satellite Communications, and thus I am pleased to have contributed to the research activities in this field. From now on, I will exert my best efforts for the development of satellite communication technologies and expansion of their areas of application.

Prize Winner ● Homare Murakami
Senior Researcher, Strategic Promotion Office for New-Generation Network R&D, Strategic Planning Department
Senior Researcher, Ubiquitous Mobile Communication Group, New Generation Wireless Communications Research Center

◎DATE : September 15,2010
◎NAME OF THE PRIZE:
Distinguished Contributions Award
◎DETAILS OF THE PRIZE:
Contribution of organizing events and workshops for stimulation of research community in the Communications Society
◎NAME OF THE AWARDING ORGANIZATION:
IEICE Communications Society

◎Comments by the Winner :
Since October 2008, I have been serving as an assistant secretariat of the IEICE Technical Committee on New Generation Network to coordinate its activities for about two and a half years. During this period, I have had valuable experiences with people beyond my field. I would like to extend my gratitude to the committee members as well as the colleagues in the Strategic Promotion Office for New-Generation Network R&D and Ubiquitous Mobile Communication Group who have understood these activities and made cooperative efforts.

Prize Winner ● Ryouichi Nishimura Expert Researcher, Multimodal Communication Group, Universal Media Research Center

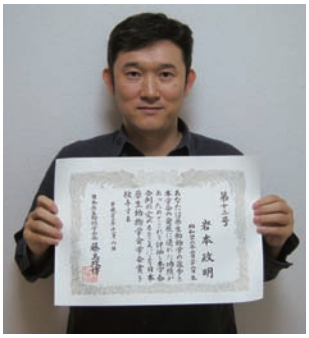
◎DATE : October 16,2010
◎NAME OF THE PRIZE : **Best Paper Award**
◎DETAILS OF THE PRIZE:
Audio Information Hiding Based on Spatial Masking
◎NAME OF THE AWARDING ORGANIZATION:
Sixth International Conference on Intelligent Information Hiding and Multimedia Signal Processing

◎Comments by the Winner :
Data hiding is a technology to superimpose information on the content itself while suppressing distortion to a minimum. Since it is applicable to existing communication systems as well, a variety of applications is expected as a transmission path of information required for extending media functions. The approach, as the subject of receiving the award, is a combination of the characteristics of the human auditory system and the signal processing methods used for spatial, audio technology. I would herewith express my appreciation to those people who have joined our discussion for a number of years, and carry on the research work including the utilization of data-hiding technology.

Prize Winner ● **Masaaki Iwamoto** Expert Researcher , Biological ICT Group, Kobe Advanced ICT Research Center

◎DATE : November 6,2010
◎NAME OF THE PRIZE:
The Award of the Japan Society of Protozoology
◎DETAILS OF THE PRIZE:
Achievements for the progress of protozoology and the development of the Japan Society of Protozoology were appreciated.
◎NAME OF THE AWARDING ORGANIZATION:
Japan Society of Protozoology

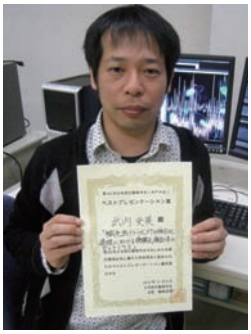
◎Comments by the Winner :
Our study to understand the biological mechanism controlling genetic information using ciliated protozoa Tetrahymena has been highly evaluated by the Japan Society of Protozoology. It is a great honor for me. This study has been achieved by utilizing advanced laboratory equipments and technologies existing in the Kobe Advanced ICT Research Center. I would like to express my gratitude to the members of the Bioformation Project of Biological ICT Group Bioinformation Project and all other people concerned with the study.



Prize Winner ● **Fumihide Bunai** Expert Researcher, Biological ICT Group, Kobe Advanced ICT Research Center

◎DATE : November 6,2010
◎NAME OF THE PRIZE:
Best Presentation Award of the Japan Society of Protozoology
◎DETAILS OF THE PRIZE:
Excellence in the presentation on "Dynamics of Nuclear Pore Complex in the Nucleus Division Process of Ciliate Tetrahymena" (authors: Fumihide Bunai, Masaaki Iwamoto and Noriko Haraguchi) at the 43rd Conference of the Japan Society of Protozoology
◎NAME OF THE AWARDING ORGANIZATION:
Japan Society of Protozoology

◎Comments by the Winner :
The award was given to our efforts of clarifying the mechanism of nucleus division that takes place in the ciliate Tetrahymena. In our study, we noticed some differences in the structure of newly forming nucleus by fully using both optical and electronic microscopes. We would like to express our gratitude to the people of the Biological ICT Group who have offered guidance to us for conducting our study.



Prize Winner ● **Rui TENG** Expert Researcher, Medical ICT Group, New Generation Wireless Communications Research Center
Bing Zhang Senior Researcher, Medical ICT Group, New Generation Wireless Communications Research Center
Jianqin Liu Expert Researcher, Kobe Advanced ICT Research Center

◎DATE : December 2,2010
◎NAME OF THE PRIZE : **Best Paper Award**
◎DETAILS OF THE PRIZE:
Infrastructure Optimization of Flight-Formation Inspired Self-organization for Address Configuration in Sensor Networks
◎NAME OF THE AWARDING ORGANIZATION:
BIONETICS 2010

◎Comments by the Winner :
We feel greatly honored that our papers have been evaluated at the International Conference Bionetics 2010 and given the Best Paper Award. In our subject study, we apply the notations of bio-inspired self-organization mechanisms to the configuration and energy saving of sensor node. We will continue to carry on our studies in collaboration with researchers of different fields to broad knowledge mutually. We would like to extend our heart-felt gratitude to the people who have offered support to our study.

From left, Bing Zhang, Rui TENG, Jianqin Liu

Prize Winner ● **Shunsuke Yoshida** Expert Researcher, Multimodal Communication Group, Universal Media Research Center

◎DATE : December 14,2010
◎NAME OF THE PRIZE : **Research Promotion Award**
◎DETAILS OF THE PRIZE:
"Implementation of Auto-stereoscopic 3D Display for Tabletop Tasks" (authors:Shunsuke Yoshida, Sumio Yano, and Hiroshi Ando)
◎NAME OF THE AWARDING ORGANIZATION:
The Institute of Image Information and Television Engineers (ITE)

◎Comments by the Winner :
The award has been given to my paper on the proposal and initial-stage installation of a new tabletop type glasses-free 3D display. The proposed system is characterized by the fact that a 3D video image can be created above a vacant tabletop to allow users to observe the image without glasses from any point in the 360-degree circumference. The high evaluation was given to its advantage that it has an epoch-making 3D display having very high affinity with the motions of work above the tabletop. Encouraged by this award, I will proceed with the research and development to improve the image quality and to bring it up to its commercialization stage.

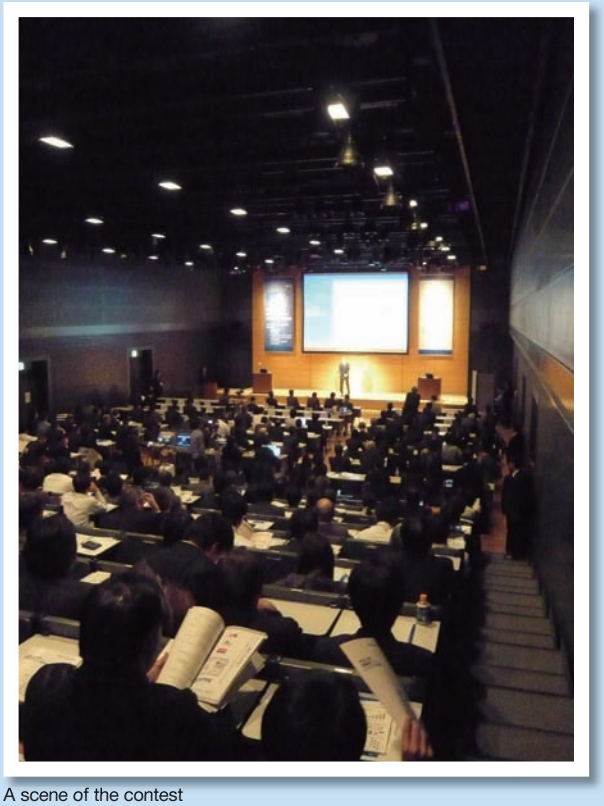
2010 Information and Communications Venture Business Plan Contest Report on the Event

For the benefits of information and communications venture businesses, NICT holds the "Information and Communications Venture Business Plan Contest" every year with the objectives of offering a venue for presenting business plans as well as exhibiting products and services, and thus promoting the business matching (funding, business collaborations, and creating new markets).

We organized the meeting on January 25, 2011 at THE GRAND HALL in Shinagawa with the keynote speech by Professor Takeshi Natsuno (Guest Professor at Graduate School of Media and Governance, Keio University) followed by the presentations of 12 venture enterprises. At the event site, display booths were provided, where a total of 22 companies including the venture enterprises performed their respective public relations presentation of products and services.

As a result of examination of the presentations, CONIT Co., Ltd. (Mr. Kentaro Hashimoto, CEO) with the presentation title “Samurai Purchase” won the Grand Prix, and Fusic Co., Ltd. (Mr. Sadayoshi Notomi, CEO) got the Excellence Prize for their “Presentation Distributing Web Services entitled ZENPRE”.

Approximately 350 guests visited this event and joined the meeting of participating companies and the visitors to exchange views and promote business talks. For further details, please visit our Web site below:
http://www.venture.nict.go.jp/contents/venture/nict_2/22/node_34277/node_34917



A scene of the contest

Grand prize CONIT Co.,Ltd.

Excellence Prize: Fusic Co., Ltd.

Information for Readers

The next issue will feature the third medium-term plan of NICT.

NICT NEWS No.402, March 2011 ISSN 1349-3531

Published by
Public Relations Office, Strategic Planning Department,
National Institute of Information and Communications Technology
<NICT NEWS URL> http://www.nict.go.jp/news/nict-news.html

Editorial Cooperation: Japan Space Forum

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