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NICT NEWS

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Standardization and System Development of Body Area Network

–Toward Health Monitoring and Safety for Visually Impaired People–

Li Huan-Bang

Senior Researcher, Dependable Wireless Laboratory, Wireless Network Research Institute

After completing a doctoral course, Li Huan-Bang joined Communications Research Laboratory, Ministry of Posts and Telecommunications (currently NICT) in 1994. He has been engaged in research on mobile satellite communications, UWB, and body area networks (BAN). He is a visiting professor at the Graduate School of Information Systems, the University of Electro-Communications, and vice chairperson of IEEE802.15 TG6. Ph.D. (Engineering).

What is a Body Area Network?

A Body Area Network (BAN) is a wireless network that comprises small devices placed on surface of, inside of, or in the vicinity of a human body and connected by wireless communication. Incorporating sensors for body temperature, electrocardiogram (ECG), carotid pulse, and a triaxial accelerometer in the BAN allows us to monitor the health status and activities of a person in real time, which helps to prevent chronic diseases, provides close monitoring of the elderly, and removes some of the burden from those who provide nursing services on a daily basis. BAN can also be used to wirelessly transfer audio, images, and other types of data between small leisure devices, including game controllers and wireless headphones. BAN attracts attentions as a technology that promotes safe, secure, and convenient daily life (Figure 1).

NICT is promoting research and development, as well as standardization of BAN, focusing mainly on its application to health monitor and healthcare.

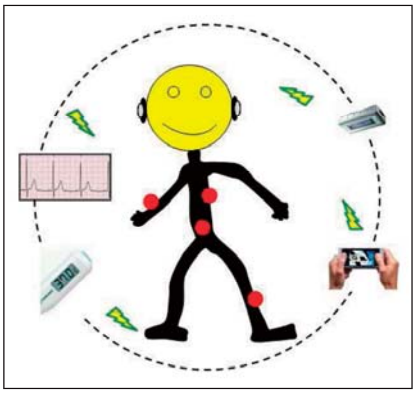


Figure 1●BAN that connects various small devices placed in the vicinity of, or inside of, a body

BAN Standard on the Way

In December 2007, IEEE802 LAN/MAN Standards Committee*[1] set up task group 6 (TG6) under the WPAN working group (WG15) to establish a global standard for BAN. More than thirty research institutions, private companies, and universities have participated in the TG6 from the U.S., Europe, and Asia to work together on the standardization. The purpose of the standardization is to define the specifications for BAN so that they can be commonly used around the world.

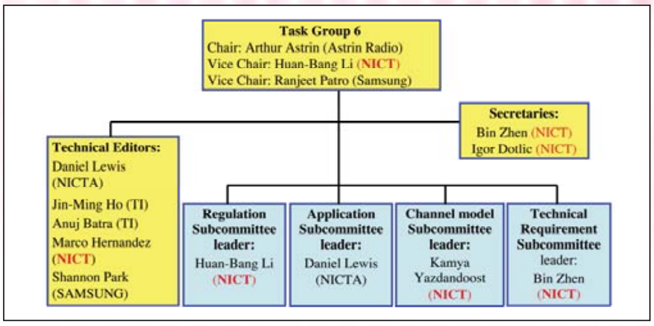


Figure 2●Organization chart of TG6, the task group for BAN standardization

NICT has played a key role in launching TG6, as well as promoting the subsequent standardization activities. NICT also has led the Regulation Subcommittee, Channel Model Subcommittee, and Technical Requirement Subcommittee (Figure 2). To make BAN commonly available in the world, it is necessary to specify the standard for the physical layer (PHY) that defines the communication method and specifications for radio waves, and for the media access control layer (MAC) that defines the network formation and access method. Many technical proposals from NICT for the PHY and MAC layers have been adopted in the draft standard. The number IEEE802.15.6 has been assigned to the global standard for BAN, and its first draft was drawn up in July 2010. The draft has been revised again and again to incorporate input from the WG15 members through letter ballots. As of June 2011, the fourth revision has been completed and currently awaits approval by the Standards Committee before a sponsor ballot*[2] to be held in July 2011. It will take several months to conduct the sponsor ballots and update the draft accordingly. It is expected that the standard will be finalized around the end of 2011.

Prototype BANs Based on Ultra-wideband Radio Communication

BAN can be implemented by using narrowband or ultra-wideband (UWB) technologies, and both technologies are standardized in the draft. UWB is a radio technology that spreads transmission power over a wide range of frequencies with an extremely lower power density (Figure 3) to provide high-speed communications. The method has the following advantages:

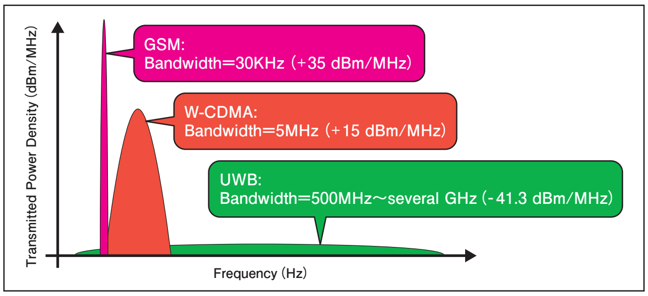


Figure 3●Power spectrum of UWB and narrowband signal

- The low power consumption of UWB is ideal for BAN, where the devices are expected to run for a long time on a small battery.
- The radiation power density of UWB is only about 1/10,000 to 1/100,000 that of a narrowband signal such as cell phones. Therefore, it is considered to have little impact on the human body.
- Thanks to the low radiation power density and high frequency band, the transmission distance of radio waves for UWB is restricted. Therefore, it is beneficial for the co-existence of different wireless systems.

In general, the frequency band assigned for UWB is divided into low band and high band, and the available frequency band ranges differ among countries and regions. Use of the UWB low band is subjected to certain conditions by regulations, such as, adoption of interference mitigation technology, limited period of operation, etc.. Therefore, there is a greater need to develop a system based on the UWB high band.

Prototye System 1: BAN for Health Monitor

BAN for health monitors consists of fixed devices and wearable small devices that range from wrist-watch and pendant types to a belt-attached type (Figure 4). Each of these devices is combined with sensors for carotid pulse, ECG, triaxial accelerometer, body weight, and so on. All the devices here use the UWB high band specified in Japan.

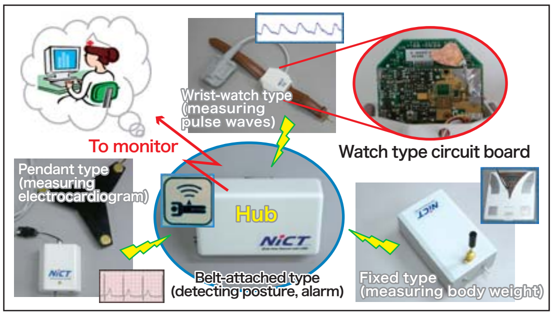


Figure 4●Structure of BAN for health monitors

The belt-attached device is a hub of the BAN and plays various roles, including network formation and the control and assignment of channels to other devices. Taking advantage of the high-speed transmission of UWB, we only use a small portion of time interval for data transmission. Each device transmits data once a second, and it takes only about 4 milliseconds for a device to transmit data and receive a reply from the hub acknowledging the reception of the data. So for the rest of the time, the devices move into a sleep mode to reduce power consumption.

Prototype System 2: BAN for Assisting Visually-impaired People

The above BAN for health monitors uses the band of 7.25 - 10.25 GHz, which is available in Japan. The UWB high band that is commonly available in the U.S., Europe, and Japan, however, is 7.25 - 8.5 GHz. In order to develop a BAN that can be used around the world, we developed a prototype system for assisting visually-impaired people, that operates at a center frequency around 8 GHz with a bandwidth about 0.5 GHz.

The BAN system (Figure 5) collects color signals, including traffic signals from a video camera attached to sunglasses; carotid pulse, SpO_2 (blood oxygen saturation level), body temperature, and so on from a watch type device; and obstacle detection information from a cane-attached device. The information is transmitted to a belt-attached unit through UWB, and the system tells a user what color it recognizes and gives an audio warning if an obstacle is in the way. In addition, the system displays the distance to an obstacle, carotid pulse, SpO_2, and body temperature on a demonstration monitor. With the prototype system, we have successfully demonstrated the operation of a BAN based on high band UWB with a bandwidth about 0.5 GHz, which is commonly available in the world.

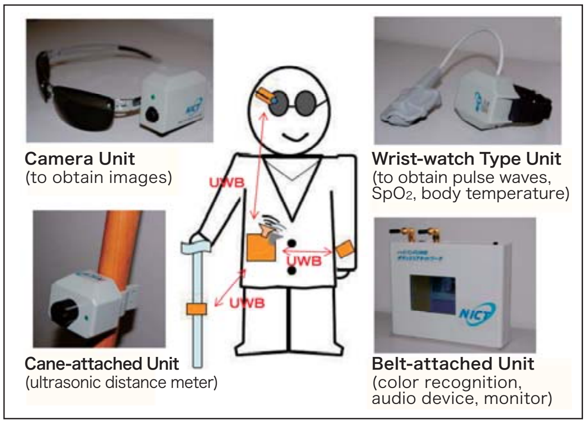


Figure 5●BAN for assisting visually-impaired people

Conclusion

BAN can conveniently handle various kinds of information, images, and data collected from small devices placed in the vicinity of, or inside of, a body and, therefore, can be used in many different ways. The global standard to be established soon will add impetus to the use of this technology, which shows great promise as a core technology to help build a safe and secure society.

Acknowledgement

The international standardization and technical development for BAN has been a main task in the medical ICT project. I would like to express my sincere appreciation to all staff members who have been involved in the project and the people concerned for their generous support.

Glossary

＊1 IEEE802 LAN/MAN Standards Committee
The Committee was established by the IEEE (Institute of Electrical and Electronics Engineers) to proceed with technical standardization for LAN (Local Area Networks) and MAN (Metropolitan Area Networks). One of the working groups that belong to the committee, WG15, mainly studies the technologies for WPAN (Wireless Personal Area Networks).

＊2 Sponsor Ballot
A sponsor ballot is one of the processes in the review of a standard in the IEEE802 LAN/MAN Standards Committee, where the experts registered with the Standards Committee are asked for their comments on a draft of a standard. The draft will pass to the Standards Committee for final approval if at least 75 percent of all ballots bear a "yes" vote with no new “no” votes.

Optical Packet and Circuit Integrated Network

−Energy-efficient Network Providing Flexible Choice of either High-speed and Low-cost Service or High-quality Service without Delay and Data Loss−

Hideaki Furukawa

Senior Researcher, Network Architecture Laboratory, Photonic Network Research Institute

After completing a doctoral course, Furukawa joined NICT in 2005. He has been mainly involved in studies related to photonic networks and the AKARI architecture design project. Ph.D. (Engineering).

Introduction

The Photonic Network Research Institute is now researching and developing New generation network to be implemented after 2020 that will solve the problems of existing communications networks and provide new options for communications services.

Communications traffic has been increasing in recent years and so has the power consumption of communications equipment. Given the current electricity situation in Japan, a new network should be able to communicate a large amount of data at low power consumption. It is also anticipated that the various contents will be distributed over a network, and therefore, the network should offer various forms of data communications, from "best-effort"* delivery of small volumes of data (e.g., accessing a web site, sending or receiving email, collecting information from sensors) to high-quality delivery service of large volumes of data (e.g., digital movies, remote medical care).

As a solution to these issues, we have incorporated optical technologies in communication equipment to help reduce power consumption, and have been researching and developing the Optical Packet and Circuit Integrated Network, which will provide various communication services by employing both packet switching and circuit switching.

What is the Optical Packet and Circuit Integrated Network?

Packet switching, which is used by the current Internet, can raise the efficiency of "best-effort" link usage as many users share the communications links. On the other hand, circuit switching, employed by conventional telephone networks, can provide high quality communications services (Quality of Services: QoS), since a user temporarily occupies a communications link. An Optical Packet and Circuit Integrated Network incorporates both switching methods in one network, and a user can choose between the best-effort service and the QoS-guaranteed service, depending on the situation (Figure 1).

Another problem with the current internet system is that the router, which is a relay unit, converts the optical signals into electrical signals and consumes more power as additional router hardware is added to process more data. An integrated network, however, can transfer data in optical forms using an optical packet and circuit integrated node that employs optical packet switching and optical circuit switching. Therefore, it is capable of transferring large volumes of data while consuming little power and doesn't depend on the bit rate of the optical packet or optical path.

The integrated network assigns separate wavelength bands for optical packet switching and optical circuit switching, and allows both switching methods to operate together by means of a wavelength multiplexing technology. By dynamically changing the range of the wavelength bands assigned to the switching methods in accordance with the traffic and the user needs, the wavelength resources can be efficiently utilized. For example, when communications are difficult to establish during a disaster, the network system can increase the band range for optical packets so that many users can share the links. Transmitting and receiving not just data but also the control signals for reserving/releasing the optical paths and those for assigning the wavelength bands using the optical packet switching network also helps eliminate unnecessary interfaces and simplify the network's control mechanism.

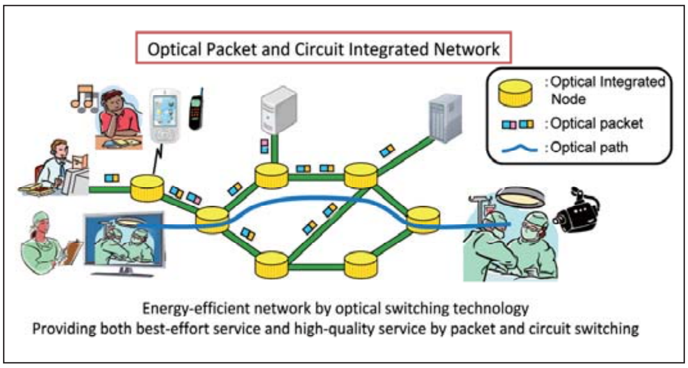


Figure 1●Conceptual diagram of optical packet and circuit integrated network

Development of Optical Integrated Node and Demonstration Network

We have now developed a new optical packet and circuit integrated node with excellent stability and operability by combining a variety of NICT's latest optical switch technologies (Figure 2). The optical integrated node was developed for ring networks, mainly consisting of an optical packet switch, optical add/drop multiplexer (doubling as a resource adjuster and optical circuit

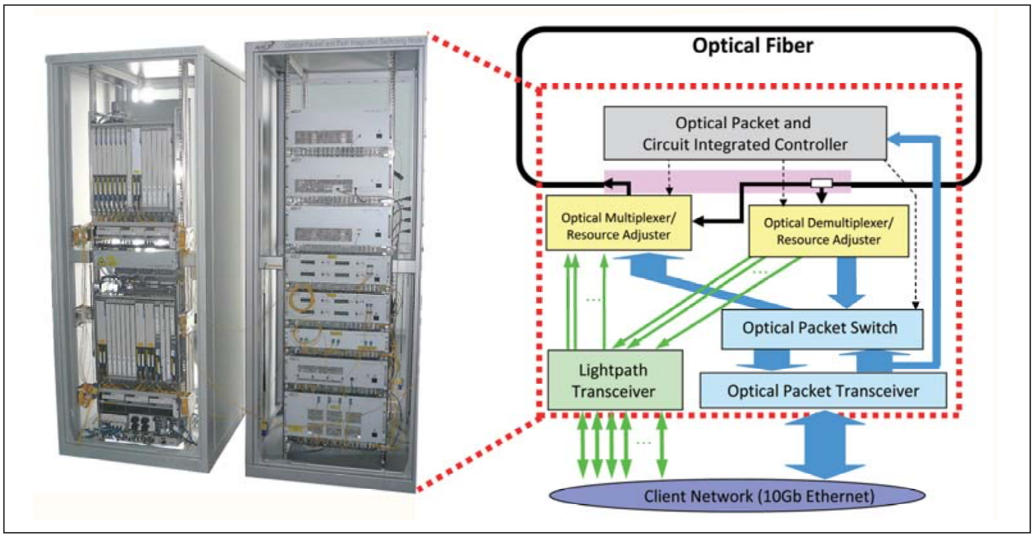


Figure 2●Developed optical packet and circuit integrated node

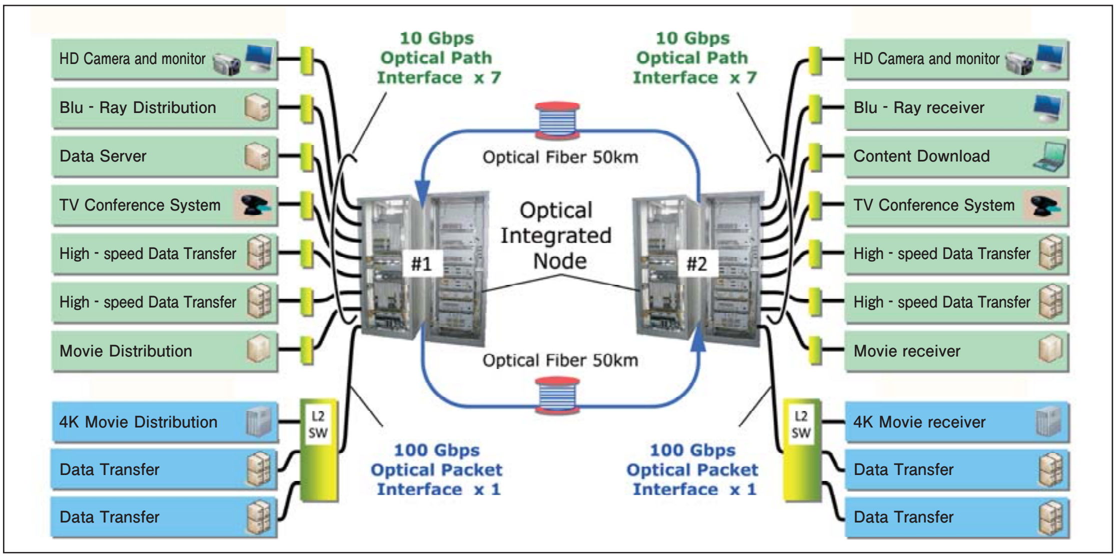


Figure 3●Structure of demonstration network

switch), optical packet transceiver, optical-path transceiver, and optical packet and optical circuit integrated controller. 10-gigabit Ethernet is used for interfacing with the client network and the format is converted into either a 100-Gbps optical packet by the optical packet transceiver or into a 10-Gbps optical path by the optical-path transceiver. In a ring network, both the optical packet and optical path data are transmitted over the same optical fiber infrastructure, and the optical packet or optical path finishes at a given node according to a command from the integrated controller.

We have succeeded in trimming by at least half the size of the chassis for the optical integrated node, thanks to the stabilization and integration of devices. In addition, with the help of a polarization-independent optical switch and a gain-transient-suppressed optical amplifier, the system can provide communications of a quality that always meets or exceeds the strict criteria of the ITU-T recommendation, even in an environment with polarization-rotating and power-fluctuating where conventional experimental equipment cannot operate stably. Equipment adjustment also is easier, so that even those who are unfamiliar with optical systems can operate it. For example, if the network configuration is changed and the number of systems increased, a network administrator can easily change the control setting.

We built a ring network consisting of two optical integrated nodes connected with a 50 km optical fiber and successfully transferred from a remote location 4K video (4,096 x 2,160 pixels), high-definition video (1,920 x 1,080 pixels), a bidirectional video conference, and data via the high-speed 10-gigabit Ethernet links of NICT's JGN-X testbed network (Figure 3).

Toward the Future

In the future, we will incorporate optical buffer functions, enhance the quality of the integrated controller, and automate the controller to further strengthen the functions of the optical integrated node. The goal is to make the optical packet and circuit integrated network highly reliable and practical so that many users and administrators can easily use it. Furthermore, we will incorporate it into the infrastructure for the JGN-X testbed.

Glossary

＊ "Best-effort" Delivery

"Best-effort" delivery describes a network service in which the network does not provide any guarantees for the communication speed at which data is delivered.

Large-scale Application Layer Network Monitoring System for Preventing Information Leaks

–File sharing security on large-scale L7/L8 networks–

Ruo Ando

Senior Researcher, Security Architecture Laboratory, Network Security Research Institute

After completing a doctoral course, Ando joined NICT in 2006. He has been studying information communications security, cloud computing, and application layer network monitoring and security. Ph.D. (Media and Governance).

What is a Large-scale Application Layer Network Monitoring System for Preventing Information Leaks?

In recent years, due to the widespread use of cloud computing*[1] and the implementation and deployment of file swapping and sharing protocols such as P2P*[2], it has become more and more common for large volumes of files to be distributed widely. In keeping with this trend, the circulation of fraudulent files and the leaking of confidential files has become an international problem that is now seen almost everywhere. The inequality in the degrees of technology sharing and cooperation between the offenders and the defenders makes the current situation even more serious.

Under these circumstances, NICT's Security Architecture Laboratory has been monitoring and analyzing the circulation of fraudulent files that cause the leaking of information and confidential files in the widespread application layer (WEB, P2P, SNS, etc.). At the same time, we are also developing an information leak detection and tracking system that can monitor widespread network traffic and process large volumes of the monitored data in order to deal with increasing number of information leaks world wide. The technical challenges facing us include developing a protocol analysis technology that allows large-scale monitoring and a cluster technology*[3] to process large volumes of data, both of which are currently being researched. Furthermore, we hope to make the monitoring systems open by coordinating these technologies with other institutions on NICT's testbeds (JGN-X, StarBED[3]).

Current Status and Challenges of Information Communications System

The technologies that make cloud computing possible include the maturation of a distributed file processing technology, the rapid growth of a storage technology. and a larger, faster Internet. The same advances, however, have also resulted in the information leak issue being recognized as a social problem on a global basis. In fact, thanks to the widespread use of cloud computing and the implementation and deployment of file swapping and sharing protocols such as P2P, the situation where large volumes of files are widely distributed without using a specific application has become more common. In addition, one of the features of recent information leaks is the global recognition of the problem.

Therefore, it is imperative to build a mechanism of cooperation and a cluster system for monitoring and suppressing the circulation of fraudulent and confidential files on growing and widely used file-sharing networks (Figure 1).

Large-scale Application Layer Network Monitoring System for Preventing Information Leaks

The NICT Network Security Research Institute has been developing a monitoring system of wide-spread file circulation and a cluster system to process the large volume of data gathered by the former system. Our goals in developing a system to deal with the current problem are summarized by the following two points: virtualization*[4] and consolidation of a probe, and horizontally scalable (scale out*[5]) distributed processing.

Figure 1●Widespread, larger-scale file sharing network
These are the locations of file-sharing computers around the world, as monitored by the large scale application layer network monitoring system for preventing information leaks. The colored pins at each point (red, green, and yellow) indicate the relative volume of files that each node (computer) owns.

1: Virtualization and Consolidation of Probe

In designing a large-scale application layer network monitoring system for preventing information leaks, we need to scale out both the monitoring system and data storing and processing system. Therefore, we virtualize the probes for the systems in order to consolidate them. By doing so, we can place several virtualized probes on one physical server and increase the performance of both input and output monitoring. It is also possible to consolidate the functions in a single node PC.

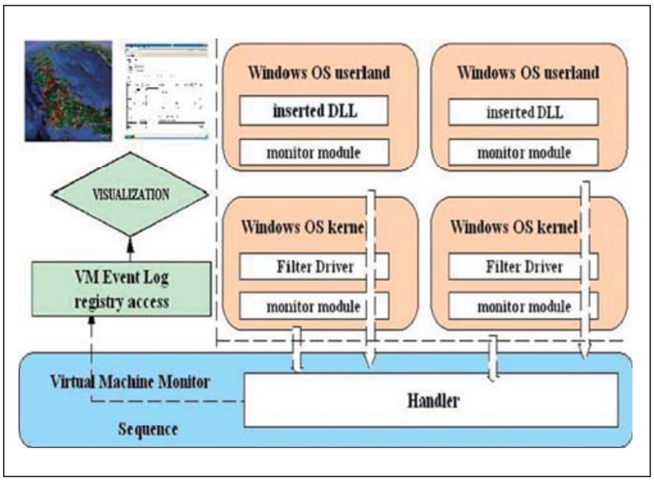


Figure 2●Virtualization and consolidation of probe
Like the system design employed by Google and other companies, it is designed to increase the monitoring volume (to scale out) by adding a monitoring node.

2: Horizontally Scalable Distributed Processing Technology

Since the amount of data gathered by large-scale application layer monitoring will increase rapidly, a system to store and retrieve the data must be able to handle the faster speed and the scaling out. The Security Architecture Laboratory has been constructing a large-volume data processing system using a file system for data processing clusters, such as distributed KVS*[6] and Hadoop*[7].

The large scale application layer monitoring system, developed with an emphasis on the above two points, are now operating on NICT's testbeds, JGN-X and StarBED[3], with a view to enhancing cluster technologies for large-scale, widespread traffic data processing.

Making the Monitoring System Open

The challenges we face in the future include bridging the gap between the offenders and the defenders in the degrees of information and technology sharing and cooperation. This is obvious if you look at recent information leak incidents, but the offenders have a mechanism to share technologies and facilitate cooperation on a global basis. The defenders have no such a mechanism for information sharing and cooperation. Therefore, the reality is that the offenders have developed their skills rapidly while the defenders are always one step behind and must deal with problems individually. To overcome the disadvantage, the Network Security Research Institute has now started to make the monitoring system open. By making the monitoring system smaller with the help of virtualization and consolidation of monitoring nodes, as mentioned above, and making the monitored information open, our goal is to share the system and its output among various organizations, whether public or private, or from the government, industry, or academia.

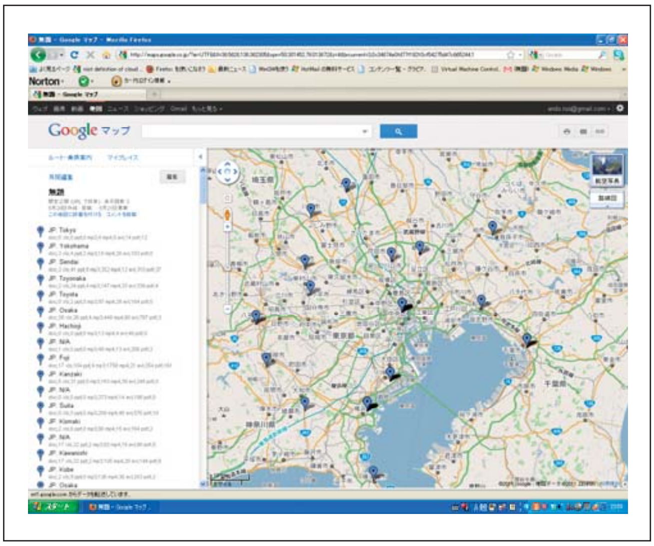


Figure 3●To make monitoring technologies and systems open
The dots in blue indicate the locations of computers that have relatively many files, with the left column showing what type of files they own.

Figure 3 shows the results of the monitoring and data processing of the large-scale application layer network monitoring system for preventing information leaks. We are aiming to share the monitoring technologies and data more widely. We are also considering publicizing a part of the retrieval functions. For more details, please visit:

http://blink.nict.go.jp/

Glossary

＊1 Cloud Computing
Cloud computing is the delivery of information and application services to a user via servers on the Internet.

＊2 P2P
P2P (Peer-to-peer) networking is an architecture where computers connected on a network directly communicate each other with equal privileges.

＊3 Cluster Technology
A cluster is a group of linked servers that work together closely to form a single system.

＊4 Virtualization
Virtualization is a technology that allows an OS to run on another OS. It is also possible to make one server computer operate as if it were several computers.

＊5 Scale Out
Scale out means to increase the processing performance of a group of servers as a whole by adding servers.

＊6 Distributed KVS (Key-Value Store)
Distributed KVS is a method for storing and managing data that assigns a unique identification (key) to the data (value) to be stored and saves them as a pair.

＊7 Hadoop
Hadoop is an open-source software infrastructure (middleware) that was developed and released by the Apache Software Foundation (ASF) for readily distributing and processing a large amount of data in several machines.

Seminar & Exhibition of Technology and R&D for Next-generation Wireless Communications

Report on Wireless Technology Park (WTP) 2011

Kaori Sawada, Planning Office, Wireless Network Research Institute

Highly Specialized Event is a Collaboration of Government, Industry, and Academia

NICT held Wireless Technology Park (WTP) 2011 on July 5 and 6, 2011, in collaboration with the YRP R&D Promotion Committee and the YRP Academia Collaboration Network. The event had four themes: an exhibition of state-of-the-art wireless communication technologies and the outcomes of research and development; seminar programs focusing on trends in wireless communications; academic sessions in which university laboratories presented their research; and presentations by exhibiting companies of cutting-edge technical solutions for product development. WTP has been held since 2006 as a venue for companies, universities, and institutions working on the technologies and R&D of wireless communications finding search of new business opportunities. This year, one company after another decided not to participate in the exhibition because of the earthquake, and the number of the companies that participated in the exhibition dropped to 40 companies (down from 77 last year). Still, 6,668 people (7,849 last year,) visited the event at PACIFICO YOKOHAMA during the two days, which reflects the great attention the event attracted from the wireless communications industry.

NICT offered an R&D vision for wireless communications technologies to help build a safe, secure society

With the theme of "Wireless Communications Technologies Effective in Disasters," NICT has presented a total of seventeen exhibitions, such as broadband/mobile satellite communications, including Wideband InterNetworking engineering test and Demonstration Satellite (WINDS), satellite-terrestrial laser communications technology, cognitive radio systems, broadband mobile communication system for public safety, wireless grid technologies using smart meters, ultra-high-speed video transmission technology using millimeter waves, and body area network (BAN) technology. In WTP, NICT selects its presentations every year by putting priority on dynamic exhibitions of the latest research to ensure that the latest achievements are shown. This year, we set up a special panel exhibition area to address the importance and challenges of wireless technologies that were recognized in the wake of the Great East Japan Earthquake. In this area, NICT showed the effectiveness of the wireless communication network technologies for which we are promoting R&D. At the same time, we also introduced the contribution in rescue and support activities by WINDS and Cognitive Wireless Router.

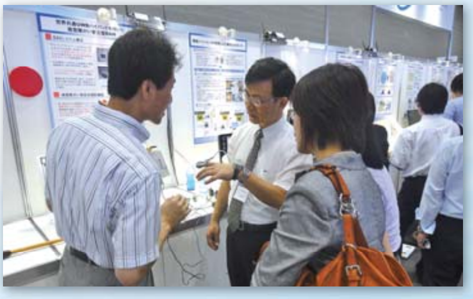
The visitors to our booth wanted to hear about not just the technologies but also the progress towards the application, practical use, and commercialization of the technologies, as well as about joint research, which imparted a lively mood to the event. We also welcomed various people from different areas, including Dr. Chou Sheng-Lin, Deputy General Director of Information and Communications Research Laboratories (ICL), Industrial Technology Research Institute (ITRI). Visually-impaired people came to see the prototype of the B BAN using UWB High-Band to Assist Visually Impaired Person , and exchanged their views with the researchers in charge of the development.

In the seminar programs, which consisted of 9 courses by subject, 52 lectures were given by various experts from government, industry, and academia, including Mr. Yasuo Tawara, Director of Land Mobile Communications Division and Mr. Hironobu Yumoto, Director of International Cooperation Division from Ministry of Internal Affairs and Communications (MIC). On behalf of the NICT staff members, Li Huan-Bang, Senior Researcher at the Dependable Wireless Laboratory, spoke about the standardization of BAN and a prototype of the BAN System using UWB. Homare Murakami, Senior Researcher at the Smart Wireless Laboratory presented NICT's approach to wireless communication using TV White Space. Both lectures drew attention from the audience. Also, four companies that participated in the exhibition made presentations. Sixteen presentations were made in the academia session by laboratories from thirteen universities, while fourteen universities participated in the poster sessions.

To provide an opportunity for experts from government, industry, and academia to interact and promote Japan's competitive advantages in the wireless communications field, NICT will continue to endeavor to make WTP2012 more fruitful and rewarding in collaboration with organizations concerned while proceeding with the research and development of wireless communications.

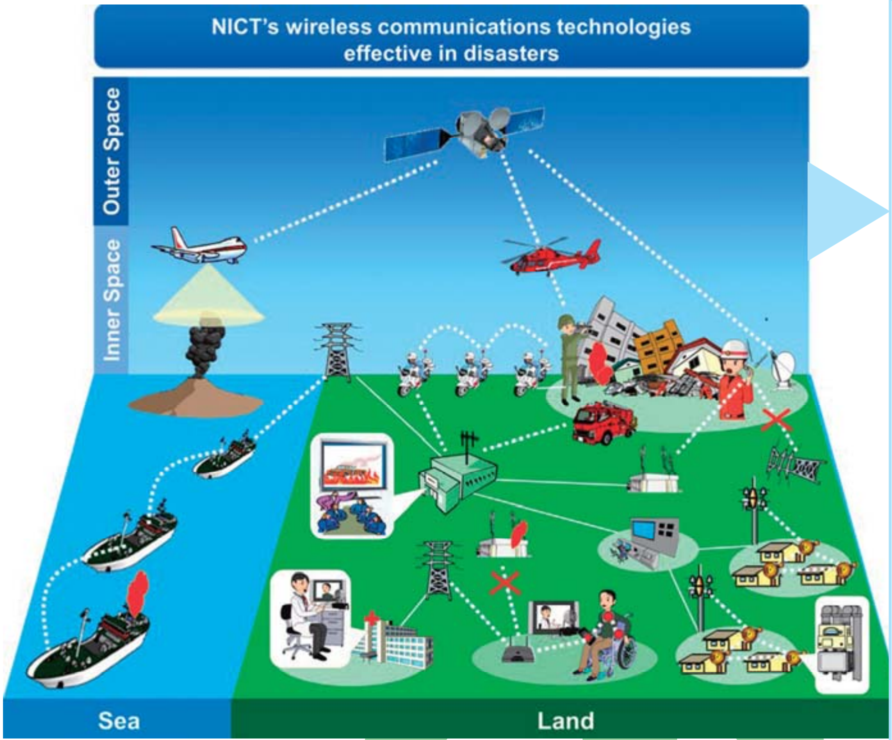
Visitors

●Visually-impaired people checking a prototype of BAN using UWB High-Band to Assist Visually Impaired Person .



●Dr. Chou Sheng-Lin, Deputy General Director of Information and Communications Research Laboratories, Industrial Technology Research Institute (ITRI) visiting the event.

Exhibition Details



- Wideband InterNetworking engineering test and Demonstration Satellite (WINDS)
- Engineering Test Satellite VIII "Kiku No. 8" (ETS VIII)
- Small Optical Transponder for Satellite Laser Communications
- Satellite/Terrestrial Integrated Mobile Communication System (STICS)

In the exhibition, the item that attracted the most attention was a transportable 2.4m antenna for WINDS, which played an essential role in rescue operation after the Great East Japan Earthquake.

A model of the radio-wave absorbing characteristics of a human head was used to measure interference by radio waves.

Can be used when terrestrial communications networks are disrupted due to a disaster, to communicate large volumes of earth-monitoring data, and to utilize frequencies efficiently.

- Human Detection System Using Radio Waves

With the use of several sensors, it detects the variations in the angle of incidence. Since it does not respond to variations in the reception level of the signals, it can detect any changes in the situation in a room.

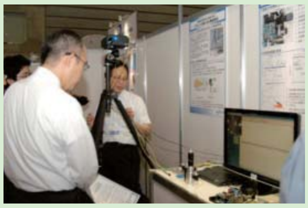
In addition to ensuring indoor security, the technology can be applied to detect survivors in a disaster-stricken area.

- Cognitive Radio System
- Broadband Mobile Communication System for Public Safety
- Advanced Wireless Grid Technology using Smart Meters
- Ultra High-speed Image Transmission Technology using Millimeter Wave
- Compact Free-Space Optical Terminal for the communication beyond Tera bps

The Broadband Mobile Communication System for Public Safety allows fire-fighters and policemen to transfer high-definition video of the disaster-stricken site to the task force in real time.

Prototype of a smart meter with low-power radio devices, which conforms to IEEE802.15.4g/4e and enables the service coverage to expand by means of multi-hop communications. We also demonstrated its connection to a radiation dosimeter.

The Ultra High-speed Image Transmission Technology using Millimeter Wave successfully transmits an uncompressed full high-definition video without delay.



By bringing this compact free-space optical teminal to a disaster-stricken area, we can build an optical communications network with nodes at intervals of several kilometers.

Enables prompt and easy deployment even in a disaster or emergency, with the capability of constructing an energy-saving, flexible, and large-scale/high-speed wireless network.

- BAN Using UWB High-Band to Assist People With Visual Disability
- Health Monitoring System Based on UWB
- BAN within Wireless Mesh Router for Nursing Applications
- Health Monitoring System using 400 MHz networks

Using UWB and a 2.4 GHz low-power radio, the system supports remote healthcare and health monitoring by transmitting data of blood pressure, blood oxygen level, humidity, electrocardiogram, heart rate, posture, body temperature, and weight to a medical institution.

Can be applied to medical support or health monitoring in a disaster-stricken area, at evacuation sites, and on islands.

Prize Winners

Prize Winner ● Kentaro Torisawa / Director, Information Analysis Laboratory, Universal Communication Research Institute

◎Date: March 3, 2011

◎Name of Prize:

JSPS Prize

◎Details of Prize:

Automatic Construction of Large-scale Knowledge Bases from the Web and their Application to Web Search

◎Name of Awarding Organization:

Japan Society for the Promotion of Science

◎Comments by the Winner:

The JSPS prize is granted every year to around 25 young researchers involved in fields ranging from cultural and social sciences to natural science. This is the first time, however, that a researcher in language processing, which is my area of specialization, has received the prize. This gives me a tremendous boost and greatly encourages me to work harder. I should like to express my deepest appreciation to those who gave me valuable advice about many things, as well as to all the researchers and staff members in the current laboratory and the staff members and students who supported me when I was a university teacher. I could not have received the prize without all the support and cooperation by these people.

The award ceremony was held in the presence of their Imperial Highnesses Prince and Princess Akishino, and Yoshiaki Takaki, Minister of Education, Culture, Sports, Science and Technology (right back). Dr. Torisawa was given the prize by Motoyuki Ono, President of the Japan Society for the Promotion of Science.

Prize Winner ● Yasushi Naruse / Researcher, Brain ICT Laboratory, Advanced ICT Research Institute

◎Date: March 8, 2011

◎Name of Prize:

Young Researcher Award

◎Details of Prize:

Inference of Alpha Rhythm Phase and Amplitude Using Belief Propagation on Markov Random Field Model

◎Name of Awarding Organization:

IEEE Computational Intelligence Society Japan Chapter

◎Comments by the Winner:

The prize recognizes a new signal processing method for extracting with high accuracy alpha-wave brain information. I have modified a signal processing method used for image processing and applied it to the processing of brain information. By developing a method that allows brain information to be extracted with greater accuracy by applying different methods from various fields, I hope to develop a technology for communicating more brain information.

Prize Winner ● De Saeger Stijn / Expert Researcher, Information Analysis Laboratory, Universal Communication Research Institute
Kentaro Torisawa / Director, Information Analysis Laboratory, Universal Communication Research Institute
Jun'ichi Kazama / Senior Researcher, Information Analysis Laboratory, Universal Communication Research Institute

Joint Prize Winners:

Kou Kuroda
Former NICT Expert Researcher (Currently at Kyoto Institute of Technology)

Masaki Murata
Former NICT Senior Researcher (Currently at Tottori University)

◎Date: March 9, 2011

◎Name of Prize:

16th Annual Meeting of The Association for Natural Language Processing Excellent Paper

◎Details of Prize:

Large Scale Semantic Relation Extraction using Class Dependent Pattern Induction

◎Name of Awarding Organization:

The Association for Natural Language Processing

◎Comments by the Winner:

We are deeply honored to have our presentation on the automatic construction technologies of the NICT conceptual dictionary selected as an excellent paper at the 16th Annual Meeting of the Association for Natural Language Processing. The paper proposes a method for automatically extracting the high-level semantic relationships between words from a large volume of documents on the web. We would like to express our deep gratitude to all the staff members of the Information Analysis Laboratory, who gave us valuable support during the study. We will continue to advance such studies to obtain valuable knowledge.

De Saeger Stijn

Prize Winner ● **Kazumasa Enami** / Vice President

◎Date: March 11, 2011

◎Name of Prize:

Maejima Award

◎Details of Prize:

In recognition of significant contributions to the development of image information media

◎Name of Awarding Organization:

Teishin Association

◎Comments by the Winner:

The award recognizes my studies of image signal processing systems and other studies as a researcher for NHK, as well as for negotiations for establishing practical digital broadcasting when I was in the NHK General Planning Office, research promotion of super-high definition when I was Director of the NHK Science and Technical Research Laboratories, and research advancement of Ultra-realistic Communications in NICT. These contributions were made possible by my predecessors and colleagues, and I would like to express my sincere thanks to them. I will continue to make every effort to advance research.

Prize Winner ● **Yutaka Kidawara** / Director General, Universal Communication Research Institute
Sadao Kurohashi / Expert Researcher, Universal Communication Research Institute

Yutaka Kidawara

Joint Prize Winners:

Susumu Akamine
Former NICT Research Expert (Currently at NEC)

Daisuke Kawahara
Former NICT Senior Researcher (Currently at Kyoto University)

Yoshikiyo Katou
Former NICT Senior Researcher (Currently at Google Japan)

◎Date: March 11, 2011

◎Name of Prize:

Maejima Award

◎Details of Prize:

In recognition of the development of the "WISDOM" information analysis engine that has greatly advanced the communication business

◎Name of Awarding Organization:

Teishin Association

◎Comments by the Winner:

WISDOM is intended to help a user to find reliable, valuable information by analyzing, classifying, and presenting information from the web, which contains both good and bad information. The research did not end as just as another project, but turned into something useful in real life that was highly recognized and led to our receiving the Maejima Award. We would like to express our deep gratitude to the former Knowledge Clustered Group as well as to all of the staff members of NICT. We would not have received the prize without the kind cooperation given to us. The recognition gives us huge encouragement, and we are determined to aim at even higher goals in our research and development efforts.

Report on Science and Technology Advisor Special Class

Measuring the Earth's Environment

NICT is devoted to educational activities for future researchers, who will have central roles in Japan's next generation, by making science and technology more interesting to young people. In Koganei City, where our headquarters are located, Tokyo Metropolitan Tama High School of Science and Technology (Principal: Takashi Yakuyama) opened in 2010 and has attracted many students who are interested in science and technology. Under the slogan, "Lay the groundwork to cultivate scientists who will support Japan and pioneer the future," the school has established a Science and Technology Advisor system supported by the universities, research institutions, and companies involved in cutting-edge research to give special classes that provide students with the opportunity to experience the "real thing". NICT, as a research institution in the neighborhood, is pleased to provide support.

●Dagik Earth

As a part of the activities, Director Mamoru Ishii of the Planning Office, Applied Electromagnetic Research Institute, NICT, gave a class to the freshmen when the school held special classes led by Science and Technology Advisors on Tuesday, July 19.

Using the digital 4-dimensional globe Dagik Earth (projecting the data displayed on a world map onto a big sphere), Director Ishii started his class by talking about the then-approaching Typhoon 6 and other familiar topics and gradually shifted to remote sensing, weather monitoring from space, and auroras and weather in space.

In the 80-minute class, which included practice turning the globe with a game console controller, the students were eagerly attentive, took notes, and enjoyed the class. We believe we provided the students, who dream of some day being successful in the science arena, with an opportunity to have fresh experiences.

●Director Mamoru Ishii gives a class

●Eagerly attentive students

Information for Readers

The next issue will take up various subjects, including the development of a security system to detect an intruder with radio waves.

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