

IEICE Communications Society GLOBAL NEWSLETTER Vol. 36, No.4

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Report on Communications Society Special Talk and Awarding Ceremony at 2012 IEICE Society Conference

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1. Introduction

This article reports an overview of the *Communications Society Special Talk and Awarding Ceremony* at the 2012 IEICE Society Conference held at Toyama University, Toyama, Japan, on 12 September 2012. This event was, previously known as the Communications Society Annual Assembly, renamed this year.

In the awarding ceremony session, several awards were presented by Prof. Yoshiaki Tanaka, President of the Communications Society; the Outstanding Contributions Award and the Distinguished Contributions Award.

A special technical lecture rooted in Toyama or Hokuriku District was planned in the special talk session. The lecture in this year was “*Development of Mountainer’s Radio Locating System — Challenge to a Regional Issue*” by Prof. Toshimi Okada, Toyama Prefectural University, Toyama.

Distinguished Contribution Award is presented for extraordinary planning activities and voluntary paper reviewing in the Communications Society. 87 members were awarded for their contributions prior to 2011.



Fig. 2 Opening remarks by Prof. Yoshiaki Tanaka, President of the Communications Society.



Fig. 1 Participants in the Special Talk and Awarding Ceremony in the 2012 IEICE Society Conference.

2. Awarding ceremony

The Outstanding Contribution Award is presented for the technical committee and chief editor services on the Editorial Board of Transactions on Communications and Communications Society Magazine. 20 members were awarded for their services prior to 2011. The



Fig. 3 The Outstanding Contribution Award presented by President Yoshiaki Tanaka.

3. Special lecture

In the special talk session, a technical lecture was arranged. The theme of the lecture was chosen considering regional characteristics of Toyama or

Hokuriku District, one of the greatest mountainous terrains.

The title of special lecture was “*Development of Mountainer’s Radio Locating System — Challenge to a Regional Issue*”. Professor Toshimi Okada started his talk on the boom in climbing mountains reflecting a health consciousness and an aging society and the increase of mishaps. He has been studying communication methods to find and rescue casualties in a mountainous area even during the winter season. In the lecture, the professor presented *Mountainer’s Radio Locating System (MRLS)* as his ten-year achievement. The MRLS consists of portable devices and searching devices. The portable device, equipped with a GPS receiver, sends the location information with SOS signals in the VHF range. The device can be remote-controlled to send the signals even when casualties cannot operate it. The searching device looks for

casualties by not only the SOS signals but also a direction finding technology. The professor concluded his lecture by mentioning that the proposed system could be an efficient method to rescue casualties in many cases of accidents in the mountains.

4. Conclusions

This article reported an overview of the Communications Society Special Talk and Awarding Ceremony. As described in this article, the Communications Society supports members’ activities in the field of communications by giving contribution awards.

Finally, the Special talk and Awarding Ceremony were adjourned with closing remarks by Prof. Iwao Sasase, President-Elect of the Communications Society.

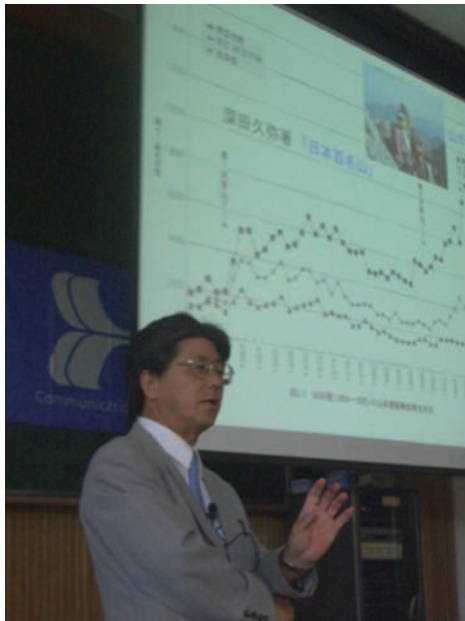


Fig. 4 Special lecture by Prof. Toshimi Okada, Toyama Prefectural University.



Fig. 5 Closing remarks by Prof. Iwao Sasase, President-Elect of the Communications Society.

Renewal of Sister Society Agreement between KICS and IEICE-CS

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1. Overview

The sister society (SS) agreement between the Korean Institute of Communications and Information Sciences (KICS) and the IEICE Communications Society (IEICE-CS) has been renewed. The first SS agreement between KICS and IEICE-CS had been concluded in December 1999, and the latest agreement effective from 2010 to the end of 2012. With this renewal, the term of the agreement was extended to the end of 2015. The signing ceremony was held at Ramada Plaza Jeju Hotel in Jeju Island, Korea during 18th Asia-Pacific Conference on Communications (APCC2012) on October 15 - 17, 2012. The APCC has been held annually since 1993, and has been technically cosponsored by KICS, IEICE-CS, the China Institute of Communications (CIC), and the IEEE Communications Society (IEEE ComSoc).

2. Signing ceremony at Ramada Plaza Jeju Hotel

From KICS, President, Prof. Jinwoo Park, Executive Vice-President, Prof. Jaiyong Lee, Vice-President, Prof. Jong-Seon No, Vice-President, Prof. Yong-Soo Cho, Executive Director for General Affairs, Prof. Chung Gu Kang, Executive Director for Strategy and Planning, Prof. Yeong Min Jang, and Executive Director for International Cooperation, Prof. Youze Cho attended the signing ceremony, while from IEICE-CS, Vice President (also Chair of Planning and Member Activities Committee), Prof. Masahiro Umehira, Director for Planning and Member Activities, Dr. Hidetoshi Kayama, and Director for International

Cooperation, Planning and Member Activities Committee, Dr. Yukihiko Okumura attended. Before signing the SS agreement, both of KICS president and IEICE-CS vice-president introduced each of their society delegates and the current status of their society activities, and then signed the SS agreement which is composed of the cooperation agreement (main agreement) and the dual membership side agreement. Unfortunately IEICE-CS president, Prof. Yoshiaki Tanaka could not attend the ceremony and he was signed the agreement in advance.

After signing, the delegates from both of the societies discussed the future cooperation among societies on the international conferences, the technical lectures, the various seminars, and so on, and they expected that their successive cooperation activities would contribute in the communications and information technology fields continuously. Such cooperation also include the activities for the publications promotion and the membership development by each society. The signing ceremony was held in a very friendly atmosphere.



Fig. 1 Signed by Prof. Yoshiaki Tanaka, IEICE-CS president.



Fig. 2 Signing ceremony of sister society agreement between KICS and IEICE-CS on October 16th, 2012 in Jeju Island. (Right photo, left to right) Prof. Jinwoo Park, President, KICS and Prof. Masahiro UMEHIRA, Vice-President, IEICE-CS



Fig. 3 Group photo at signing ceremony of sister society agreement between KICS and IEICE-CS on October 16th, 2012. (Back row, left to right) Prof. Chung Gu Kang, Executive Director for General Affairs, KICS / Prof. Youze Cho, Executive Director for International Cooperation, KICS / Prof. Yong-Soo Cho, Vice-President, KICS / Prof. Jong-Seon No, Vice-President, KICS / Prof. Jaiyong Lee, Executive Vice-President, KICS / Dr. Yukihiro OKUMURA, Director for International Cooperation, Planning and Member Activities Committee, IEICE-CS / Dr. Hidetoshi KAYAMA, Director for Planning and Member Activities, IEICE-CS / Prof. Yeong Min Jang, Executive Director for Strategy and Planning, KICS (Front row, left to right) Prof. Jinwoo Park, President, KICS and Prof. Masahiro UMEHIRA, Vice-President, IEICE-CS

3. IEICE-CS's activities with sister societies

Currently IEICE-CS is concluding SS agreements with IEEE ComSoc, KICS, KIEES, VDE/ITG and CIC (in the order of the initial conclusion date) respectively. Each SS agreement includes mutual privileges of conference registration and paper submissions fee, promotion of their publications, and further cooperation with each other, as stipulations of the main agreement. In addition to the above, the side

agreements, which introduce the discount rates for the membership annual fee, have been concluded with IEEE ComSoc, KICS, and VDE/ITG so far.

As a part of international activities, IEICE-CS will continue to construct a close and mutually beneficial relationship between all sister societies in the future. At the same time, the IEICE-CS hopes that many overseas members of "Sister Societies" would join in the IEICE-CS as a member and also participate in the IEICE-CS related international conferences/meetings.

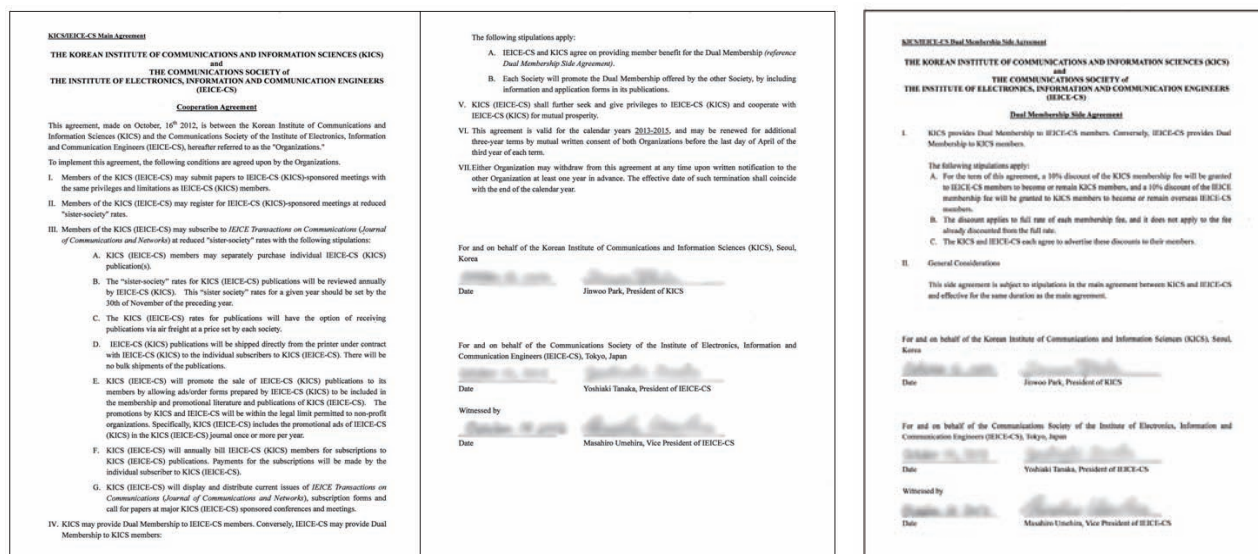


Fig. 4 Renewed sister society agreement between KICS and IEICE-CS. (Left) Cooperation Agreement and (Right) Dual Membership Side Agreement

Report on ICM English Session at 2012 IEICE Society Conference

- BS-5 Network and Service Design, Control and Management -



Mariko Yamada
Yokohama Research Laboratory, Hitachi, Ltd.

1. Introduction

The 2012 IEICE Society Conference was held from Sep.11 to Sep.14 at Toyama University, Toyama City. The IEICE Technical Committee on Information Communication Management (ICM)[1] hosted the session entitled “Network and Service Design, Control and Management” as one of the eight symposium sessions focused on special topics of advanced technologies. This session in particular was hosted and presented entirely in English.

2. Background of ICM English Session

ICM has managed this session since 2004 to promote the globalization of IEICE by providing the participants staying in Japan or joining from overseas with more opportunities to present and discuss in English.

Fig.1 shows the changes in the number of papers since 2004. When the session began, only 15 papers were submitted. The number has gradually increased and 46 papers were submitted this year(three times more than that in 2004).

The duration of the English session has also been extended with the increase of papers. Although the duration of the English session was only one day and a half in 2004, it continued for four days during the Society Conference this year.

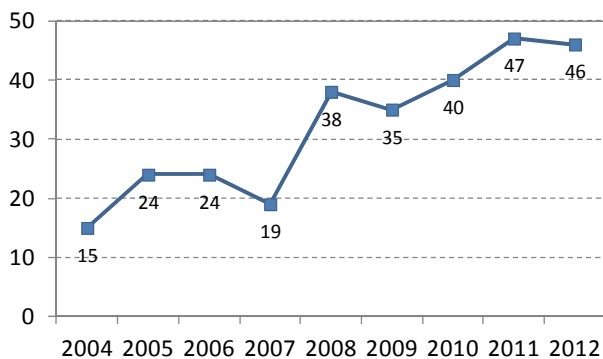


Fig. 1 The number of papers since 2004

3. Presentations at ICM English session

The 46 papers were separated into 13 sub-sessions. Various topics were discussed in each sub-session such as wireless networks, applications, QoS/QoE, network design, ad-hoc networks, sensor networks, optical

networks, green ICT and others. Fig.2 shows statistics of papers categorized according to their topics. Major topics are wireless networks and applications. This trend is largely unchanged from last year.

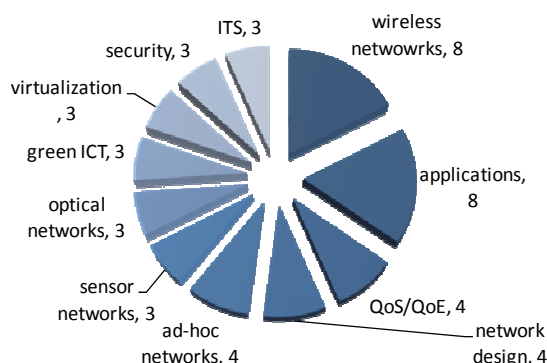


Fig. 2 Statistics of paper categorized by topics

The presenters in each English session had 20 minutes. The presentation time was twice as long as that of a general session. Therefore the presenters could present the results of their research in detail. Twenty to thirty participants attended each sub-session. All presenters and audience discussed actively and in detail.

The time for questions was five minutes. Since the time for questions passed quickly, presenters and audience continued their heated discussion here and there even into the break periods. Fig. 3 and Fig. 4 show the pictures of the presentation and discussion at the English session.



Fig. 3 2012 ICM English session



Fig. 4 Discussion at the English session

Although most presenters were international students studying in Japan and foreign researchers working in Japanese companies and research institutions, the number of international students studying at overseas universities has gradually increased. One likely reason is because this session provides an opportunity for the presenters to discuss actively in English during four days. The number of Japanese presenters has also increased, probably because this session provides Japanese students and researchers with easily-accessible opportunities of experiencing an English-only discussion on the latest topics and technical issues. This year 12 papers were submitted by Japanese, twice as many as last year. Fig.5 shows the number of Japanese presenters.

The presenters had various motivations. A Japanese presenter said, “This experience would be helpful in attending international conferences as well as

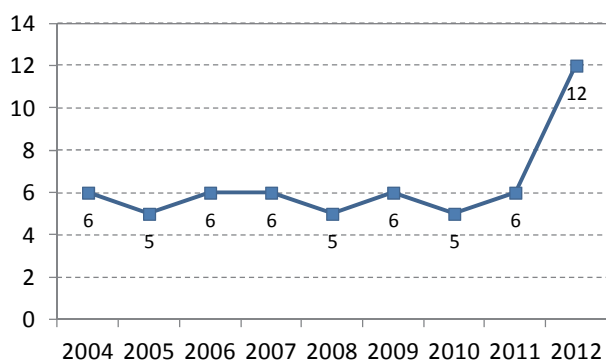


Fig. 5 Japanese presenters since 2004

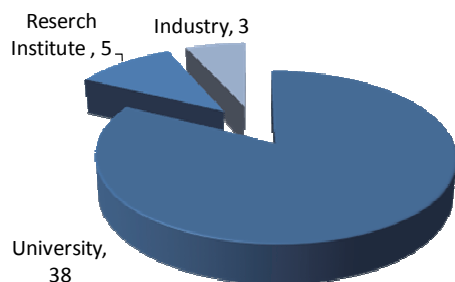


Fig. 6 The presenters' affiliations

disseminating my research results broadly to the world.”, Another international presenter said, “My dissertation will be highly improved thanks to the invaluable comments on my research.”

Fig. 6 shows the presenters' affiliations. Most presenters belong to universities. This trend is similar to last year.

4. English Session Award of ICM Committee

ICM will select the best papers and award a prize of the session in the near future to encourage continuous activity. The best papers will be awarded in the upcoming ICM workshop, which will be held in Yakushima next March. Last year, ICM gave awards to the following papers[2][3].

Table 1 English Session Awardees of ICM Committee 2011

Awardees	Title
Xin Wang (Waseda University)	GMPLS-Based Control Plane in Translucent Wavelength Switched Optical Networks
Holitiana M. Randrianandraina, (Yokohama National University)	Uniqueness of Generated Secret Key Based on Quantization of the UWB Channel Impulse Response

5. Conclusion

The 2012 ICM English session was a great success because a lot of papers were submitted and many participants discussed actively in all sub-sessions. I believe that the ICM English session contributed to the globalization of IEICE. I hope this activity was fruitful for all participants and I think it should be continued for many years.

6. Acknowledgement

I would like to thank Prof. Yoshiaki Tanaka of Waseda University. Utilizing his academic authority as a president of IEICE communications society and his professional network to encourage the submission of papers, he helped to make the 2012 ICM English session a resounding success.

I would also like to thank all the member of the ICM committee, the attendees and everyone who contributed to the discussions and supported the session.

7. References

- [1] IEICE ICM Technical Committee web site, <http://www.ieice.org/~icm/eng/>
- [2] Xin Wang et al., “GMPLS-Based Control Plane in Translucent Wavelength Switched Optical Networks,” IEICE Society Conference, BS-6-16, Sep. 2011.
- [3] Holitiana M. Randrianandraina et al., “Uniqueness of Generated Secret Key Based on Quantization of the UWB Channel Impulse Response,” IEICE Society Conference, BS-6-44, Sep. 2011.

Report on the First CQ Summer School

Kiyohide Nakauchi and Tatsuya Yamazaki
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1. Introduction

This letter reports the First CQ Summer School [1], organized by IEICE-CS Technical Committee on Communication Quality (CQ) on August 30-31, 2012 at National Institute of Informatics (NII) in Tokyo. 33 young researchers and university students joined the summer school.

This summer school is the first trial for the technical committee, aiming at gathering young researchers who are familiar with Quality of Service (QoS) and Quality of Experience (QoE) research areas, and providing state-of-the-art knowledge as well as encouraging research on QoS and QoE based on the emerging technologies. OpenFlow [2] is featured in this summer school.

The summer school program mainly consists of three parts. The first part includes tutorials on the basis of QoS and QoE. The second part is a hands-on training of OpenFlow. The final part is composed of the practices in which the attendants were involved. Especially the group practice was one of the distinctive features of the summer school. Through the group practice, the attendants could exchange opinions, discuss with each other, and present their proposed ideas. Finally the remarkable group presentations were awarded in the closing session.

2. Tutorials

There were four tutorial presentations as follows (Fig.1).

- (1) "Introduction of Network Performance Evaluation" (Dr. Hiroyuki Osaki, Osaka University)
- (2) "Evaluation Method of QoS and Resource Utilization in Wireless Networks" (Dr. Takefumi Hiraguri, Nippon Institute of Technology)
- (3) "Measurement of Network QoS and Failure Detection" (Dr. Toru Hasegawa, KDDI R&D Labs., Inc.)
- (4) "Evaluation Method of QoE and Experiment Planning" (Mr. Jun Okamoto, NTT Corp.)

The first tutorial presentation discussed the essence of network performance evaluation and a lecture using paper craft as an example to be evaluated was impressive.

The second tutorial presentation focused on the IEEE 802.11 MAC and PHY, and gave plain explanations on their mechanisms.



Dr. Hiroyuki Osaki

Dr. Takefumi Hiraguri



Dr. Toru Hasegawa

Mr. Jun Okamoto

Fig. 1 Tutorial Presentations

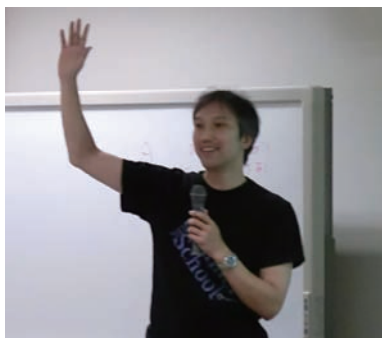
The third tutorial presentation focused on how to maintain large-scale IP networks stable by monitoring and detecting events in the network.

The final tutorial presentation showed QoE evaluation methods for video and audio communications as well as standardization activities related to the methods in ITU-T.

3. OpenFlow Hands-on

OpenFlow is considered as one of the key technologies for future networks, and has lately attracted considerable attention.

Dr. Hideyuki Shimonishi (NEC Corp.) introduced an overview of OpenFlow technology, and successively gave a lecture of half-day hands-on (Fig. 2). In an OpenFlow practice, the participants installed Trema [3], an open source OpenFlow controller software in their laptop PCs in order to build a network emulation environment, including an OpenFlow switch, an OpenFlow controller, and two hosts (Fig. 3). The goal of the hands-on is to build an OpenFlow-capable L2 switch in the laptop. Specifically the following exercises were given to participants towards this goal.



Dr. Hideyuki Shimonishi



Fig. 2 OpenFlow Hands-on

- (1) Run “Hello Trema!” (simply displaying a predefined text message)
- (2) Connecting an OpenFlow switch to an OpenFlow controller
- (3) Displaying packet-in message contents (Packet-in dumper)
- (4) Sending packet statistics information to an OpenFlow controller (Learning switch)
- (5) Displaying traffic data (Traffic monitor)

4. Group Practice

This group practice is one of the distinctive features of the summer school. A mission of each group is “to propose a novel and interesting idea on network control or application, making good use of state-of-the-art technologies introduced in the tutorial presentations and OpenFlow hands-on”.

Though the group discussion time is very limited (after a reception in the first day, and 2-hour slot in the second day), all the groups proposed ideas and gave impressive presentations. It was surprising that some group actually implemented the idea on OpenFlow switch in an emulation environment, and demonstrated the idea in the presentation.

The proposed ideas are as follows. Group C won a competition.

[Group A] Controlling paths of attack packets based on the “Gamification” concept.

[Group B] Priority-based QoS control using application-specific information

[Group C] OpenFlow-based burst traffic shaper (**The Highest Award**)

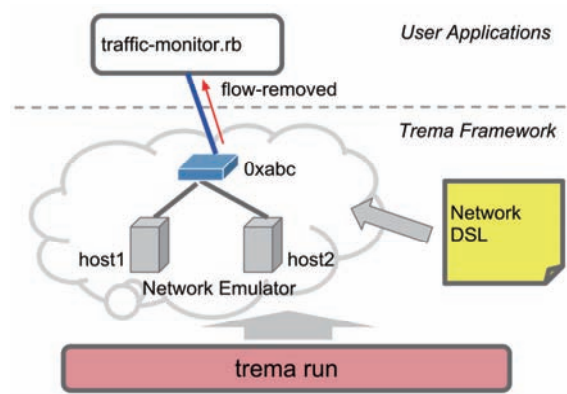


Fig. 3 Network Emulation Environment for OpenFlow/Trema Exercises



Fig. 4 Commemorative Photo

[Group D] Centralized wireless network control for content distribution

[Group E] Ad-hoc network control using OpenFlow

[Group F] Auction-based QoS control for wireless access

[Group G] Dynamic carrier network inter-connection for disaster recovery

5. Conclusions

This kind of summer school event was the first trial for the technical committee of CQ, and it was difficult to draw up its program and exercises for the group practice. We will try to hold the second summer school next year, following the great success of the first one.

6. Acknowledgement

The First CQ Summer School was supported by the activation preparation fund of Communication Society. The authors appreciate all the committee members of the First CQ Summer School for their great efforts and contributions to make this event successful.

7. References

- [1] The First CQ Summer School, <http://www.ieice.org/cs/cq/jpn/cqss1/>
- [2] OpenFlow, <http://www.openflow.org/>
- [3] Trema, <http://trema.github.com/trema/>

A Super Wideband FM Conversion Technique Employing Optical Heterodyne Detection for Access Network Fiberizing

Nori Shibata

Nihon University, College of Engineering



1. Introduction

Video distribution service is being provided on the PON (Passive Optical Network)-based access systems [1],[2]. One drawback of a conventional SCM (Sub-Carrier Multiplexing)-PON system using AM-carrier direct transmission is that the system has insufficient dynamic range in terms of its optical power budget given the expected loss of the optical transmission line, and it is not robust against optical connector reflectivity and fiber chromatic dispersion [3],[4]. A super wideband modulation scheme that uses optical AM/FM signal conversion was intensively investigated and developed in order to overcome the drawbacks of the direct transmission of AM subcarriers [5]-[12]. This article describes a commercially deployed coherent system for video distribution. The key to commercial deployment is FM conversion of multichannel FDM (Frequency-Division-Multiplexing) video signals by means of an optical heterodyne detection.

2. Commercially Deployed FTTH System

In an early stage of access network system development, asymmetric digital subscriber line (ADSL), hybrid fiber coax (HFC), and fiber-to-the-home (FTTH) were candidates for providing broadband access services such as video distribution and the Internet access services. At the present, PON-based FTTH system seems to become the service platform of the information age.

Figure 1 shows the configuration of the commercially deployed FTTH system. The GE (Gigabit Ethernet)-PON system, in conformity with IEEE 802.3ah,

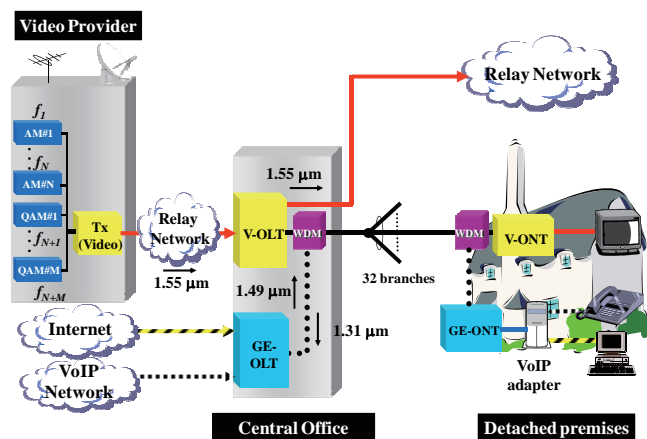


Fig. 1 FTTH system configuration

consists of GE-OLT (Optical Line Terminal) and GE-ONT (Optical Network Terminal), and provides voice and data communication services. In the SCM-PON system, multichannel video signals from the video provider are E/O converted in the transmitter and relayed by V-OLTs, which consists of Er^{3+} -doped fiber amplifiers (EDFAs). A WDM (Wavelength-Division-Multiplexing) technology is applied to integrate GE-PON and SCM-PON systems. After WDM transmission with the GE-PON signal and 32-way splitting, the video signal is terminated in the V-ONT. The wavelength allocation is, in compliance with recommendation ITU-T G.983.3, 1.49 and 1.31 μm for downstream and upstream, respectively, in the GE-PON system, and 1.55 μm in the SCM-PON system.

Here, requirements for SCM system are described. In order to share the fiber-optic access system with the GE-PON system, the SCM-PON system had to meet the following requirements: (1) Optical power budget of 29 dB including 32-splitting loss, (2) Relative intensity noise (RIN) due to cascaded optical amplification (3) Robustness against optical reflection induced at mechanical splice points, (4) Robustness against crosstalk from GE-PON system, (5) Robustness against fiber transmission in chromatic dispersion regime. In conventional SCM system, utilizing external modulation can satisfy requirement (5). Although a few approaches have been proposed to meet the other requirements (1)-(4), they are not seen as definitive solutions from the viewpoint of deployment in the FTTH-based access network.

3. Video Distribution System Employing an FM Conversion

All of the problems mentioned above could be solved by the video distribution system employing a super wideband FM conversion technique. The configurations of the conventional SCM system and the FM conversion system are shown in Fig.2(a) and (b), respectively. The principal difference between the two systems is that the FM conversion system has an FM converter in the video transmitter and an FM demodulator in the V-ONT. In the FM converter, the multichannel FDM video signal is split into two signals with 180° phase difference, and each signal modulates the optical frequency of a different FM laser diode (LD). This modulation scheme not only reduces the modulation current injected into the FM LD but also cancels the intensity modulation component triggered by FM modulation, as found from

Fig.3. Optical heterodyne detection generates a single wideband FM signal from the input multichannel FDM video signals with center frequency of 3 GHz. The FM signal whose spectrum ranging from 0.5 to 5.5 GHz modulates the intensity of the transmitter LD, and it is transmitted through relay/access network. Thus, FM conversion system makes the transmission signal robust against the impairments created within the optical fiber transmission section. Because the optical heterodyne process is terminated in the transmitter, its performance is stable, and the sharing of the expensive coherent process among the subscribers minimizes the cost per subscriber. A photograph of the transmitter composed of FM LDs is shown in Fig.4.

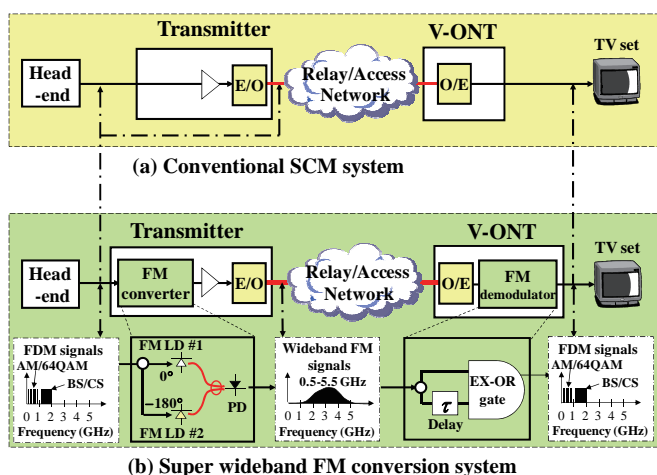


Fig. 2 Configurations of video distribution systems

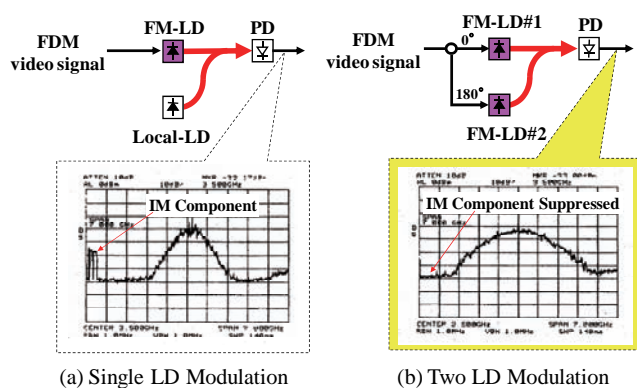


Fig. 3 FM signal spectra for (a) single LD modulation and (b) two LD modulation



Fig. 4 A photograph of transmitter

Detail of the FM demodulator in the V-ONT is shown in Fig.5. An exclusive OR gate detects both rise- and fall-edge of the FM signal to improve CNR (Carrier-to-Noise Ratio) characteristics. The FM modulator IC is fabricated using the Silicon-Germanium (SiGe) process and reduces V-ONT cost. FM demodulator output as a function of frequency for the SiGe IC is shown in Fig.6. Good linearity is obtained from DC to 6 GHz. V-ONT appearance is also shown in Fig.7.

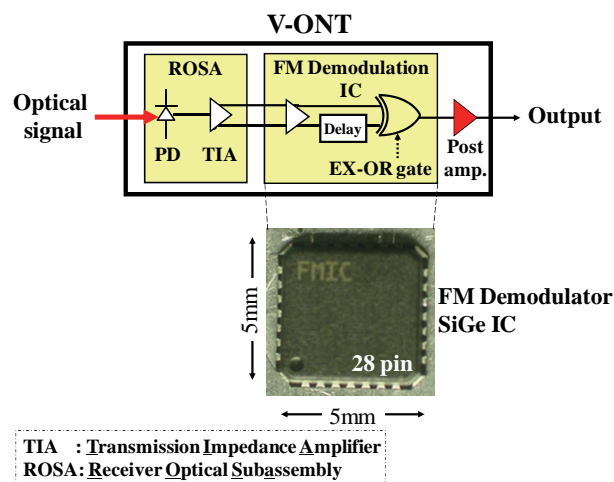


Fig. 5 FM demodulator IC

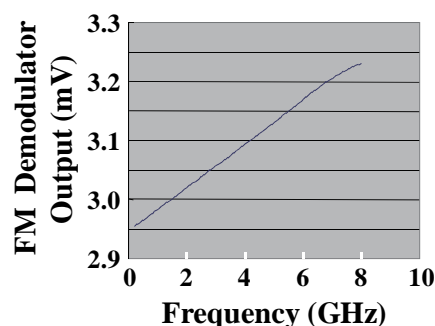


Fig. 6 FM demodulator output as a function of frequency

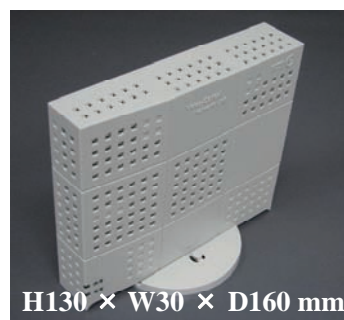


Fig. 7 A photograph of V-ONT

The FM conversion technique offers the following benefits over conventional SCM systems employing direct AM carrier transmission: (1) Improved minimum received optical power, by about 5 dB for AM video transmission, (2) RIN requirement eased by about 10 dB to -135 dB/Hz, which allows more than 20 optical amplifiers to be cascaded, (3) Reflectivity of optical

connector eased by 10 dB, (4) WDM filter crosstalk requirement eased by 14 dB, and (5) influence of nonlinear crosstalk due to Raman scattering rendered insignificant. Among beneficial effects on (1)-(5), Fig.8 exhibits relationship between distortion due to Raman-induced crosstalk and optical power of GE-OLT. As found from Fig.8, much lower levels of the distortion for the FM conversion system are clearly observed, so that the FM conversion system is robust against the Raman-induced crosstalk, comparing with conventional SCM system.

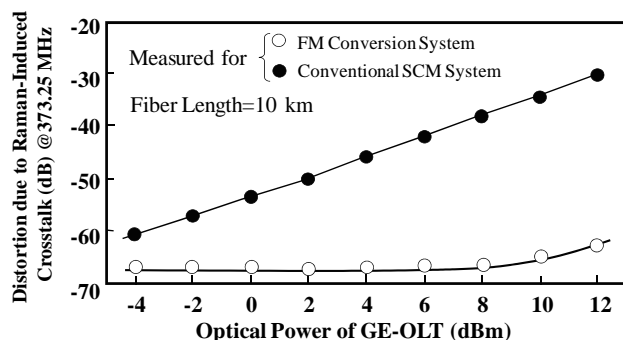


Fig. 8 Distortion due to Raman-induced crosstalk as a function of optical power of GE-OLT for FM conversion and conventional SCM systems

4. Conclusion

The FM conversion video-distribution system employing optical heterodyne detection is now widely and commercially deployed. The coherent transmission system is very effective not only for AM and/or 64QAM but also for other modulation formats for SCM system. It should be noted here that the FM conversion system is currently standardized as ITU-T recommendation J.185, and that it enables FTTH system integration with respect to GE-PON to accelerate access network fiberizing in Japan.

5. Acknowledgement

I wish to thank the R & D members of NTT for their contributions to this work during my life study in NTT Laboratories.

6. Reference

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Global Standardization Developing Broad Capabilities for Businessmen

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1. Introduction

Engineers involved in the standardization activity are increasing, since the importance of standardization in business is increasing. I was engaged in the mobile communication systems global standardization about 15 years. Through my experience, I found that standardization is useful to the industry and at the same time, quite useful to develop various capabilities of individuals. In this newsletter, I will discuss what sorts of capabilities are obtained through standardization activity and how delegates should behave to develop such capabilities.

In the standardization meeting each delegate represents some organization. Sometimes it is a country, like Japan, sometimes it is a company, and sometimes it is an individual. Throughout this newsletter, I assume that a delegate represent a company.

2. My standardization experience in 3GPP

2.1 Making a new standardization body

I started my standardization activity to make a Japanese 3G mobile system proposal to ITU-R, a wireless telecommunication standardization body under the United Nations. Second generation (2G) mobile systems were independently designed in Japan, US, Europe and brought to ITU-R to be granted as global standard. ITU-R made a true global mobile standard concept called IMT-2000 and called for proposals. Japanese industry tried to submit our own proposal to make it as a basis for IMT-2000.

Through the negotiation with Europe, we have come to the agreement that it is better to make a new forum, named as 3GPP, by industry and submit a common proposal to ITU-R from each country attending 3GPP. With this way, actual technical discussions are done in 3GPP, but still get authorization by ITU-R. The main reason to establish 3GPP was decision making is much faster in 3GPP since each delegate represents a company, while decision making is tend to be slow in ITU-R where each delegate represents a country. Company decisions are much faster than country decisions. The change of the proposal making scheme by 3GPP is illustrated in Fig.1

Actually, technology evolution became much faster after 3GPP establishment. Like 3GPP, a new standard organization establishment is quite often considered in making a new standard when existing standardization body does not fit to the purpose.

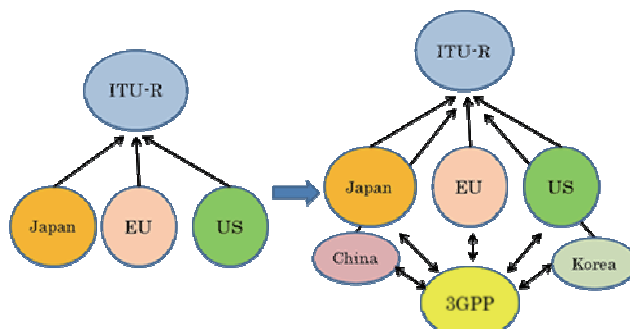


Fig. 1 Change of ITU-R proposal procedure by 3GPP

Establishing a new standardization body is somewhat similar to make a new company. Everything related to a new organization, such as budget, membership, technical policy, operation rules, and so on, should be determined from scratch. In such a case, only basic principles are determined at first and details are determined and modified while running the organization.

I was involved as a technical expert and did not contributed much about organizational matters, but still I could feel the excitement and difficulties in making a new organization. Also, people involved became creative to make the system better, since everybody understood that the system is premature. Spending some period within such a creative organization provides quite useful experience.

Large companies sometimes make a new organization. It is quite different from a new standardization body, however, since rules, mechanism to run the organizations are given from the beginning. In standard activity, you may have a chance to establish a new organization together with your competitor, which is quite interesting.

2.2 Experience as a chairman

In 3GPP, I was elected as a first chairman of radio group, which gave me a quite interesting experience. 3GPP rules are based on European decision style, trying to get consensus as much as possible. This European style matched with my personal style well.

In general, chairmen should be neutral. At the same time chairmen belongs to a company, which has its own strategy. Balancing the company strategy and chairmanship is the difficult task for a chairman. I did not suffer this difficulty so much, since my company policy was to fix the standard specification as soon as possible to satisfy Japanese market demands, which was shared by many companies. In my case, lack of

knowledge on European style standardization rule was the difficulty. Also, premature organization sometimes had problem. But as I mentioned above, effort trying to overcome such a problem by proposing a mechanism was a fun.

In most standard meetings, there are key persons who lead discussions by mentioning reasonable opinions and trying to summarize discussions. Such key person opinions are important for a chairman, especially on critical subjects. Also for key person side, opinion of the chairman is important. Quite naturally, chairman and key persons discuss frequently during the coffee break or lunch time. What is called “key person group” is naturally formed as meetings are repeated. Joining in this key person group is very important for members attending standard meetings, since most of the important decisions are made in this key person group discussion. If you are a chairperson, you can automatically a member of key person group, but it is not easy to be a chairman since it sometimes requires political power. If you are a normal standard delegate, you should try to be a member of key person group by actively joining the discussion.

3. What you can learn through standardization

Through standardization activities, engineers can learn a lot of important skills necessary for high level businessmen. Normally engineers engaged in the new technology attend the standardization meetings, since deep and intensive discussion are essential to make a new technical standard. In actual standardization activity, however, many different capabilities other than engineering are required.

The first capability is the debate and negotiation. It is essential to explain the mechanism of the new technology and get others convinced. Compared with academic presentations, the standard discussion requires much tough debate to get others convinced. Negotiation capability is another important skill in standardization. It is rare that everybody agree with your proposal simply from technical reason. Normally, there are conflicting proposals or modifications to your proposal from the business background.

Deep understanding of the company policy is another required capability. In order to get consensus, it is often required to get compromise with other people. If you are representing a company, you need to consult to your boss if it has a large business influence. If it is within your responsibility, you need to judge by yourself. If you understand your company business strategy, your decisions are basically right to the company, even if there is a small difference. Also it is important to capture to what extent the opponents will compromise. When you are asked your company opinion, how smoothly you can respond is an important point to be regarded as a key person.

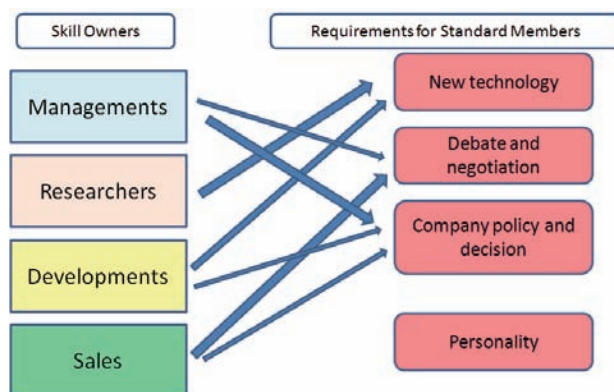


Fig. 2 Necessary skills for standard and owners

Since people want to talk with a person who like, personality whether you are trusted, reasonable person is also an important factor. Figure 2 summarizes the required capability as a standard delegate. The expertise required for standardization is held by several different business section people in the company. The width of the arrows indicates the strength of the relationship. Once a standard delegate obtains all capabilities necessary for standardization, it means he has quite broad business capabilities.

Since the standard work requires high skills, it is difficult to replace established standard experts by other people. Standard delegates tend to stay in the same job for several decades as a result.

I believe that standard delegates should have job rotation (around 5 years) than staying in the same position for a long period. Capabilities obtained through standard activity are important for high level businessmen. Companies should consider standard activity as an education tool to make businessmen who can work in global business.

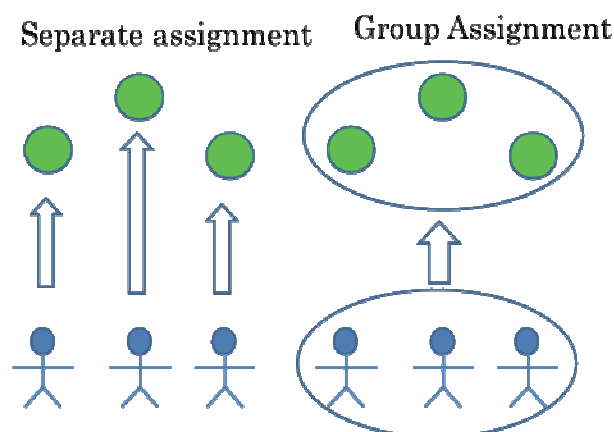


Fig. 3 Job assignment style to standard delegates

On the other hand, changing standard delegates have some risk to a company, since it takes at least about one year for a new delegate to be able to actively work in the standard meetings. If only one delegate is attending the meeting, the activity of the company is down during the transition period. Figure 3 shows job assignment scheme to avoid such a transition activity down. If three persons are assigned to standard work, they should work as a

group, instead of individual. Normally there are three standard items exist if three persons are assigned. They should share information even main responsibility is assigned to each person. Members should exchange information such as progress, technology, and so on. If such a group is formed, other delegates can support a new delegate when someone is replaced.

4. How to enjoy the standardization activity

In this section, I will discuss about behaviors of standard delegates.

4.1 Time unlimited job

Standard work is not a 9 am to 5 pm work. Standard delegates come from different region of the world, each having different time basis. If there is a teleconferencing, it can be anytime of the day. Performance of the standard delegates should be measured by the output, not by working hours. You should manage your time by yourself and try to maximize the efficiency of the work.

Preparation to the standard meeting is almost as important as the meeting itself. Before the meeting week, standard delegate should collect information about other company activities, exchange opinions with key members, and make up company decisions. Normally, international teleconferencing is used for that purpose. If Asia, Europe and US members are included, such teleconference take place around midnight in Asia. There is no limit about preparation effort. Standard delegates should consider the efficient use of time, considering their own health and family relations.

Time management is also important during the standard meeting. Standard meetings are normally held several consecutive days. It seems that many people consider attending the meeting and listening to the discussion is the job. Through my observation, I found that key persons sometimes leave the meeting room while discussion is going. Outside of the meeting room, they are discussing with other key persons about the conclusion of the important topic for them. Not all the topics are important for everybody. Key persons judge important topics from the agenda and try to progress important topics, using discussion time on non-important topics for them. This is also an example of time management.

4.2 Positive Conversation

Standardization meetings make decisions through discussion. Conversation is essential to standardization. For a delegate newly assigned to standardization, talking with many people is essential to let you be known by others. Asking questions during the coffee break is the easiest way to have conversation with others. As for official talk during the meeting, submitting a contribution and present it, is the most popular way to start. Trying to talk with various people from the first day you attend the meeting is important, since your mind tend to shrink if you do not speak with others several days.



Fig. 4 Coffee break conversations

Figure 4 shows typical situation at coffee break. People are talking each other everywhere. Some talks are serious, some are just enjoying conversation.

4.3 Enjoyable job

As I have explained above, standardization is a quite tough in interesting work. Also, standardization is a enjoyable work. Normally standard meetings are held in various countries in the world, to provide equal chance of easy attendance to each member. As a result, standard delegates have chances to visit many countries. Normally, each company has its own rule to do sightseeing when employees visit some country on business. I encourage, especially to young delegates, to do sightseeing within the rule. Knowing many countries expand your global personality.

Another important aspect, perhaps more important than sightseeing, is making friends. You have a high chance to make friends globally, since you will meet with same person many times. I encourage standard delegates to go to dinner with delegates from other countries, apart from business dinner. Over the dinner, you will talk many things, like education, marriage, politics, economical situation, religion, food and so on. Through such conversation, you will learn other cultures and reconfirm your identity in the world, normally a Japanese identity if you have a Japanese nationality. Also you will find yourself that you need to learn more about the home country to explain to others. Views on global subjects, such as presidential election, riot in some countries, or Euro crisis are also a good topic to discuss. You will know the background information which is not reported in your home country. Through such experience, your personality will become richer.

5. Concluding remark

I have explained various aspects which standard delegates can experience. Standard work is a tough, useful, interesting and enjoyable work. Also for industry, standardization is a good training to bring up high level businessmen. I hope young engineers who read this article are interested in standard work.

Research Areas and Trends in Next Generation Fixed and Mobile Networks



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1. Introduction

With the development of wireless mobile communication technologies, ubiquitous networking will be a reality in the near future. To ensure the success of ubiquitous networking, it is important to construct a next generation network, which is envisioned as a huge aggregate of heterogeneous networks; cellular, mobile, satellite, and ad hoc networks are all converged on to a high-speed wired backbone network using the Internet Protocol (IP). Providing seamless connection, satisfying user requirements for Quality of Service (QoS), and increasing energy efficiency are big challenges in next generation networks. We introduce here a part of our wide scope of research.

2. Fiber-Wireless Networks

In order to satisfy increasing Internet access demands, Fiber Wireless (FiWi) access networks, which integrate Passive Optical Networks (PON) and Wireless Local Area Network (WLAN) as shown in Fig. 1, have attracted much attention. FiWi access networks can offer wide coverage and wide capacity communication because of their wireless and optical network features. However, since each network works independently in FiWi access networks, a novel mechanism to connect them seamlessly is indispensable [1]. Therefore, we focus on QoS and energy efficiency in FiWi access networks.

2.1. Novel QoS Control

Mobile users require many different types of network applications, e.g., web browsing, video streaming, and Voice over IP. As the number of mobile users increases and multimedia services become more popular, the amount of traffic passing through both PON and WLAN also dramatically increases. In such environments, QoS control is one of the most important issues. In order to provide comfortable IT communications, the efficiency of QoS control will significantly affect users' QoS. As an example of QoS control schemes in FiWi access networks, Dynamic Bandwidth Allocation (DBA) in PON and HCF Controlled Channel Access (HCCA) are expected to provide the users' QoS accurately. However, since there are some gaps in the QoS control policy of each

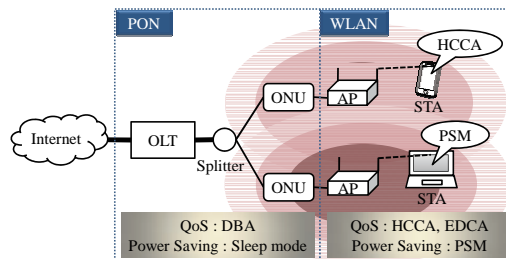


Fig. 1 FiWi access network

network, a coordination technique for different QoS control schemes is necessary to improve the system performance and the users' QoS satisfaction. Therefore, we attempt to propose an efficient QoS control technique for FiWi access networks.

2.2. Smart FiWi

Due to the growth of the number of users and the amount of data being transmitted, the energy consumption for communications increases substantially. Therefore, it is one of the most important research directions to achieve energy efficiency in the Information and Communications Technology (ICT) industry. In order to realize environmental friendly networks, energy-efficient technologies are essential. In FiWi access networks, there are two main power saving mechanisms, namely, Power Saving Mode (PSM) and Optical Network Unit (ONU) sleep. PSM works in wireless networks, and ONU sleep works in optical networks. These two mechanisms work independently in FiWi access networks. Since both PSM and ONU sleep turn off the node's transmission device to save energy, the latency becomes longer and the throughput of the network decreases. Therefore, taking into account this relationship between the energy efficiency and the latency is essential when discussing energy efficiency in these networks. Thus, we focus on the impact of PSM and ONU sleep on throughput and energy consumption. Furthermore, we analyze both the energy consumption and the throughput in FiWi access networks.

3. Next Generation Satellite Networks

Recently, Non-Geostationary Earth Orbit (NGEO) satellite networks have gained research attention. Since

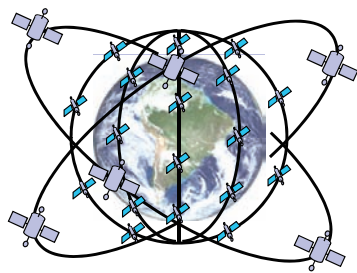


Fig. 2 Multi-layered satellite network

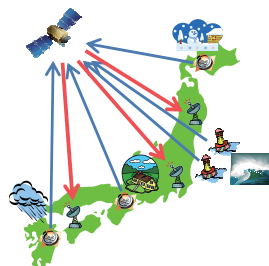


Fig. 3 Satellite-routed sensor system

they offer many features, e.g., extensive coverage, disaster-resistance, and efficient power consumption, they are considered as a good candidate for providing global communication services [2]. Moreover, Multi-Layered Satellite Networks (MLSNs), which consist of layered NGEOSatellite networks as shown in Fig. 2, have attracted much attention since they achieve excellent load distribution through bypassing traffic from the lower layer to the upper layer.

3.1. Downlink Traffic Distribution in LEO/MEO Two-Layered Satellite Networks

In order to use MLSNs efficiently, it is important to consider the issue of controlling the traffic route. In existing route control methods for MLSNs, traffic is detoured in Low Earth Orbit (LEO) layer or between LEO layer and Medium Earth Orbit (MEO) layer. It is possible to avoid congestion at LEO-LEO links by using existing route control methods. However, the existing methods cannot avoid the congestion at LEO-ground links. For example, when a LEO satellite covers the area where satellites are highly utilized, such as disaster area, a high amount of traffic is transmitted to this LEO satellite and congestion occurs at this LEO-ground link. In order to solve this problem, we introduce a new link as a detour pass and propose a novel route control method. The new link is a MEO-ground link. By using such links, traffic can be transmitted to destination without going through LEO satellite covering the destination. Additionally, we propose the route control method by considering congested situation. In this method, traffic is detoured sufficiently to avoid congestion at LEO-ground links.

3.2. Delay-Based Traffic Distribution for MLSNs

There is a possibility that traffic congestion may exist at a satellite in the upper layer because each satellite in the upper layer usually covers more than one satellite in lower layers in MLSNs. To cope with the above

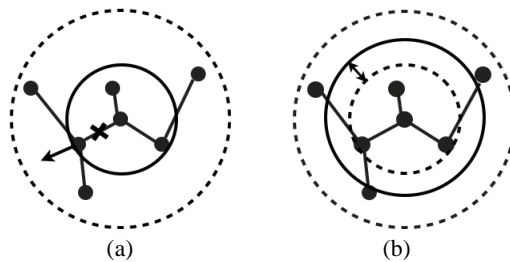


Fig. 4 Transmission range adjustment

mentioned issue, we consider a method to distribute packets flow in a MLSN model in which the coverage areas of some MEO satellites are overlapped. We consider the utilization of such overlapped areas in our traffic distribution method. In our proposed model, LEO satellites, which lie in the overlapped area, are able to communicate with more than one MEO satellite. Therefore, traffic from a congested LEO satellite can be distributed to more than one MEO satellite in order to avoid traffic congestion.

3.3. Network for Satellite-Routed Sensor System

Satellite-routed sensor system as shown in Fig. 3 is expected to be used as early disaster detection systems. The networks efficiently provide data collected from wide areas with small sensor terminals and satellites. In this system, each sensor terminal collects and sends data to monitoring stations on the ground via satellites. Although the future major disaster detection systems require high capacity to manage numerous sensor terminals, it is difficult to collect data from a large number of sensor terminals simultaneously since the bandwidth of each satellite is limited. Hence, an efficient system to allocate the bandwidth to each sensor terminal is necessary. Moreover, for early disaster detection, the real-time performance is very important. Therefore, we focus on an appropriate bandwidth allocation model to construct a next generation satellite-routed sensor system while considering the real-time performance. In the new model, we particularly focus on the relationship between throughput of each sensor terminal and real-time performance, and we introduce a method to allocate the bandwidth.

4. Wireless Ad Hoc Networks

4.1. Topology Control in MANET

Many topology control algorithms have been researched for static networks, e.g., sensor and ad hoc networks. Topology control has been considered to reduce power consumption and collisions by using minimum transmission range for each node while maintaining a certain level of network connectivity. In static networks which are constructed by fixed nodes, it is not necessary to change topology frequently. However, in Mobile Ad Hoc Networks (MANETs), nodes can move anytime in any direction. Thus, topology information needs to be updated frequently and appropriately according to nodes' moving speed to maintain the connectivity.

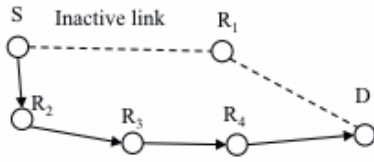


Fig. 5 Traditional power-aware routing

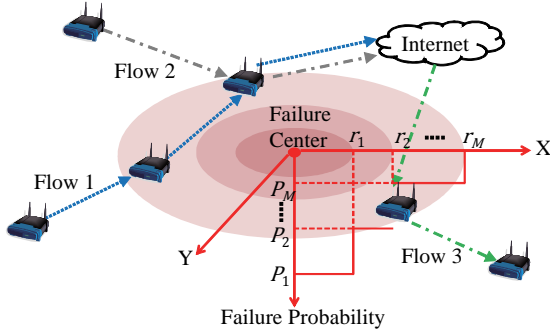


Fig. 6 Region failure model

Topology control for static networks adjusts nodes' transmission range which is set to the distance between the center and the farthest node. However, those methods do not consider the moving speed of the farthest node which will move out of range soon if it moves in the opposite direction (Fig. 4). In our method, each node calculates its optimal transmission range according to the mobility information of its neighbors and determines the update interval. Our method can maintain local connectivity which results in maintaining global network connectivity in spite of the mobile networks [3].

4.2. Power-Aware Routing

Many operations such as disaster relief or surveillance operations are carried out in situations without network infrastructure. Wireless ad hoc networks are a robust solution that allows nodes to organize themselves into a network without the need for infrastructure support. Furthermore, in the absence of infrastructure it is difficult to have centralized Medium Access Control (MAC), therefore decentralized carrier sense approaches is more practical to realize. However, carrier sense approaches are prone to collisions and interferences. Energy consumption is a very important issue for battery-powered wireless ad hoc networks. Also, since the share of energy consumption attributed to communications is larger than the computation costs, many researchers have investigated power-aware routing for wireless ad hoc networks. Therefore, in this research we focus on the transmission distance that minimizes the energy consumption in wireless ad hoc networks [4].

Based on the energy used for a single successful transmission, short transmission distances are more energy efficient, early research in this topic advocated the use of short distance transmissions. However, short transmission distances increase the probability of collision. Thus, a trade-off relationship exists between using many short-hop transmissions, and a single long-

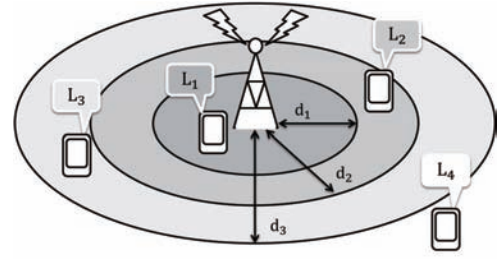


Fig. 7 Message replication in DTN

hop transmission. This is illustrated in Fig. 5. A contemporary transmissions scheme would opt for the path that goes through R2. However, this path has many relay nodes and will have a higher probability of collision. In this research, we consider the transmission distance that minimizes the energy consumption of a wireless ad hoc network while considering the effect of collisions.

4.3. Network Vulnerability under Region Failures

Since wireless networks in an open environment are exposed to various large region threats, e.g., natural disasters and malicious attacks, proactive evaluation of network reliability against network failures becomes essential for the design and maintenance of future highly survivable wireless mesh networks. Available works with regard to region failures generally adopt a kind of "deterministic" failure models. However, real physical attacks or natural disasters, rarely have a deterministic nature, where the probability that a network component is affected by an attack depends on various factors, e.g., the distance from the attack center to the component, the topography of the area around the component, and the component's specifications. We first provide a more general "probabilistic" region failure model, as shown in Fig. 6, to capture the key features of a region failure and apply it for the reliability assessment of wireless mesh networks. We further develop a theoretical framework to estimate the expected flow capacity degradation from a random region failure such that a specified estimation error requirement is satisfied. This study helps us understand the network reliability under a region failure and facilitates the design and maintenance of future highly survivable wireless networks [5].

5. Delay- and Disruption-Tolerant Networks

Delay- and Disruption-Tolerant Network (DTN) is a promising solution which allows us to communicate with each other even in areas having shortage of base stations. In DTNs, source users who are outside of the base stations' coverage can transfer their messages to one of the base stations by relaying to other users. In fact, the communications performance largely depends on the employed routing scheme which determines the signature of message distribution, especially the redundancy by replicating. Additionally, the delivery ratio of every user is different according to the location where they create messages because base station is stable and users' mobility is unpredictable.

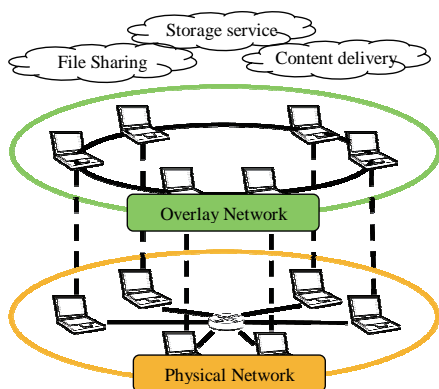


Fig. 8 P2P network

Therefore, we proposed a new efficient routing scheme which limits the number of replicas of the original message according to the distance between the source node and its nearest base station (Fig. 7). Our routing scheme can improve not only the message delivery ratio but also the fairness of the message delivery ratio between users by decreasing the number of replicas of users being near to a base station and increasing the one of users being far from a base station. Our routing scheme improves the selection of the replication number for each user while considering their situation and environment.

6. Peer to Peer Network Tolerant to Failures

Peer to Peer (P2P) networks have been widely applied to file sharing, storage service, content delivery network, and so forth (Fig. 8) [6,7]. Hierarchical unstructured peer-to-peer networks have made a tremendous achievement as practical networks recently, because they can be tolerant to node departure. However, it has been revealed that they are vulnerable to attacks such as Denial of Service (DoS) and computer virus since they follow the power-law degree distribution. To cope with this issue, we focus on bimodal degree distribution which is proposed as a degree distribution tolerant to both attack and node departure in complex network theory discipline. In comparison with power-law degree distribution, it is difficult to construct a network following the bimodal degree distribution because it is required to keep the degree of nodes constant under the dynamics of node participation and departure. It would be interesting to reveal the relationship between the degree distribution and data distribution method including coding method in the future.

7. Dynamic Load Distribution over Multipath Networks

Following the increase in popularity of multimedia and real-time applications which are commonly known to be sensitive to delay, demands for network infrastructure in providing high-speed high-quality network services able to support them have been continuously growing. Moreover, with the exponential growth of data usage, mobile data offloading is

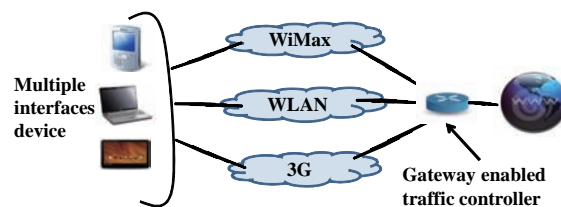


Fig. 9 Load balancing over multiple paths

currently the most viable solution for operators to alleviate network congestion quickly, and adequately meet the capacity needs of their mobile broadband customers.

In order to maximize high quality network services at high speed under a delay constraint, effective exploitation of network resources, provided by multiple interfaces available on today devices, is critical in facilitating parallel connections through multiple paths. These are achieved mainly through bandwidth aggregation and network-load balancing (Fig. 9) [8]. However, inefficient load distribution among paths may cause many problems, e.g., packet reordering and load imbalance, which can occur when loads are improperly assigned on paths with respect to their capacity. Such problems degrade the network performance, thus degrade the required QoS. In this research, we focus on alleviating these issues by performing efficient load distribution for an adequate utilization of the multiple available paths, crucial for multimedia data transmission and real-time applications [9].

8. Network for Smart Grid

In recent years, research attention on Micro Grid (MG) network comprising distributed power generators has increased (Fig. 10) [10,11]. To produce electricity, many MGs exploit renewable energy sources, e.g., wind farm, solar panel, PHEVs, and so on. Because the production capacity of renewable resources cannot be controlled, MGs often require power plants to provide energy, and the power loss between each MG and the power plant is larger than that between the MGs. The power loss issue involving the MGs and/or the individual MGs and the Macro Station (MS) has been intensively explored in literatures.

To alleviate this power loss, we propose that the MGs in the same MS can effectively form coalitions by using cooperative game theory. Our proposal allows the MGs to autonomously cooperate and self-organize into a partition composed of disjoint MG coalitions. Also, our proposed algorithm enables the MGs, in a distributed manner, to decide whether they will remain in the coalitions or not upon environmental changes, e.g., the variation of the power demand of the MGs. Within every coalition, MGs coordinate the power transfer among themselves as well as with the MS in a fashion to optimize a utility function, which captures the total loss over the power distribution lines. MGs in the same coalition will distribute the extra profits (i.e., payoff) produced from forming coalitions by their

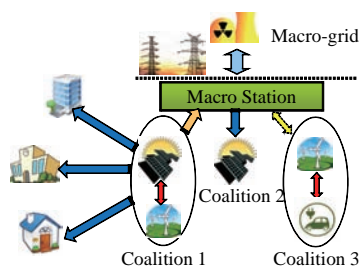


Fig. 10 Smart grid

“Shapley value”. Through simulations, we demonstrate that the proposed algorithm reduces the average power loss per MG significantly in contrast with the conventional non-cooperative approach.

9. Wireless Mesh Networks for Disaster Recovery

The wireless mesh network (WMN) has already been admitted as an alternative technology for last-mile broadband Internet access. In order to improve the performance of WMNs, a number of works have been done from both academic and industry points of view, which leads to great development of the networks in specific areas. However, most of the works are not suitable for unique scenarios such as disaster where the Access Points (APs) or Mesh Routers (MRs) are unstable due to earthquake, typhoon, and so forth. After an event of disaster, the existing communications infrastructure maybe damaged or completely destroyed. Moreover, the demand of using communications services increases significantly. Therefore, it is necessary to develop new strategies to deploy the WMN with high performance in disaster areas.

9.1. Movable and Deployable Resource Unit Based Network Structure

After the great earthquake on March 11, 2011, Japanese government focuses more on projects related to disaster recovery. One of the projects we are involved with, “The research and development on the reconfigurable communication resource unit for disaster recovery” attempts to build a resilient network based on Movable and Deployable Resource Units (MDRUs). An MDRU is designed to accommodate processing servers, storage servers, and Internet connectivity. Moreover, it can be rapidly transported to the disaster areas and then configure a resilient network to provide Internet connectivity to ICT devices in disaster zones. Prior to disaster, the MDRU can be rapidly transported to the disaster areas. Upon arriving, MDRU will configure the resilient network by using remaining infrastructure.

Fig. 11 illustrates a considered MDRU-based infrastructure. Here, we divided the network into three hierarchies. The top hierarchy is MDRU located at the center of the WMN. It establishes connections with the gateways by using quasi-millimeter wave band. The middle hierarchy comprises of Mesh Routers (MRs), which make up the backbone network with 802.11a. The bottom hierarchy consists of Mesh Clients (MCs),

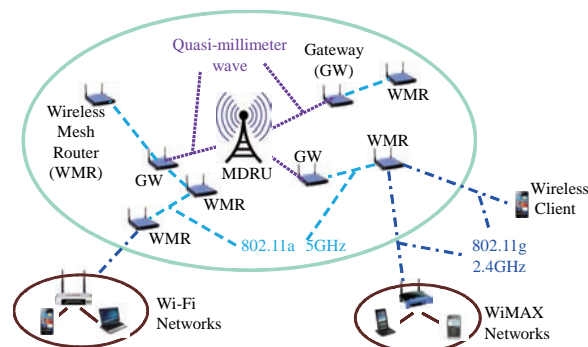


Fig. 11 An example of MDRU based network

which communicate with the MRs by 802.11g.

9.2. Access Points Selection

Due to the unique characteristic that we plan to rely on existing wireless APs to act as MRs, it is likely that MRs do not have optimized devices placement. Therefore, the number of operating MRs plays an important role in determining the performance of the overall network. This is because MR is a device that operates as both the wireless mesh backbone node and as wireless AP. Consequently, it may either cripple the network performance due to the additional interference or increase the capacity of the network. Thus, it is necessary that the set of operating MRs should be selected from the set of available MRs to improve the performance in addition to preserving connectivity.

9.3. Gateway Selection

In disaster areas, we would like to quickly recover network communication and ensure high performance for the WMN. However, the network performance is affected by many factors, like the location of MRs, channel assignment, and so forth. In particular, the problem of gateway selection significantly influences the network throughput capacity. Selecting different MR as the gateway will lead to different throughput capacity. We take into account the gateway selection problem to efficiently select the optimal MR as the gateway, in order to maximize the network throughput capacity with high accuracy and low computation complexity.

9.4. Channel Assignment

Channel assignment is a major research problem in WMNs [12]. By using multiple channels, we can reduce the interference influences and improve the network throughput. We have conducted some experiments with a simple channel assignment method, which is a network partitioning method, to verify the advantages of using multiple channels. The preliminary results show that utilizing multiple channels gives a significantly higher network throughput. There have been many researches on channel assignment. However, a method that is specifically suitable for disaster recovery has not been focused on. Therefore, a novel channel assignment scheme that satisfies the requirements of the disaster recovery network will be one of our objectives in the future work.



Fig. 12 Fifth straight victory in Ekiden championship

10. Welcome to our laboratory

By envisioning the new age research challenges emerging in the new millennium, our lab was established in 2003. Featuring a wide spectrum of nationalities, we have around 30 students. Almost half of students are foreigners, who represent the USA, China, Bangladesh, Thailand, Brazil, Venezuela, Korea, Indonesia, Egypt, Bahrain, and so on. We are proud to be one of the most active research groups in Japan in terms of publishing quality papers in prestigious international journals with high impact factors, and a large amount of papers in prestigious conferences, as summarized in Table 1. Our lab has set unprecedented examples in the highest level. Numerous awards and grants received by the lab members speak for our phenomenal performance over the last ten years. In international conferences such as IEEE WCNC'12, IEEE Globecom'10, ACM IWCMC'09, IC-NIDC'09, and Wimob'08, we received the best paper awards.

Our lab has enjoyed a proud tradition of excelling in sports and other extra-curricular activities. We do emphasize on maintaining great communications between staffs and students, and among students as well. So far, our lab has won Ekiden championship (a marathon competition where teams of 10 people participate over a 10 km running course) for a phenomenal record of five consecutive years (Fig. 12). Besides Ekiden, we have earned numerous successes in other events as well, including championships in soccer, volleyball, and baseball tournaments. This shows the remarkable interaction amongst Japanese and foreign students both in and out of the laboratory activities. We are looking forward to welcome you to our lab [13].

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Table 1 Publications as of Oct. 2012.

IEICE Transactions	25
IEEE Transactions / Journals	35
IEEE Magazines	8
IEEE Communications Surveys and Tutorials	1
IEEE Conferences	
INFOCOM	4
ICC / GLOBECOM	38
WCNC / PIMRC / HPSR	15

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Advanced and Collaborative ICT research in Europe by the Telecommunications Research Laboratory of Toshiba

Shinichi Baba

Telecommunications Research Laboratory,
Toshiba Research Europe Limited



1. Introduction

The Telecommunications Research Laboratory (TRL) [1] of Toshiba Europe Research Limited (TREL) was established in Bristol, United Kingdom in 1998 as Toshiba's second research and development (R&D) center in UK. The Bristol region has a long association with high technology such as steam boat manufacturing in the nineteenth century and the aircraft industries in the twentieth century. In this environment, TREL-TRL was engaged to undertake advanced studies in Information and Communication Technologies (ICT), especially wireless technologies including high speed wireless communication systems, cognitive radio and so on from their beginning. Recently, smart community and other ICT applications for the social infrastructure system have gained much attention from society and so have become important research subjects for us. Collaboration is an important enabler for us to conduct such advanced research in Europe, since there are many sophisticated research resources there and an efficient exploitation of them is vital for the success of R&D.

In this short note, I would like to describe the effect of such collaborative research in Europe after the brief introduction of the laboratory in the next section. Then, the 3e-Houses project will be introduced as an example of valuable collaboration in a European project with a short summary at the end.



Fig. 1 External view of TREL-TRL
TRL (in the building behind the trees) faces the green of Queen Square in the heart of Bristol.

2. Laboratory in Bristol

Since its establishment, the laboratory has been at the cutting edge of research into technologies for the next-generation of communication technologies, especially wireless technologies such as cellular, wireless local and personal area networks, smart technologies and reconfigurable device architectures. We engaged in multi-antenna technology research in the early 2000s and achieved several demonstrations of high speed wireless systems. Cognitive radio is another challenging research subject and our research has enabled devices to adapt continuously to their environment to optimize the communications experience.

Recently, communication technologies also play a role in shaping our use of energy in our homes, offices and communities. The smart community is a community augmented by pervasive, wireless, continuous communication between not just people but also appliances, machines and infrastructure. One example is the Smart Grid. This is a new way of employing communications technology in the electrical power system with the objective of improving efficiency, enhancing service quality and reducing cost. Machine-to-machine (M2M) wireless networks are a core technology to realize the smart grid and our studies enhance its reliability, power efficiency and so on, which define the value of the system.

The research environment in Bristol is nurturing and successful because of the existence of sophisticated academia, high-level technology industries and its people, who have a culture of embracing advanced technologies. This supports our aggressive research very well. One of the best examples is our close relationships and collaborations with the University of Bristol (UoB). We can extend our research capability through collaborative research, commissioned research or other projects with UoB that can create many opportunities to make new growing technology clear in its value to us and extend the existing R&D subject with the new viewpoint from a different angle.

3. Collaboration within EU community

In addition to collaboration with UoB, an important part of what we do is partnering with other research organizations across Europe. The benefits of

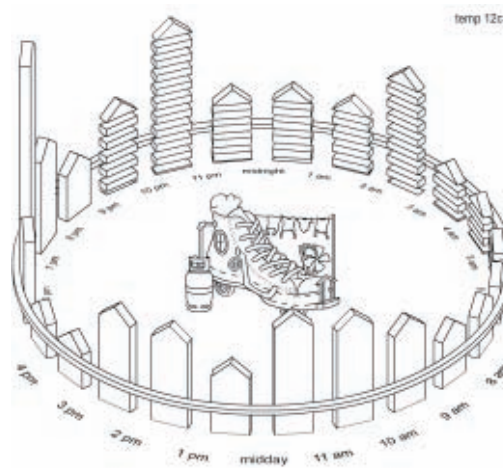
collaboration are manifold. We gain from different points of view and expertise, and participate in defining the latest research trends. Partnering allows us to engage in higher risk research by sharing the risk with others. Researchers work with their peers from leading research laboratories across Europe to challenge the limits of telecommunications. The experience gained as a result shapes our research capability so that we can continue to challenge ever higher targets. In Europe, there is a scheme to encourage us to work with others: R&D funding programs from the EU. We have taken part in such projects since our foundation and have an established successful track record of participation in projects attracting key funding from the EU. These projects are defining the future standards for information and technologies in communications.

Many EU R&D projects involve developing a pilot or prototype system in order to demonstrate the value of the technology researched. That really provides a useful sight toward our ultimate goal: to pursue a way to deploy the technology into society in a way that adds value and worth to the society. In the following section, I would like to introduce one of our examples of such cases.

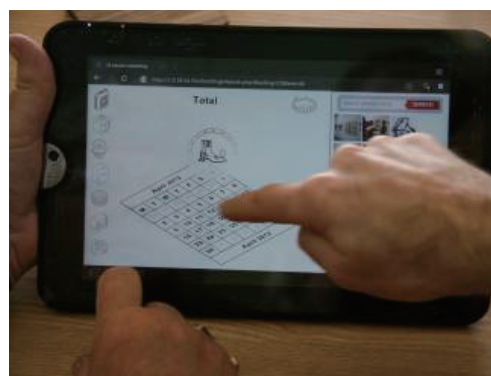
4. 3e-Houses Project [2]

3e-Houses is a European project with the main goal to involve customers in the energy system through ICT, allowing them to develop or enhance their relationship with the utility for saving energy. This will be achieved by piloting, in many social housing buildings, the interaction between smart devices and the users (being tenants, promoters and utilities) to create, initially, awareness around their energy consumption and therefore a change in their energy-use behavior.

In this project, TREL-TRL cooperates with Bristol City Council (BCC) and other pan-European partners, and implemented the latest smart plugs and switches into one hundred social houses in order to record the energy consumption of each house. We designed the pilot system and supported its deployment and the necessary user education needed for them to know what they could do. One year since joining this project, we are now collecting the data from each house. Each engaged household has a tablet terminal which has an application to show energy consumption in real time. As the project goes on, the information displayed on the tablet evolves (as designed) so that we can study the effects on the energy saving behavior of the resident as a result of the feedback information they receive. As a result, we will find more effective ways of providing energy consumption information to households in order to positively influence their energy saving behavior. Our participation in this project has highlighted the persuasive power of research which is supported by demonstration in the actual community. This cannot be accomplished without a deep mutual trust for collaboration between BCC, the local municipal, and us, which is grown by the tangible and intangible support of the European collaborative project.



(a) Example of energy consumption plot



(b) Using the tablet interface

Fig. 2 Energy Footprint Tablet Interface

5. Summary

In this short note, as an ICT related R&D laboratory in the UK, our view on the collaborative research activity in Europe was briefly introduced. Specifically, there is an excellent research environment in Europe, where high risk advanced and fundamental research can be encouraged by collaboration supported with the help of collaborative European projects. Leveraged by this efficient means, our research shall be kept at the global cutting edge.

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A Chance to Be at Center of Innovation

Boonsarn Pitakdumrongkija
Green Platform Research Laboratories, NEC Corporation



1. Introduction

First of all, I would like to express my gratitude towards the editor for giving me the opportunity to share my experiences about research and life in Japan with the readers of IEICE-CS GLOBAL NEWSLETTER. In this letter, I will talk about my journey since I came to Japan in 2002 to pursue my post-graduate study. I will highlight my important experiences which help shaping my thinking into a more mature and innovation enthusiastic researcher today. Also, I will share with the readers, what I consider as difficulties for foreigners to live and work in Japan, so that it may be helpful for those who are thinking about coming and for those who are providing study and work places for foreigners.

2. Post-graduate student life

I finished my Bachelor's degree in my home country, Thailand, from Sirindhorn International Institute of Technology Thammasat University in March, 2002. Then, I came to Japan under the Japanese Ministry of Education, Culture, Sports, Science, and Technology (MEXT) scholarship to continue my post-graduate study at Tokyo Institute of Technology [1]. I was in the laboratory of Professor Hiroshi Suzuki and Associate Professor Kazuhiko Fukawa [2] from April, 2002 to March, 2009. There, I was able to conduct research related to signal processing in mobile communications. During my Master's degree, I conducted research on single sideband QPSK and as one of my achievements, published my research results in IEEE VTC-2005 Spring in Stockholm. During my Doctor's degree, I conducted research on linear precoding with minimum BER criterion for MIMO-OFDM system and published the results in IEEE ICC-2007 in Glasgow and IEEE ICC-2008 in Beijing. Besides the mentioned international conferences, I also attended many domestic conferences organized by IEICE.

2.1 Important experiences

(1) *A chance to understand what is the purpose of research and what does a researcher do.* After I finished my Bachelor's degree in Thailand, I still did not have a clear picture of what is research and what a researcher does. Coming to Japan to continue my post-graduate study greatly helped me understand that. This is because the post-graduate study in Japan is research-oriented and it is taught through hand-on experiences. This means I had to start doing research from day-one, even though I still did not fully understand what I have to do. However, through my professors' advises and

helps from the colleagues in the laboratory, I gradually learned the way of research, and finally understand that research is a process of finding an answer to an unanswered question. And with the answer and the method I used to achieve that answer, I could contribute to the advancement of technology, which one day, could be developed further into real-world applications to make people's lives better.

(2) *A chance to stay close to the rapid-changing world of technologies.* First, by just staying in the laboratory, I could learn about what is going on related to my research field through many resources available in the laboratory. For example, using the laboratory's account, I could access many on-line conference and journal databases. Also, the laboratory held a weekly seminar, which had its members taking turn to present research done by other universities or companies. Second, by participating in an activity that is a collaboration between different laboratories, I could broaden my understanding about the mobile communication industry. In my university case, the collaboration is in the form of having a joint-seminar between laboratories that have different expertise but all are involving with the mobile communication industry. This way I could learn about other fields such as software-defined radio, antenna and propagation. Third, by attending domestic and international conferences, I could get the latest update on mobile communication industry from presentations by both universities and companies.

(3) *A chance for a career opportunity.* By meeting and talking with many people when attending the conferences, I could gradually get the picture of how the people in the mobile communication industry work together, and in which area I can contribute. With that knowledge, I could effectively express what I may be able to contribute to a company at the job interview.

2.2 Difficulties for foreigners

(1) *A language barrier.* This refers to the university as a whole rather than one individual laboratory. Although I mentioned before that the post-graduate study in Japan is research-oriented, some course-works are still required to graduate. In this aspect, I felt that the university still offered very small number of courses in English. This leads to foreign students shying away from the course, even though it was a very interesting and useful for their research.

(2) *A difference between student's and professor's fundamental expectation towards post-graduate study.* In my opinion, I think this difference arises from

different cultures. In my case, I came to Japan with the expectation that my professor would have all the plans laid out for me to ensure that my post-graduate study goes smoothly. However, in reality, my professor expected me to craft such a plan by myself with him being in a supporting role rather than a boss. This realization finally came to me after I came to Japan and had struggled with my research for some time.

3. Corporate life

I joined NEC [3] in April, 2009 after finishing one-year term post-doctoral research at Tokyo Institute of Technology. Since entering NEC, I have always been in Wireless Access Network Technology Group, which is one of the research divisions in NEC Central Research Laboratories [4]. I was tasked with developing key technologies for 3GPP LTE-Advanced standard, especially those related to relay. My main responsibilities are to investigate technical issues about relay, develop solutions, and file patents to strengthen company's intellectual property right portfolio in the 3GPP standardization activities. Also, my job requires me to work with the development division in order to ensure that the development and transfer of technologies are inline with product lineup strategy.

3.1 Important experiences

(1) *A chance to participate in standardization activities.* Since my job requirement includes creating key technologies for 3GPP LTE-Advanced standard, I had a great opportunity to learn what is standardization and how it is important. I learned that since the mobile communication business has become a global business, it is necessary to make a product can be used anywhere. This is where standardization plays an important role, because standardization is a process where all players in mobile communication business come together to define a set of rules that is needed to ensure the products made by different people can work with each other. Therefore, in order to protect NEC interest and ensure that the standard is inline with the business strategy, there is a necessity to actively engage in such activities. The key to success here, therefore requires not only strong technologies but also the ability to see ahead what majority in the standardization wants and how to deliver a proposal that can steer them to agree upon. I, myself, am fortunate enough to be able to learn those skills from a group of more-experienced standardization delegates in the company.

(2) *A chance to put priority on customer value when conducting research.* This is where I feel is the most different aspect between conducting research in a company and in a university. And it is also the most important and necessary factor to ensure the success and the survival of the company. The consideration about customer value starts from drafting the research plan. Here, the situation of the customer is carefully analyzed to identify what is the problem that bothers the customer the most. Then, the research plan is created with the goal to deliver the solution to that problem. From the research division point of view, the customer refers to the business division in the same

company that delivers products or services to the outside customer, and it also refers to the outside customer of that business division as well. Through daily activities in the company, I have learned that the key to succeed in research is to have a well-understanding about the needs of the business division and its customer, and deliver the results that go beyond their expectations.

3.2 Difficulties for foreigners

(1) *A language barrier at job recruitment.* This refers to the job recruitment in Japan as a whole rather than at any one individual company. When I was job-hunting, I noticed that there was very small number of job fairs that opened exclusively for recruiting foreigners. Moreover, the number of companies that attended such job fairs was very limited. This leads to foreigners, who may have difficulty in getting influence with Japanese language but have a great potential to contribute, giving up on finding job in Japan. However, it has been more than 3 years since my last experience with job-hunting, and I feel that the situation has improved gradually. Now, I see the number of job fairs and companies recruiting foreigners increasing each year.

(2) *A very unique job recruiting timeline.* Again, this refers to the job recruitment in Japan. I remember that I was very surprised when I saw my seniors in the first year of Master's degree started job hunting half a year before they entered their second year (Master's degree usually takes 2 years in Japan). I finally found out that the job recruitment timeline here usually recruits students about one year before they graduate. This is very different from my home country where companies start recruiting process when students are about half-way through their last year. I feel that this timeline may put tremendous pressure on some foreign students who wish to work in Japan after they graduate. This is because those students, for example Master's degree students, just arrive in Japan for only half a year and they have to start hunting for job already, while they are still adapting to various things. This could lead to some students are unable to effectively concentrate on both research in the university and job hunting.

4. Conclusion remarks

Personally, I think coming to Japan to study and work is a very useful and pleasant experience. As I have mentioned, my times in the university and company have brought me many wonderful chances that help me to become more mature and more professional. Of course, there would always be some difficulties along the way. But I also think that they are necessary to help you appreciate the good times better. Finally, I hope that this letter could be helpful to those who are seeking information about study and work in Japan. And I wish you all the successes.

5. Further readings

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My Precious Memories in Japan

Saher UMER

Japan Advanced Institute of Science and Technology (JAIST)



1. Introduction

First, Many thanks to the editor of IEICE-CS GLOBAL NEWSLETTER, for providing me such a great platform to express my pleasant experience in Japan. I have never thought that I could write an article. Regarding my brief introduction, my name is Saher Umer from Pakistan. I joined JAIST (Japan Advanced Institute of Science and Technology), school of information science, under the supervision of Associate Professor Azman Osman LIM, in October 2011 as a Doctor student. Have coming to Japan is my first time to be abroad, let's have some flash back, starting from the first day in Japan. As a start of my new life, I experienced critical but memorable events which have strong impact on my life. Some of them are pleasant but some came with sufferings. All of them are precious memories for me. Coming to Japan is a world away from anything I had experienced before.

2. Critical events

From the time when I entered in the University for Graduation in Pakistan, I wanted to be a part of an organization where I could learn the new technologies and could work to my full potential to prove myself as an asset to that organization. After graduation, I had an opportunity to teach in the same institute and started teaching. But, my keen interest for learning new ideas, when combined with my inner desire to reach a degree of excellence in every piece of work I performed, enabled me to acquire significant knowledge on various aspects of nature and technology, as well as lead me through a successful educational career. My eagerness towards research topics got more and more specific, and my excitement to go deeper and deeper into my subject of interest to discover new ideas. At last, I came to Japan to fulfill my dreams and appeared in entrance exam on 31st August 2011 came and left my job. As a start of my new life, I experienced some critical but memorable events which have strong impact on my life. When, I came to Japan everything was very strange for me. As there is a communication gap between Japanese and foreigners; the same barrier I faced at that time. But, I was lucky that my supervisor was able to speak English very well. After one week, I received my result of entrance exam and I acknowledged that I failed to get scholarship for PhD. At that time I was depressed and had only two options to avail; either to join PhD with empty hands and to make my destiny by my own or go back to Pakistan

and found a new job and left behind my dream of higher studies. At that time, I was restless and there was no way out.

3. Life as Challenge

After thinking day and night, I took life as a challenge for me and joined JAIST as a regular student. In first six months, I struggled very hard as a research assistant and got some ambition. I did not know what was happening in my life and what would happen after that but I kept going. I did not have any idea what to do but I was not hopeless. Meanwhile, I was searching and applying for scholarships for different organizations. I continued living in spite of many trials which were coming in my way. I knew that all of those were just obstacles in my life that I must be eradicated in order to pursue. At that time I was appreciating all of those things and supposed that everything would be alright until end. At last, I got the news that I was selected for the Japanese Government Scholarship “Monbukagakusho”. Thanks to the Japanese Government because now I am able to study and can enjoy life in Japan which is my greatest desire.

4. Research life in Laboratory

During my daily life, I like to spend most of my time in my laboratory to know much about the environment and to improve myself accordingly. My research focuses on stability analysis for home energy management system (HEMS). HEMS often encounter unexpectedly high energy consumed level. The HEMS needs to continuously balance the energy available and consumed energy for reliable energy delivery across the appliances.



Fig. 1 IEICE Society conference, Toyama 2012

Throughout my first year of doctor studies, I have published two papers in national conference with entitled “Lyapunov stability analysis for intelligent home energy management system” in IEICE society conference, Toyama University, Toyama and “Lyapunov stability analysis of energy constraints for intelligent home energy management system” in IEICE USN conference, Fukuoka University, Fukuoka 2012. The objectives of my research are (a) to model and design the optimized HEMS model under the constraints of energy for multiple home appliances; (b) to enable real-time measurement of the energy imbalance via the Smart Meter implementation and propose an energy-aware stability scheme in considering the issues of energy and delay constraints; and (c) to evaluate and verify the performance of the proposed stability scheme by computer simulation.

5. Gratifying Life in Japan

Besides my campus life, I enjoyed visiting to Sendai, Toyama, Kyoto, Tokyo, and now planning to go to Fukuoka to explore beauties of Japan.



Fig. 2 Michinoku Park in Sendai

I never missed any event of Ishikawa prefecture like Jonkara dance, New year celebration, Wearing Yukata event, Hanabi, Rice cake making event and many places of Ishikawa prefecture including water fall around JAIST, kenrokuen Garden, Ishikawa insect meuseum, Shishiku Park etc.



Fig. 3 Wearing Yukata Event

In my opinion, a sense of community can be engendered between Japanese people and foreigners through regular meals, sports activities and social gatherings. Outside of university life, food was often on my mind. Among incredible number of Japanese food, the most delicious dishes that I ever tried are Okonomiyaki, Takoyaki, Japanese sweets and rice cracker. I have learned the process of making these things.



Fig. 4 Jonkara Dance Festival, Nomi City

Moreover, my pleasures of enjoying snow fall for the very first time in my life in Japan. Now I have a great focus to learn Japanese language for better survival. One of the most astonishing aspect of Japan is the kind people of Ishikawa prefecture. They are generous towards foreigners and I think people are the strength of any Nation towards success and achievements. So, this factor is the basic inspiration for me.



Fig. 5 The beauty of snow

6. Concluding Remarks

Writing this article has been a good opportunity for me to look back my life in Japan. I hope that it would be useful for those who are planning to develop their career and want to go abroad for higher studies but do not have enough resources to fulfill their desire. There are always obstacles in our way going to success but it does not matter how long it would be. We should continue our journey in life until we reach the pinnacle of success, and faith is one of the key to demolish this entire blockage in life.

Report on 8th International Symposium on Communication Systems, Networks and Digital Signal Processing

Mariusz Głąbowski
Poznan University of Technology



1. Introduction

The International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP 2012) was held at Poznan University of Technology, Poznań, Poland, July 18-20, 2012.

CSNDSP is recognised as a forum for the exchange of ideas among engineers, scientists and young researchers from all over the world on advances in communication systems, communications networks, digital signal processing and other related areas and provides a focus for future research and developments.

This was the eighth biennial conference of this series. The conference was held for the first time in Eastern Europe and for the third time outside Great Britain (previous conferences were hosted by Greece and Austria).

The sponsors of the conference were: The Institute of Electronics, Information and Communication

Engineers (IEICE), IEICE Communications Society, IEICE Europe Section, The Institute of Electrical and Electronics Engineers (IEEE), IEEE UK&RI Section, IEEE Photonic Society (Poland), IEEE Communication Society Poland (Chapter Poznan, Chapter Kraków), The Institution of Engineering and Technology (IET), INEA S.A., The European Association for Signal Processing, Poznan University of Technology, Polish Association of Telecommunication Engineers, and Soft Motors.

The conference started with opening speeches by the chair of CSNDSP2012, Prof. Mariusz Głąbowski and the Dean of Faculty of Electronics and Telecommunications of Poznan University of Technology, Prof. Paweł Szulakiewicz. The conference was officially opened by the chair of CSNDSP Steering Committee, Prof. Zabih Ghassemlooy.



Fig. 1 Opening session:

(from the left) CSNDSP Steering Committee Members: Prof. Erich Leitgeb (Graz University of Technology, Austria) and Prof. Michael D. Logothetis (University of Patras, Greece);

CSNDSP Steering Committee Chair: Prof. Zabih Ghassemlooy (Northumbria University, UK);

Dean of the Faculty of Electronics and Telecommunications, Prof. Paweł Szulakiewicz (Poznan University of Technology, Poland)

Local chair: Prof. Mariusz Głąbowski (Poznan University of Technology, Poland); Technical chair: Dr. Piotr Zwierzykowski (Poznan University of Technology, Poland)

2. Statistics of paper submission

The CSNDSP2012 received a large number of papers, 241 submissions, from 41 countries. 174 papers were accepted. The structure of papers submission is presented below.

Region	Authors	%
Europe, Middle East, Africa	431	75.9
Asia/Pacific	121	21.3
United States	8	1.4
Latin America	6	1.1
Canada	2	0.4

Each paper was reviewed by at least two independent reviewers and the authors were given the opportunity to respond to the reviewers' comments, revise and resubmit their paper. All the accepted and presented papers are published in the IEEE Xplore.

3. The conference program

The CSNDSP, except for the main track, also included three colloquiums on:

- Satellite and Space Communications,
 - Photonic Communications Systems and Networks,
 - Optical Wireless Communications,
- and a tutorial on Overview of Survivability and Fault Management in Optical Networks.

The programme included internationally known keynote speakers presenting overviews of current research in topical areas:

- Prof. Izzat Darwazeh from University College London, UK
- Dr. Frank Deicke from Fraunhofer Institute for Photonic Microsystems, Dresden, Germany
- Dr. Haris Gacanin from Alcatel-Lucent Bell N.V., Antwerp, Belgium
- Prof. Maciej Stasiak from Poznan University of Technology, Poznan, Poland
- Prof. Zhengyuan Xu from Tsinghua University, Beijing, China

The CSNDSP2012 conference also included special sessions organized by experts in the field, i.e. :

- Antenna Technology for Satellites and Terrestrial Wireless Systems
- Chaos in Communication Systems
- Complex Networks in Signal Processing and Communication Systems
- Emerging Technologies for Secure, Intelligent, and Energy-Efficient Optical
- Communication Networks
- Next Generation Wireless LANs
- Resilient Optical and Wireless Networks Design
- Routing Algorithms and Optimization Techniques in Packet Networks
- Signal and Image Processing Systems and Techniques for Medical Monitoring and Diagnosis: New Developments and Applications

- Teletraffic Models, Traffic Engineering and Network Optimization

4. IEICE Panel discussion

The CSNDSP conference also organised the plenary panel session entitled "Theoretical and practical aspects of research and development activities". Prof. Mariusz Głabowski from Poznan University of Technology was the moderator for the panel session, while the panelists included:

- Dr. Haris Gacanin, the chair of Europe Section of IEICE (Alcatel-Lucent Bell N.V., Antwerp, Belgium)
- Monika Grajzer (Telcordia, Poznan, Poland)
- Bartosz Musznicki (INEA S.A, Poznan, Poland).

The panel session was well attended by both PhD students and research workers of Poznan University of Technology.

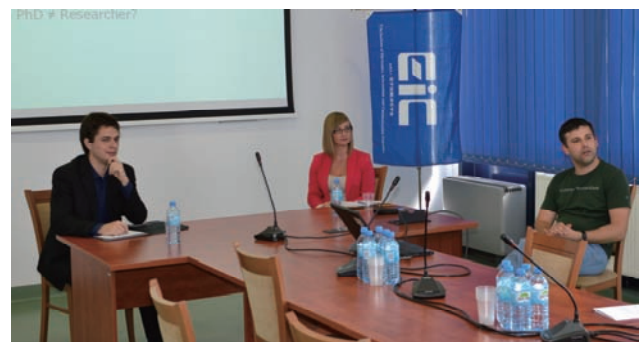


Fig. 2 IEICE Panelists: Bartosz Musznicki, Monika Grajzer, Haris Gacanin

5. Awards and grants

One of the basic objectives of the CSNDSP conference is to provide a platform for young scientists from developing countries to present their ideas and work. This year, young participants of the conference were granted two registration waivers and eight travel grants. The CSNDSP 2012 Chairs awarded two equivalent Best Paper Awards:

- Nicolas K. Fontaine, Ryan P. Scott, David J. Geisler, and S. J. B. Yoo: Dynamic Optical Arbitrary Waveform Generation and Measurement to Increase the Flexibility, Fidelity and Bandwidth of Optical Networks
- Joon-Yong Lee, Chang Kyeong Kim, Dong-Woo Ha, Seun Sangodoyin, Ruiqing Dong: UWB Propagation Measurements in BAN Scenarios

6. Conclusions

On behalf of the Local Organizing Committee I would like to thank all the authors, the Steering Committee members, Technical Program Committee members and the reviewers for their contribution to the success of CSNDSP2012.

I would also like to thank IEICE and INEA S.A. for their financial sponsorship which ensured that the CSNDSP 2012 conference was open not only to the authors of the accepted papers and registered participants, but also to all students interested in information and communication technology.

Report of the Symposium on Network Virtualization 2012 and AsiaFI Network Virtualization Workshop

Toru Hasegawa^{*}, Akihiro Nakao^{**} and Yasuo Okabe^{***}

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^{**}NICT/ITRC/The University of Tokyo, ^{***}Kyoto University



1. Introduction

While the Internet has become indispensable social infrastructure for supporting our social and economic activities, its various issues have been also addressed in the areas of security, availability, robustness, etc. It is necessary to innovative information and communication infrastructure in order to enable platforms to deliver communication services that meet constantly changing requirements and demands from users.

Advanced network virtualization is the key to realizing such ICT infrastructure and is expected to enable coexistence of multiple customized networks, prompt delivery of innovative network functionalities, programmable network within isolated resources, stable operation and management of massive ICT systems, extension of cloud computing to networking, and secure service infrastructure.

Accordingly, the Symposium on Network Virtualization 2012 and the AsiaFI Network Virtualization Workshop took place in Kyoto University, jointly sponsored by National Institute of Information and Communications Technology (NICT), JSPS 163rd Committee on Internet Technology (ITRC), Network Virtualization Working Group, IEICE Technical committee on Network Virtualization and Kyoto University. These events were collocated with the Asian Network Symposium 2012.

The purposes of the symposium on Network Virtualization 2012 are to focus the virtualization technology that is one of core technologies for the new generation networks, and to promote international research collaboration.

The organizing co-chairs, Dr. Hiroshi Imase (NICT), Prof. Yasuo Okabe and Dr. Toru Hasegawa (KDDI R&D Laboratories Inc.), organized the symposium. The members of organizing committee are Prof. Akihiro Nakao (NICT/ITRC/The University of Tokyo), Mr. Toshiaki Suzuki (Hitachi Central Research Laboratory), Dr. Osamu Akashi (NTT Network Innovation Laboratories), Mr. Masaki Fukushima (KDDI R&D Laboratories Inc.) and Dr. Takaya Miyazawa (NICT). The program chair is Prof. Akihiro Nakao (NICT/ITRC/The University of Tokyo). The members of program committee are Prof. Ryoichi Shinkuma (Kyoto University) and the members of

organizing committee. 82 researchers, engineers and other experts from academia or industry attended the symposium and had fruitful discussion.

The AsiaFI (Future Internet) Network Virtualization Workshop was held to motivate young researchers to do research on network virtualization. Six papers were presented and 50 researchers and engineers attended the workshop.



Fig. 1 Conference Room of the Symposium and the Workshop

2. The Symposium on Network Virtualization 2012

The symposium consisted of two key note speeches and eleven invited talks by speakers from Japan and the US. They covered the recent research activities on network virtualization and the directions of researches.



Fig. 2 Keynote speech: Dr. Chip Elliott

Dr. Chip Elliott gave us a keynote speech entitled “GENI: Exploring Networks of the Future”. Prof. Tomonori Aoyama (NICT/Keio University) did a keynote speech entitled “Promoting Phase 2 R&D on NWGN”.



Fig. 3 Keynote speech: Prof. Tomonori Aoyama

Distinguished researchers were invited from the US and Japan. Each of them gave us a talk about the recent research results in his area of expertise.

The following eleven invited talks were given:

- 1) Dr. Rick McGeer (HP Labs), “InstaGENI and GENICloud: An Architecture for a Scalable Testbed”
- 2) Prof. Andy Bavier (Princeton University), “Merging PlanetLab and the Cloud”
- 3) Dr. Ilia Baldine, RENCI, “ExoGENI: A Multi-Domain Infrastructure-as-a-Service Testbed”
- 4) Prof. Shinji Shimojo (Osaka University/NICT), “Evolution of Future Internet Testbed: Experiences in JGN-X”
- 5) Prof. Robert Ricci (University of Utah), “Designing a Federated Testbed as a Distributed System”
- 6) Dr. Atsushi Takahara (NTT Network Innovation Laboratories), “Network virtualization and application : A new look of networking”
- 7) Prof. Akihiro Nakao (NICT/ITRC/The University of Tokyo), “Deeply Programmable Network (DPN) Enabled by Advanced Network Virtualization”
- 8) Dr. Hiroaki Harai (NICT), “Network Virtualization and Innovative Network Service Research in Japan”
- 9) Dr. Toru Hasegawa (KDDI R&D Laboratories, Inc.), “Network Platform for Providing Programmability over Virtualized Networks”
- 10) Mr. Yoshiaki Kiriha (NEC), “SDN Vision for Social Cloud Infrastructure”
- 11) Mr. Toshiaki Tarui (HITACHI, Ltd., Central Research Laboratory), “Development of VNode Federation Mechanism to Support non-IP Data Communication”

Among the eleven speakers, the two of them, Dr. Ilia Baldine and Prof. Robert Ricci, did a presentation remotely. The symposium consisted of four technical sessions chaired by Prof. Akihiro Nakao (The University of Tokyo), Dr. Atsushi Takahara (NTT), Mr. Hiroshi Mano (Yamanashi University) and Mr. Toshiaki Suzuki (Hitachi).

3. The Asia FI Network Virtualization Workshop

The Asia FI Network Virtualization workshop aimed at cultivating students’ and young researchers’ motivation for doing researches on network virtualization and also timely dissemination of researches in this research field. The topics of submitted papers include:

- Network virtualization architecture for enabling multiple customized networks
- Innovative applications based on network virtualization
- Platforms for fusion of computing and networking
- Operation and management of integrated multi-layer networks and network virtualization
- Resources monitoring for network virtualization
- Cloud computing and networking
- Data Center Networking
- Operating systems and network virtualization
- Security for network virtualization and secure services
- Testbeds for above technologies and experimental results

The papers were submitted from Japan and China and the following six accepted papers were presented on August 23rd.

- 1) Hamid Farhadi, Akihiro Nakao (Univ. of Tokyo), “Security Services as Software Defined Network APIs”
- 2) Hitoshi Yabusaki, Daisuke Matsubara (Hitachi), “Clustered Candidate Path (CCP) Algorithm for Higher Scalability in Virtual Networks”
- 3) Takaya Miyazawa, Hideaki Furukawa, Hiroaki Harai (NICT), “A Proposal for Software-Defined Circuit-Switched Networking on Optical Packet and Circuit Integrated Networks”
- 4) Pingping Lin, Jun Bi, Hongyu Hu (Tsinghua University), “Designing a Virtualization Cloud Platform for Network Applications in SDN Intra-domain Production Network”
- 5) Kenji Fujikawa, Yasunaga Kobari, Hiroaki Harai (NICT), “Automatic Construction of Mini Data Center and Wide Area Network using Virtual Machines and Virtual Routers”
- 6) Yohei Katayama, Kazuhisa Yamada (NTT), Takehito Yamamoto (NTT Bizlink), Akihiro Nakao (Univ. of Tokyo), “Slice Extension of Network Infrastructure into Virtualization-enabled Terminal Device”

The workshop consisted of two technical sessions chaired by Dr. Rick McGeer (HP Labs) and Prof. Andy Bavier (Princeton University).

4. Conclusion

We would like to give a special thanks to all speakers, all participants, all committee members, secretaries, and staffs for their hard work, and to all financial sponsors. Following this successful symposium, we are planning an even more successful symposium next year.

Report on the 2012 International WDN Workshop on Cooperative and Heterogeneous Networks (WDN-CN2012)

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1. Introduction

The 2012 International Wireless Distributed Network (WDN) Workshop on Cooperative and Heterogeneous Networks (WDN-CN2012) was held in conjunction with IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC 2012), on 9 September 2012, at Sheraton on the Park in Sydney, Australia [1]. This workshop is co-sponsored by IEEE Comsoc Japan Chapter and IEICE-CS. The previous WDN workshops were held in Cannes France in 2008, Tokyo Japan in 2009, Istanbul Turkey in 2010, and Toronto Canada in 2011 [2] respectively. Especially, the workshop of this year was a joint workshop with another group of Future Heterogeneous Networks [3].

2. Scope and Objectives

In the last decade, telecommunication has experienced a tremendous success causing proliferation of new applications which have increased the demand for both cellular and ubiquitous heterogeneous broadband mobile wireless networks. However, traditional cellular network is not capable of accommodating huge amount of high data traffic users. It furthermore suffers from the so-called cell-edge problem where users at the cell borders are subject to low throughput due to pathloss and diverse propagation conditions to multiple cells yielding co-channel interference. To address these issues, coordinated multi-point (CoMP) transmission/reception and heterogeneous networks (HetNET) play a key role for future cellular networks. In the CoMP technique, adjacent cells coordinate to transmit towards cell-edge users to solve the cell-edge problem. On the other hand, deployment of heterogeneity in the network is seen as one of the most promising solutions to support the increasing data traffic demand, offloading macrocell traffic, reducing the carbon footprint, and lowering operators OPEX/CAPEX expenditures. Future CoMP and HetNET are based on the idea of deploying short-range, low-power and low-cost base stations and encompass a mix of cell types, such as micro, pico, femto cells as well as advanced wireless relays and distributed antennas.

In the past, the WDN has been investigating fundamental theories and technologies for realizing future wireless network applications. This year, with the aid of the past outcomes, WDN-CN2012 aims to

focus and specify topics on the cellular network design aspects in terms of CoMP and HetNET.

3. Overview of WDN-CN2012

The workshop venue of WDN-CN2012 was Sydney, which is the gateway city of Australia and the capital of New South Wales. The city is located around one of the most beautiful harbors of the worlds and along miles of golden surfing beaches which stretch north and south of the city on the shore of the Pacific Ocean. Many national parks and protected areas of natural bushland surround the city and the beautiful Blue Mountains are a short journey to the west. The most famous of Sydney's landmarks is the spectacular Sydney Opera House with its graceful 'sails' (Fig. 1). The Opera House has become Sydney's cultural center, offering opera, ballet, drama and film.

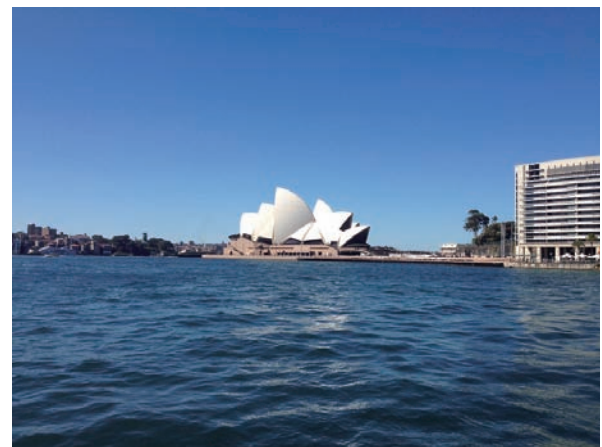


Fig. 1 Sydney Opera House

WDN-CN2012 is a full-day workshop which is divided into four sessions including 10 oral presentations, 3 invited talks and finalized by a panel discussion. In the opening, Prof. Kei Sakaguchi from Osaka University, Japan (Fig. 2(d)), the general co-chair of the workshop, briefly explained the scope of WDN-CN2012, introduced the program, the panelist and also called for cooperation toward the proposal of the next workshop in conjunction with PIMRC2013 to be held in London.

In the first invited talk, Dr. Yongxing Zhou from Huawei, P.R. China (Fig. 2(b)) talked about "Amorphous Heterogeneous Networks". The speaker is the LTE standard leader and the leader of the CoMP task group in Huawei. In the talk, he introduced a new

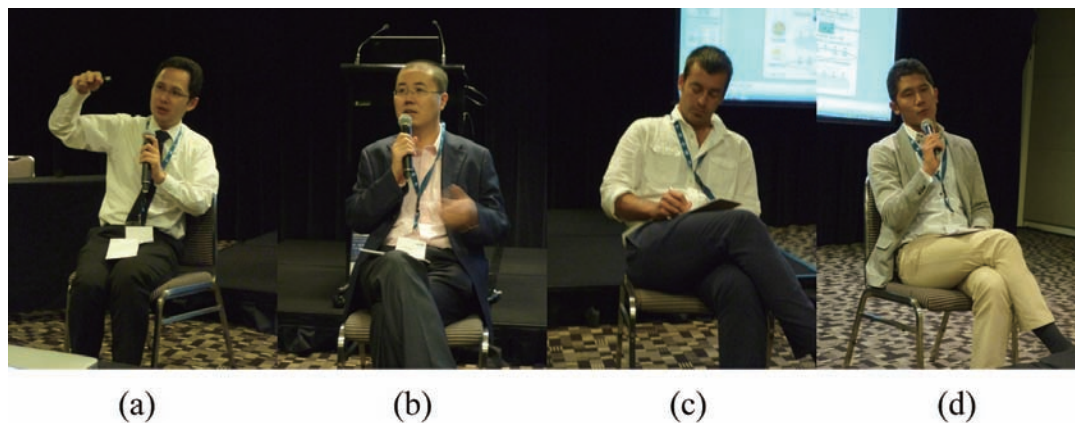


Fig. 2 The panelist (a) Mr. Satoshi Nagata (*NTT DOCOMO, INC. Japan*) (b) Dr. Yongxing Zhou (*Huawei, P.R. China*) (c) Dr. Emilio Calvanese Strinati (*CEA-LETI, France*) (d) Prof. Kei Sakaguchi (*Osaka Univ., Japan*)

concept called amorphous heterogeneous networks (ANET) in which the picocell shape is amorphous at any layer of the protocol stack, e.g. control channel, traffic channel etc. The speaker showed that ANET at PHY layer can provide a more than 30% throughput gain compared to conventional LTE scheme and suggested future evolution of ANET.

In the second invited talk, Dr. Emilio Calvanese Strinati from CEA-LETI, France (Fig. 2(c)) talked about “Green Heterogeneous Networks”. The speaker showed another aspect of designing HetNET which should match the offered and demanded capacity for achieving energy saving gain. He mentioned that conventional HetNET are designed for satisfying peak rates, thus fluctuations in rate demands result in energy wastage. The speaker also introduced several techniques to realize the future green HetNET e.g. adaptive power amplifier, bandwidth adaptation, antenna muting, cell zooming, inter-cell cooperation etc.

The third invited talk was given by Mr. Satoshi Nagata from NTT DOCOMO, Japan (Fig. 2(a)) with title “Cooperative and Heterogeneous Networks in 3GPP LTE Release 11 and Beyond”. The speaker is the LTE standard leader in NTT DOCOMO, and currently the vice-chair of 3GPP RAN1. The speaker introduced about the CoMP and HetNET techniques considered in 3GPP LTE Release 11 and then focused the viewpoint of NTT DOCOMO of future HetNET. He proposed a concept called phantom cell in which the cell size can be adaptively changed without the notice of UE. This concept is rather similar to the ANET of Huawei.

After the last invited talk, a panel discussion with topic “Future trend of cooperative and heterogeneous cellular networks: research, standardization, and industrial perspective” was organized and moderated by Prof. Iain Collings from CSIRO, Australia. The panelist included the three invited speakers and Prof. Kei Sakaguchi (Fig. 2). First, each member of the panelist gave a presentation on their perspective about the topic. Prof. Sakaguchi indicated that the future CoMP and HetNET should include Cloud RAN (C-RAN) with overlapped architecture, CoMP HetNET combination, and dynamic cell formation. The other

speakers further emphasized on their proposed techniques mentioned in the invited talks i.e. ANET, offer-demand rate matching HetNET for power saving and phantom cell. Under the moderation of Prof. Iain Collings, the panelist received many questions from the floor, many of which were related to the implementation cost, energy consumption and practicality of CoMP and HetNET technologies. Prof. Seiichi Sampei from Osaka University, Japan raised an important question about the requirement for latency guarantee for M2M and D2D applications while introducing these advanced techniques. The panelist agreed on the point that the future backhaul for cellular networks should be carefully designed to overcome this challenge.

Finally, Prof. Iain Collings expressed gratitude to the committee members for their efforts and closed the workshop. A petit party was held that night by Prof. Shinsuke Ibi from Osaka University, Japan in a bar close to the conference venue with the attendance of not only presenters, committee members but also audiences of the workshop.



Fig. 3 Workshop audiences

Information URL

- [1] <http://www.icwdn.org/>
- [2] <https://sites.google.com/a/icwdn.org/wdn2011/wdn2011>
- [3] <http://hetnet.i2r.a-star.edu.sg/>

Report on 16th ICIN (ICIN2012)

Osamu Mizuno
Kogakuin University



1. Introduction

In 1989, “The International Conference on Intelligent Networks (ICIN)” was launched to discuss not only technical aspects of intelligent networks but also business aspects among telecoms, vendors, and academics from mainly Europe, America, and Asia/Oceania.

Since intelligent networks has commercialized, the main topics of ICIN are shifting to “intelligence” of Information Communication Technologies (ICT) including IP-telecom convergence, and Next Generation Networks. Therefore, “ICIN” is not an appropriate acronym today.

2. Conference Overview

ICIN has been held 15 times almost every year or every 18 months in European cities. The 16th ICIN (ICIN 2012) was held from October 8 to 10, 2012 at Park-inn Alexander-platz in Berlin, Germany.

ICIN 2012 was organized by the non-profit organization, ICIN Event Inc. and supported by IEEE COMSOC and major standardization organizations including ITU-T, ETSI, and 3GPP. The IEICE Communication Society cooperated with ICIN and major technical societies in Europe. Almost 100 people from Germany, France, Sweden, U.K., Italia, U.S., China, Japan and other countries attend the conference.

3. Topics of ICIN2012

Keynote Speeches

ICIN 2012 reserved one day for keynote speeches (Fig. 1).

The keynote speeches on topics such as standardization, information industry, and vendor and telecom’s viewpoint.

From Japan, Dr. Minoru Etoh (NTT DOCOMO) was invited as a keynote speaker. He introduced the East Japan Earthquakes in 2011 and shown disaster prevention and mitigation technologies from various points of views.

The other speeches were as follows;

- Luis Jorge Romero (ETSI) mentioned importance of cooperation of standardization organizations toward M2M era.
- Markus Hofmann (Alcatel-Lucent Bell Labs) introduced cloud load balancing using ALTO(Application Level Traffic Optimization).

In addition, following two keynotes have presented from partner organizations/companies;

- “OSS and BSS: Driving Radical Change” by Beauford Atwater (Ericsson)
- “Self-Organization in Heterogeneous Wireless Networks” by Henning Sanneck (Nokia Siemens Networks)

Technical Session

There were 9 technical sessions, and 29 papers were presented. Two sessions ran simultaneously, one concerning technical aspects the other concerning business/service aspects.

Five papers were from Japan: three from NTT and others were from Fujitsu and Kogakuin University. Especially, Amemiya (Fujitsu) proposed traffic control method depending on user context. Kataoka (NTT) proposed new service system called “Sightfinder”, which navigates way to disable-users with voice applying AR and recognize technologies. Those two papers expect new services in cloud era, therefore, they won the best paper award. Other Japanese papers are very high-quality. I’d like to express our gratitude to these authors and their companies for supporting the ICIN conference.

Many papers discussed telecom-based technologies/services including service enabler, service models, identity management etc. For business point of view, policy based services, regulation aspects are discussed.

Impressible trends at ICIN 2012 were cloud computing and its applications. Papers from many organizations proposed cloud-based services and systems at not only cloud computing session, but also at other sessions.

Especially, panel session entitled “Is cloud security ready for mission critical application?” was held as the last session (Fig. 2). In this panel, various aspects of security issues on cloud services are discussed.

Poster and Demonstration Session

Four papers were presented during the poster sessions. During poster session, the committee required a demonstration (Fig. 3).

End user configuration, data transmission for mobile enterprise service, monitoring and abstraction for clouds network, and data mining were demonstrated.

Tutorials and Workshops

The tutorial sessions, “Towards a Converged M2M Service Platform: Motivation, Standards and Applications” and “Service Control Paradigms in Future Net-

works: Client-server, P2P and Network Intelligence” were held on the first day.

Also, the workshops “MediaSync 2012 workshop”, “The 2nd ULOOP Industrial Workshop” and “Smart Home Standardisation Ecosystem workshop” were held on the last day. These workshops focused on the causes and effects of the current explosion in platforms in the mobile ICT industry.

Social Events

The welcome reception was hosted by TECHNOLOGIE STIFTUNG BERLIN. They also enjoyed the Organ Recital and the Gala dinner with delicious selection of wine and beer.

Awards

Lots of high-quality paper were submitted. So, TPC gave the best paper award to following three papers:

- “SightFinder: Enhanced Videophone Service Utilizing Media Processing” by Haruno Kataoka; Daichi Namikawa; Hiroya Minami; Michio, Shimomura; Naoki Uchida (NTT, Japan)
- “Application-Aware Traffic Control for Network-based Data Processing Services” by Kouichirou Amemiya; Kenichi Abiru; Tomohiro Ishihara (Fujitsu Laboratories, Japan)
- “Towards a User-Centric Personal Data Ecosystem - the Role of the Bank of Individuals’ Data” by Corrado Moiso; Roberto Minerva (Telecom Italia, Italy)

The best presentation awards are

- Antonio Manzalini (Telecom Italia, Italy) for “Towards Halos Networks: Ubiquitous Networking and Computing at the Edge”
- David Ludlam (formerly Marconi, UK) for “A Perspective on Regulation and Users’ Experience”

The best demonstration award is

- “Monitoring and Abstraction for Networked Clouds” by Michael Scharf (Alcatel-Lucent Bell Labs, Germany)

4. Conclusion

Programs and presentation materials can be downloaded from the ICIN site [1].

The ICIN committees would like to thank the paper authors and participants from Japan, and the IEICE Communication society for supporting ICIN conferences for long time.

The next conference, ICIN 2013, will be held on October 2013. Detail information and CFP will be able to be downloaded from the ICIN site. We welcome your participation.

References

- [1] ICIN, <http://www.icin.biz/>



Fig. 1 Keynote Speech



Fig. 2 Panel Session



Fig. 3 Poster Session



Fig. 4 The best paper winners
(Left Ms. Kataoka, Right: Mr. Amemiya. Center: Dr. Stuart Sharrock, Chairman of International Advisory Board)

Report on the 18th Asia-Pacific Conference on Communications (APCC2012)

Takashi SHIMIZU
Secretary of APCC Steering Committee



1. Introduction

The 18th Asia-Pacific Conference on Communications (APCC2012) was held from October 15 to October 17, 2012 in Jeju Island, Korea. APCC2012 was technically co-sponsored by IEICE Communications Society (IEICE-CS), Korea Information and Communications Society (KICS), China Institute of Communications (CIC) and IEEE Communications Society Asia-Pacific Board.

With the theme “Green and Smart Communications for IT Innovation”, the conference features 5 keynote addresses, 6 invited talks (named industry sessions) with 30 technical sessions and two panel sessions. It was attended by 241 researchers and engineers

2. Opening and Plenary sessions

The conference was commenced by Opening address by Prof. Jinwoo Park, the President of KICS and Welcome address by Prof. Byeong Gi Lee, the General Chair of the conference. It was followed by two congratulatory addresses by Mr. Kye Chul Lee, the Chairman of KCC (Korea Communications Commission) and by Prof. Yang Zhen, the Vice Chairman of CIC.

Two plenary sessions were organized with totally 5 keynote addresses by high-profile speakers from all over the world. The first keynote address by Prof. Tomonori Aoyama, Keio University, touched the episode when the first APCC was held in 1993. This inspiring story convinced the audiences that APCC had taken a crucial role for facilitating R&D in Asia-Pacific regions. Excellent talks by Dr. Heungnam Kim, the President of ETRI, Prof. Zhisheng Niu, Tsinghua University, Dr. James W. Hong, Senior Executive Vice

President of KT and Prof. Bijan Jabbari, George Mason University, covered a range of R&D visions, including what we will see beyond the current advance ICT society.

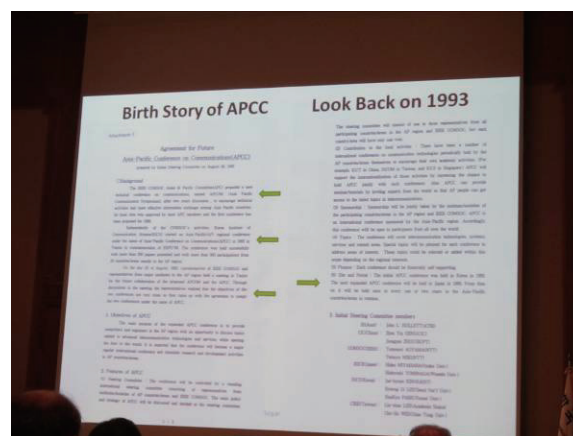


Fig. 2 The Birth story of APCC by Prof. Aoyama

3. Technical Program

The Technical Program Committee received 381 paper submissions from 30 countries and regions, and selected 205 papers for presentation by careful peer-review process, involving more than 100 professionals from 16 countries. Oral sessions were organized in 5 parallel tracks for 150 papers, and two poster sessions were organized for 55 papers. Each session was well-attended and active discussions were facilitated.



Fig. 3 Discussion at a technical session



Fig. 1 Welcome address by Prof. Byeong Gi Lee

4. APCC Best Paper Award

Each year, best papers were selected by the Award Committee in APCC Steering Committee. The members of the committee made another peer-review of the top 10 high-score papers, considering not only their technical aspects but also the impact of the works in the relevant field. Based on the average of the committee scores and the original scores, following three papers were selected.

1) “Geometric Programming for a MIMO Relaying System with Multiple Source-Destination Pairs,”

Jaesin Kim

(Agency for Defense Development, Korea)

Suil Kim

(Agency for Defense Development, Korea)



Fig. 4 Recipient of the best paper

2) “Novel Cognitive Radio Technique for Using White Space in Public Cellular Networks,”

Hiromasa Fujii (NTT DoCoMo, Inc., Japan)

Shunji Miura (NTT DOCOMO, Inc., Japan)

Hidetoshi Kayama

(DOCOMO Beijing Communications Laboratories Co., Ltd., P.R. China)



Fig. 5 Recipient of the best paper

3) “ONU Sleep Control by HGW Considering Users' Traffic Distribution for Energy-aware Access Networks,”

Hiroko Nomura (NTT, Japan)

Susumu Nishihara (NTT, Japan)

Hirofumi Ujikawa (NTT, Japan)

Masashi Tadokoro (NTT, Japan)

Takashi Yamada (NTT, Japan)

Naoto Yoshimoto (NTT, Japan)



Fig. 6 Recipient of the best paper

The award was presented by the APCC Steering Committee Chair, Professor Hyung Jin Choi, during the conference banquet on October 16. This award was sponsored by KICS, IEICE-CS, CIC and IEEE Comsoc Asia-Pacific Board.

5. Conclusion

Since 1993, APCC has been the forum for researchers and engineers in the Asia-Pacific region to present and discuss topics related to advanced information and communication technologies and services, while at the same time, opening the door to the world. APCC2012 successfully provided an excellent venue and facilitated the research collaboration in Asia-Pacific regions.

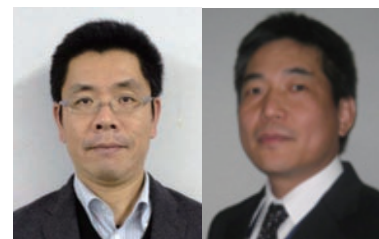
Next year, APCC2013 will be held in August, in Bali, Indonesia.

Report on 14th Asia-Pacific Network Operations and Management Symposium (APNOMS2012)

Jun Ogawa*, Makoto Takano**

* Fujitsu Limited

** NTT Corporation



1. Overview

The 14th Asia-Pacific Network Operations and Management Symposium was held from September 25 to 27, 2012 in Seoul, Korea. APNOMS 2012 was organized by the IEICE ICM Committee and The Korean Institute of Communication Science, Korea Network Operations and Management Committee (KICS KNOM). It was technically co-sponsored by IEEE Comsoc, CNOM, TeleManagement Forum, KT, Kyung Hee University, Korea Be Inspired, Korea Tourism Organization and Seoul Metropolitan Government were Supporting organizations. The past activities of APNOMS can be seen in [1]. APNOMS 2012, which is titled “Management in the Big Data & IOT Era”, consisted of four keynote speeches, one DEP session, three special sessions, four tutorial sessions, eight technical sessions, three short paper sessions and three innovation sessions. Totally nine enterprises and academic organizations actively exhibited their technologies. The overall attendances hit 183 from 5 countries.

2. Sessions and Activities

In keynote speeches, Mr. Atsushi Kitai, executive manager from NTT Comware, introduced the latest activities and the accomplishments by the TeleManagement Forum (Fig.1). Prof. Atsuhiko Goto from Institute of Information Security pointed out the emerging importance of technologies related to Inter-Cloud in his speech titled “Inter-Cloud Computing and Networking for the Secure Social Infrastructure” (Fig.2).

In the Distinguished Experts Panel session, Dr. Minoru Etoh from NTT DoCoMo, Prof. Atsuhiko Goto and three other panelists from US and Korea discussed the management in Big Data & IOT era from broad and deep perspective such as mobile, security and even the way of business.

In the tutorial sessions, cutting-edge researches for Data Center Networks were presented by Prof. Yuichi Ohsita from Osaka University.

129 papers, of which 19 papers from Japan, were submitted to APNOMS 2012 and of these 32 were presented in the technical sessions. It included 8 papers from Japan. In the short paper session, 33 papers including 8 Japanese papers were delivered as poster-style presentations. Three innovation sessions covered 17 topics including 7 from Japan. Prof. Yuuichi

Teranishi from Osaka University, Dr. Toshio Tonouchi from NEC and Dr. Toru Kobayashi from NTT were the Japanese speakers in the special sessions.

In the closing ceremony, the APNOMS 2012 organizing committee announced the top three papers with the highest overall (paper + presentation) scores from the technical session as “Best Paper Awards”. Xin Wang from Waseda University, who presented “Distributed GMPS Optical Control in Translucent Wavelength Convertible WDM Networks”, is among the winners. The other winners are Jae Yoon Chung from POSTECH in Korea and Li-Der Chu from National Central University in Taiwan.



Fig. 1 Keynote Speech by Mr. Atsushi Kitai



Fig. 2 Keynote Speech by Prof. Atsuhiko Goto

3. Conclusion

Thanks to the dedicated efforts from organizing committee and the cooperation of ICM committee members, IEICE, the fruitful discussions of APNOMS 2012 will accelerate the research of network operations and management.

The next APNOMS, organized by General Chair Dr. Makoto Takano from NTT, will be held in Hiroshima, Japan in September 2013.

4. References

- [1] <http://www.apnoms.org/>, Home page of APNOMS.

IEICE-CS Conferences Calendar

Date	Conference Name	Location	Note
01 Jul. - 05 Jul. 2013	18th OptoElectronics and Communications Conference / International Conference on Photonics in Switching 2013 (OECC/PS2013)	Kyoto, Japan	Submission deadline: 31 Jan. 2013
30 Jun. - 05 Jul. 2013	The Pacific Rim Conference on Lasers and Electro-Optics 2013 (CLEO Pacific Rim 2013)	Kyoto, Japan	Submission deadline: 31 Jan. 2013
29 May - 31 May 2013	2013 IEICE Information and Communication Technology Forum (2013 IEICE ICTF)	Sarajevo, Bosnia and Herzegovina	Submission deadline: 10 Dec. 2012
20 May - 23 May 2013	URSI Commission B 2013 International Symposium on Electromagnetic Theory (EMTS2013)	Hiroshima, Japan	To be held soon
19 Feb - 22 Feb 2013	The third ENRI International Workshop on ATM/CNS (EIWAC2013)	Tokyo, Japan	To be held soon
05 Nov. - 09 Nov. 2012	9th Asia-Pacific Symposium on Information and Telecommunication Technologies (APSITT2012)	Santiago and Valparaiso, Chile	Done
05 Nov. - 08 Nov. 2012	12th International Conference on Telecommunications for Intelligent Transport Systems (ITST2012)	Taipei, Taiwan	Done
29 Oct. - 02 Nov. 2012	2012 International Symposium on Antennas and Propagation (ISAP2012)	Nagoya, Japan	Done
15 Oct. - 17 Oct..2012	The 18th Asia-Pacific Conference on Communications (APCC2012)	Jeju Island, Korea	Reported on this issue
08 Oct. - 11 Oct. 2012	16th International Conference on Intelligence in Next Generation Networks (ICIN2012)	Berlin, Germany	Reported on this issue
25 Sep. - 27 Sep. 2012	Asia-Pacific Network Operations and Management Symposium 2012 (APNOMS 2012)	Seoul, Korea	Reported on this issue
16 Sep. 2012	Workshop in the European Conference and Exhibition on Optical Communication 2012 (ECOC2012 workshop)	Amsterdam, Nederland	Done
09 Sept. 2012	The 2012 International WDN Workshop on Cooperative and Heterogeneous Cellular Networks (WDN-CN2012)	Sydney, Australia	Reported on this issue
05 Sept. - 07 Sept. 2012	6th Advanced Satellite Multimedia Systems Conference (ASMS2012)	Baiona, Spain	Done
03 Aug. 2012	AsiaFI Network Virtualization Workshop (AsiaFI NV workshop)	Kyoto, Japan	Reported on this issue
01 Aug. - 03 Aug. 2012	The 4th International Conference on Communications and Electronics (ICCE2012)	Hue, Vietnam	Done
18 Jul. - 21 Jul. 2012	8th IEEE, IET Int. Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP2012)	Poznan, Poland	Reported on this issue
18 Jun. - 21 Jun. 2012	The 11th International Workshop on Assurance in Distributed Systems and Networks (ADSN2012)	Macau, China	Done

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<http://www.ieice.org/cs/conf/calendar.html>

Special Section Calendar of IEICE Transactions on Communications

Issue	Special Section	Note
Feb. 2014	Technologies for Effective Utilization of Spectrum White Space	Submission due: 5 Jun. 2013
Jan. 2014	Management for Flexible ICT Systems and Services	Submission due: 17 May 2013
Dec. 2013	Network and System Technologies for Sustainable Society	Submission due: 14 Mar. 2013 See page 43
Nov. 2013	Progress in Information Network Science	Submission due: 15 Mar. 2013 See page 42
Oct. 2013	Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2012	Submission due: 21 Jan. 2013 See page 41
Sep. 2013	No special section	
Aug. 2013	No special section	
Jul. 2013	Internet Architectures, Protocols, and Management Methods that Enable Sustainable Development	To be issued
Jun. 2013	Heterogeneous Networks for Future Cellular Systems	To be issued
May 2013	No special section	
Apr. 2013	No special section	
Mar. 2013	No special section	
Feb. 2013	Quality of Communication Services Improving Quality of Life	To be issued soon
Jan. 2013	Network Virtualization, and Fusion Platform of Computing and Networking	To be issued soon
Dec. 2012	Coding and Coding Theory-Based Signal Processing for Wireless Communications	Vol. E95-B, No. 12
Nov. 2012	Satellite Communication Technologies in Conjunction with Main Topics of JC-SAT2011	Vol. E95-B, No. 11
Oct. 2012	Medical Information Communication Technology for Disaster Recovery and Human Health Care Support	Vol. E95-B, No. 10
Sep. 2012	Emerging Technologies and Applications for Ad Hoc and Wireless Mesh Networks	Vol. E95-B, No. 9
Aug. 2012	Networking Technologies for Cloud Services	Vol. E95-B, No. 8
Jul. 2012	Future Internet Technologies against Present Crises	Vol. E95-B, No. 7

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Call for Papers

----- Special Section on Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2012 -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2012" in **October 2013**.

The objective of this special section is to discuss the antenna and propagation technologies related to progressing technologies for MIMO, LTE, PAN/BAN, and wireless power transmission and so on. The 2012 International Symposium on Antennas and Propagation (ISAP2012) will be held in Nagoya, Japan during October 29 – November 2, 2012, which aims at providing an international forum for exchanging information on such progress of research and development in antennas, propagation, electromagnetic wave theory, and the related fields. By taking this opportunity the special section has been planned to publish papers on advanced technologies in antennas, propagation and the related fields. The special section seeks for submission particularly from, but not limited to, the authors of ISAP2012.

1. Scope

This special section aims at timely dissemination of research in these areas. Possible topics include, but are not limited to antennas and propagation technologies related to progressing technology for MIMO, LTE, PAN/BAN, and wireless power transmission, so forth. The topics also include electromagnetic wave theory and its related topics including emerging topics for metamaterial and its antenna application.

2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Submissions of "letters" are not accepted. Manuscripts should be prepared according to the guideline in the "Information for Authors". The latest version is available at the web site, http://www.ieice.org/eng/shiori/mokuji_cs.html. The period for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

This special section will accept only papers by electronic submission. Prospective authors are requested to follow carefully the submission process described below.

1. Submit a manuscript and electronic source files (TeX/Word files, figures, authors' photos and biography) for publishing using the IEICE Web site https://review.ieice.org/regist_e.aspx by **January 21, 2013(Japan Standard Time)**. Authors should choose the [Special-EB] Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2012 as a "Type of Issue (Section)/Category of Transactions" on the online screen. Do not choose [Regular-EB].
2. Send "Copyright Transfer and Page Charge Agreement" and "Confirmation Sheet of Manuscript Registration" by E-mail, FAX or postal mail to the following address (guest editor of the special section) by the above due date. There is a possibility that we shall withdraw the manuscript without receiving them by the due date, even if we have received the manuscript by electronic submission. For additional guidelines on manuscript preparation, please visit the web-page: http://www.ieice.org/eng/shiori/mokuji_cs.html

Submission to: Jiro Hirokawa

Dept. of Electrical and Electronic Eng., Tokyo Institute of Technology

Address: S3-20, 2-12-1 Ookayama, Meguro-ku, Tokyo 152-8552, Japan

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Call for Papers

----- Special Section on Progress in Information Network Science -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Progress in Information Network Science" in **November 2013**.

Information networking technologies have been achieving tremendous growth as an indispensable infrastructure in our society. The technologies, however, lack the solid theoretical foundation to resolve new quantitative and qualitative challenges posed in current and future networks, since they have been created in a patchwork or ad-hoc approach. In order to maintain the progress of these technologies, more systematic and scientific foundation, which is often called Internet science or network science of complex systems etc., has been highly demanded. For developing the theory of information networking technologies, we encourage multidisciplinary studies including mathematical engineering, theoretical physics, biological system engineering, and computer science etc. We are thus planning to publish a special section (scheduled to appear in the November 2013 issue) to further promote research and development of progress in information network science.

1. Scope

This special section aims at timely dissemination of research in these areas. Possible topics include, but are not limited to:

- novel approach for information network science, theory of information network as complex systems etc.
- theory and/or application of autonomous distributed systems and self-organized networks
- theory and/or application of very large-scale systems including Internet of Things (IoT)
- novel modeling, performance measure, analyzing methods for information network
- theory and/or application of network information theory such as network coding
- advanced physics for information networks, such as statistical physics, photo-physics, and quantum mechanics
- theory of nature-inspired information networking
- theory and/or application of information networking as social networks
- physical systems and devices inspired by network science
- novel energy engineering for information networks
- novel network analysis method based on computer science and applied mathematics

2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Manuscripts should be prepared according to the guideline in the "Information for Authors". The latest version is available at the web site, http://www.ieice.org/eng/shiori/mokuji_cs.html. Note that the IEICE Transactions on Communications has discontinued LETTERS. The term for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

This special section will accept papers only by electronic submission. Prospective authors are requested to follow carefully the submission process described below.

1. Submit a manuscript and electronic source files (TeX/Word files, figures, authors' photos and biographies) via the IEICE Web site https://review.ieice.org/regist_e.aspx **by March 15, 2013 (Japan Time)**. Authors should choose the [Special-EB] Progress in Information Network Science as a "Type of Section (Issue)/ Transactions" on the online screen. **Do not choose [Regular-EB]**.
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Send the above documents to:

Takeru Inoue

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----- Special Section on Network and System Technologies for Sustainable Society -----

The IEICE Transactions on Communications announces a forthcoming section on “Network and System Technologies for Sustainable Society” to be published in **December 2013**.

Information and communication technology (ICT) has been playing an important role as a social infrastructure in various areas such as energy, distribution, medicine and agriculture. For realizing sustainable society, network and system technologies should be designed considering new paradigms: energy-awareness, environment and sustainability. Research and development of network systems for sustainable society have been emerged: green by/of ICT, smart grid, wired/wireless machine-to-machine (M2M) communications, visualization, robustness and dependable networks. This special section is being planned (scheduled to appear in the December 2013 issue) to discuss network and system technologies for sustainable society. The submissions concerning new technique and discovery on various types of network architecture, network system and networking technology for sustainable society, are highly welcome.

1. Scope

This special section is aimed at timely dissemination of research in these areas. Possible topics include, but are not limited to:

- Green by/of ICT
- Smart grid
- Green data centers
- Visualization
- Energy-aware, robust and dependable next/new generation networks
- Wireless/wired networking architecture considering sustainable society
- Network and application technologies for sustainable society
- Machine-to-Machine (M2M)
- Energy-aware routers
- Network virtualization
- Robustness, fault tolerance
- Sensor networks
- Green network appliance
- Software-defined networks (SDN)
- Dependable networks

2. Submission Instructions

The standard number of pages is 8. The page charges are considerably higher for extra pages. Manuscripts should be prepared according to the guideline in the “Information for Authors”. The latest version is available at the web site, http://www.ieice.org/eng/shiori/mokuji_cs.html. The term for revising the manuscript after acknowledgement of conditional acceptance for this special section could be shorter than that for regular issues (60 days) because of the tight review schedule.

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B (Communications)	EB (English) B (Japanese)	Fundamental Theories for Communications, Devices/Circuits for Communications, Transmission Systems and Transmission Equipment for Communications, Optical Fiber for Communications, Fiber-Optic Transmission for Communications, Switching for Communications, Switching for Mobile Communications, Network, Network Management/Operation, Internet, Wireless Communication Technologies, Terrestrial Radio Communications, Satellite Communications, Optical Wireless Communications, Antennas and Propagation, Electromagnetic Compatibility (EMC), Sensing, Navigation, Guidance and Control Systems, Energy in Electronics Communications, Terminals for Communications, Multimedia Systems for Communications, Broadcast Systems, Integrated Systems for Communications, Space Utilization Systems for Communications
C (Electronics)	EC (English) C (Japanese)	Electromagnetic Theory, Lasers, Quantum Electronics, Optoelectronics, Microwaves, Millimeter-Waves, Ultrasonic Electronics, Electronic Circuits, Electronic Materials, Organic Molecular Electronics, Electronic Components, Electromechanical Devices and Components, Semiconductor Materials and Devices, Integrated Electronics, Electron Tubes, Vacuum and Beam Technology, Electronic Displays, Superconducting Electronics, Storage Technology, Electronic Instrumentation and Control
D (Information and Systems)	ED (English) D (Japanese)	Computation and Computational Models, Automata and Formal Language Theory, Algorithm Theory, Complexity Theory, Computer Components, VLSI Systems, Computer Systems, Fundamentals of Software and Theory of Programs, System Programs, Software Engineering, Database, Contents Technology and Web Information Systems, Data Mining, Networks, Dependable Computing, Application Information Security, Distributed Cooperation and Agents, Artificial Intelligence and Cognitive Science, Human-computer Interaction, Office Information Systems, e-Business Modeling, Educational Technology, Rehabilitation Engineering and Assistive Technology, Pattern Recognition, Speech and Hearing, Image Processing and Video Processing, Image Recognition, Computer Vision, Computer Graphics, Multimedia Pattern Processing, Natural Language Processing, Biocybernetics, Neurocomputing, Biological Engineering, Music Information Processing, Kansei Information Processing, Affective Information Processing
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Sister Society membership information

To apply discount rates for this IEICE-CS Sister Society member's application, please indicate your Sister Society Membership number below, and attach a copy of your Sister Society Membership certificate or card to this form.

Sister Society: ☐ IEEE ComSoc ☐ KICS ☐ VDE-ITG

Membership number (Member): _____

Copy of Membership certificate or Membership card:

(Attached here)

IEICE Overseas Membership Application Form for IEICE-CS Sister Society Members

URL <http://www.ieice.org/eng/member/OM-appli.html> E-mail member@ieice.org FAX +81-3-3433-6659

◆ **Please type or print in English. The deadline for submitting application form is the 1st day of every month.**

Personal Information

Full name: _____ Nationality: _____ ☐ Male
 First name Middle name Last name ☐ Female

☐ Prof. ☐ Dr. ☐ Mr. ☐ Ms. Place of birth: _____ Date of birth: _____
 Day Month Year

Mailing Address

☐ Home ☐ Office

Name of Company/School/College Department/Section

Street City State/Province

Postal code Country

TEL FAX E-mail

Academic Background

The highest academic degree: ☐ Ph.D. ☐ Masters ☐ Bachelors ☐ Others: _____

University/college/school of the highest academic degree

Month & year of graduation

Application Information

Membership: I want to apply for the following membership*:

- ☐ Member ☐ Member (including Japanese Journal subscription)
☐ Student Member ☐ Student Member (including Japanese Journal subscription)
 *Membership applies only to applicant who reside outside of Japan and who have non-Japanese citizenship.
 ◆ If you want to apply for OMDP (Overseas Membership Development Program), please check; ☐ OMDP

Society registration (Membership fee includes one Society of Transaction of Online version.):**

☒ B: Communications

**Discount rate (see the URL below) is applied to this IEICE-CS Sister Society Member's application.

URL http://www.ieice.org/cs/member/sister_society.html

----- Discount rate is not applied for the following optional items. -----

Additional Society (optional): ☐ A: Engineering Sciences ☐ C: Electronics ☐ D: Information and Systems

Additional Transactions of paper version (optional):

- ☐ EA: Fundamentals ☐ EB: Communications ☐ EC: Electronics ☐ ED: Information and Systems
☐ A: Fundamentals (Japanese) ☐ B: Communications (Japanese) ☐ C: Electronics (Japanese) ☐ D: Information and Systems (Japanese)

Remittance

Remittance is available only in **Japanese yen** by a **credit card**.

Admission charge.....¥ _____ Journal subscription (optional).....¥ _____
 Annual charge..... ¥ _____ Mailing option: ☐ Air mail.....¥ _____
 Additional Society (optional) ¥ _____ ☐ SAL mail.....¥ _____
 Additional Transactions (optional).....¥ _____ **Total.....¥ _____**

Credit Card: ☐ UC ☐ Master Card ☐ VISA ☐ JCB ☐ American Express

Card number:

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Expiry date: _____ / _____ Credit Card Holder: _____ Signature: _____
 Year Month

Endorsement

The following endorsement for this Sister Society member's application will be given by an IEICE-CS director (any related action of endorsement by applicant is not necessary if a copy of your Sister Society Membership certificate or card is indicated).

I recommend this applicant for IEICE membership.

(Director of Planning and Member Activities, IEICE-CS)

Endorser's name Membership number Endorser's signature Date

From Editor's Desk

● Seasons Greeting

The end of the year is just around the corner. Although it's getting colder and colder in Japan, people are enjoying the pre-holiday season spirit with winter decorations and illuminations here and there. As the readers may know, we have no Christmas vacation in Japan, instead, we have New Year's vacation when we celebrate the New Year with our families. The Editorial Staff wish the readers, their families, relatives and friends Happy Holidays and a Happy New Year.

After the winter vacation, please consider submitting a paper to IEICE General Conference to be held at Gifu University, Gifu, from March 19 – 22, 2013. Complete English Sessions are scheduled in the Conference for the globalization of IEICE's academic activities. Please check out the latest information on the IEICE web site at:

http://www.toyoag.co.jp/ieice/E_G_top/e_g_top.html

Gifu Prefecture is located precisely in the center of Japan and has many ski resorts with fantastic powder snow. Gifu Castle built in 13th century is located near the conference venue. So, you can enjoy sightseeing before or after the conference.

IEICE GLOBAL NEWSLETTER Editorial Staff

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CALL FOR PAPERS

May 29-31, 2013

Sarajevo, Bosnia and Herzegovina

2013 IEICE ICT Forum

IMPORTANT DATES

**Paper submission
deadline:**

December 10, 2012

Review

Notification:

February 10, 2013

**Final Manuscript
due:**

March 3, 2013

Topics

- ◇ 4G and beyond wireless systems;
- ◇ next-generation access technologies, management, diagnostics and troubleshooting of communications network;
- ◇ performance measurements, experimental platforms and testbeds;
- ◇ internet of things and next-generation networks, machine type communication;
- ◇ cloud computing and architectures;
- ◇ green communications models, architectures, and networking solution;
- ◇ security and privacy in next-generation network;
- ◇ healthcare and medical applications;
- ◇ optical communications and next-generation GPON, integration of optical and wireless access as a last mile;
- ◇ power line communication and smart grid;
- ◇ image and signal processing, digital coding and filtering ;
- ◇ system and software design and optimization;
- ◇ analog & mixed signal circuits;
- ◇ biomedical/bioengineering circuits and systems;
- ◇ RFIC and mm Wave;
- ◇ circuits & systems in emerging technologies;
- ◇ opto & nano electronics, integrated circuits & devices;
- ◇ VLSI systems, applications and computer aided network design;

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