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My Research Experience on Electromagnetics and Antennas

Qiang Chen
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About 35 years ago, my top choice was to study computer science in college. But I was finally accepted by the department of electromagnetics, because my score of entry examination was too low to study in the department of computer science. The department of electromagnetics was an unpopular department at that time, although the situation is probably the same in the university nowadays.

I began to feel interested in the specialty after I became a senior of college. I found the subject of electromagnetics was very logical, sophisticated and elegant, but complicated as well. I decided to continue my study in this field, and then went to Tohoku University for graduate study under my supervisor, Prof. Saburo Adachi, who was one of the leading professors in the field. The year was 1988, the start of my professional career.

In my graduate study, I engaged in the research of RF probes for magnetic resonance imaging (MRI) system, a medical imaging equipment to visualize internal structures of body organs using magnetic radiation. My research objective was to analyze the RF probes electromagnetically, for designing a new RF probe which can generate more homogeneous magnetic field, while suppressing electric field, at the frequency of 21 MHz. The big challenge was how to exactly analyze the electromagnetic performance of the probe when it was loaded by a human body and shielded by a conducting cylinder to understand the field distribution of the probe, as well as the coupling effect by the human body and the conducting cylinder. At that time, there were few commercial software packages for the electromagnetic simulation of antennas, which were so efficient and so popular as those products in nowadays. I had to start the research by coding the computer programs to develop electromagnetic simulators at first. The programs were based on the variation method by estimating current mode flowing on the probe in advance. The mutual impedance between these mode functions was evaluated analytically, rather than numerically, to ensure exactly the current continuity at the mode connection at the low frequency. The derivation of mutual impedance was composed of a double surface integral, causing the analytical formula to be very complicated and long. More than 20 pages of A4 papers were needed to print all of the derivation process. It became even a problem how to publish these analytical equations in a style of academic papers, because there were not any journals which accepted such a long manuscript.

My first paper was published in the IEICE Transaction of Japanese Edition in 1992 [1], followed by the papers [2,3] in the related topics of the RF probe analysis for the MRI, which summarized the my 5-year Ph. D study. It was the first time to analyze the RF probe for MRI with 3-D model including the coupling effect of a dielectric body as well as a surrounded conducting shield, by using a full-wave analysis method. Before that, the probe was analyzed by using either 2-D approximation or approximated circuit model. Performance of the probe, such as the input impedance, the resonance frequency, the Q value, and the magnetic field distribution, were obtained in the numerical analysis which became important data to design and improve the probe for high quality MRI images. Beside the original research contributions, the most important fruit of my Ph. D study was the skills and ability to do researches. I began to understand how to find reference papers and literature on the related research to start a research project, how to write computer code to efficiently program a supercomputer to solve the complicated Maxwell equations, how to accurately measure the antenna input impedance using a network analyzer, and radiation field in a microwave anechoic chamber, how to make slides and to give a technical presentation for group meeting and even large conferences, and how to write a technical paper and revise the paper following the reviewer's comments. I have benefited largely in decades of my research and teaching activities, from these skills, ability, and specialized knowledge I obtained in my Ph. D study.

I continued some fundamental studies on the electromagnetic analysis of antennas after Ph. D study. The method of moments (MoM) was one of the efficient methods for antenna analysis, but it showed very poor performance in solving the antennas composed of dielectric object, because the displacement current in the dielectric object is flowing in 3-dimensional space. Therefore, a double volume integration (a multiple integration in 6 variables) was required to calculate the mutual impedance between the block segments in dielectric object. The CPU time was very long and the accuracy of computation was very poor when solving the multiple integration numerically. The challenge was how to reduce the order of multiple integration in an analytical form. Owing to the experience of my Ph. D study, I was good at deriving the mathematical formulas and complicated equations. Finally, single-integral expressions of the mutual impedance between two parallel and perpendicular sinusoidal monopole blocks were derived from the

expressions of mutual impedance between wire monopoles at the presence of end point charges of the monopoles. It was demonstrated that the CPU time for calculating single integral expressions was much less than that for calculating conventional five-folded integral, and a good convergence of numerical integration was successfully demonstrated. The achievements were published in the IEICE Transaction of Japanese Edition in 1992, which was later awarded the Best Paper Award and Zen-ichi Kiyasu Award from the IEICE in 2009 [4].

The antenna measurement is also one of the most important topics. At the beginning of 1990s, electrically small antennas mounted on mobile phones were required and widely studied. The radiation efficiency is a critical parameter of evaluating performance of small antennas. We developed an equipment based on the power integration method to measure the antenna radiation efficiency and power absorption of the near-by human body and evaluated the performance experimentally [5]. Although accuracy of this method was satisfied, but the measuring time was very long because the probe has to be scanned on a spherical surface totally closing the measured antenna. Therefore, a fast measurement method using a parallel modulated probe array was proposed to measure the electromagnetic field radiated by antennas at different locations simultaneously. The feature of the method was the simultaneous measurement, different from the method using switched probe array. Each modulated probe was excited by a local signal with different frequency, so that the received intermediate frequency (IF) signal contains different frequency components which indicate the relative magnitude of the radio-frequency signal at positions of the probes, and all the IF components are measured simultaneously by a broadband microwave receiver. The performance of the system was demonstrated by rapidly measuring the radiation efficiency of antennas [6].

The inverse problem, where the radiating source is constructed based on the information of radiation field from the source, is an interesting research theme to me. My related research covered the Direction of Arriva (DOA) [7], near-field imaging [8,9] and far-field radar imaging.

Recently, technology of wireless power transfer has become attractive. We have persistently emphasized that the efficiency of wireless power transfer does not rely on the “resonance”, but depends totally on the “near-field coupling and impedance matching” [10].

Because of the failure of the college entrance examination happened 35 years ago, I was fortunately given an opportunity to open a door to enter a wonderful world and to start my carrier in the world, where I met with the electromagnetic theory and antenna technology, which are extremely elegant and perfect but full of mystery, together with lots of excellent professors, colleagues, and students.



Chen Laboratory (2017)

<http://www.chenq.ecei.tohoku.ac.jp/>

I like a Chinese idiom called “活到老学到老”, which means “never too old to learn”. As a freshman forever, I will be continuously enjoying the challenges in the research field of electromagnetics and antenna technology, till my retired age.

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A Tutorial of Communication Technologies for Business Wireless Communication Systems

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1. Introduction

In recent years, radio transmission technologies using various frequencies and schemes have been advanced and deployment to business wireless communication systems has been proceeding. In this article, we covered coastal tsunami monitoring system, wireless material transmission system, MCA (Multi-Channel Access) radio / IP radio dual system, field work support / video surveillance system as business wireless communication systems realized by Panasonic. And we explained communication technologies which are utilized in those systems and planned to be introduced in the future.

2. Various Business Wireless Communication Systems and Communication Technologies Used Therein

2.1 Coastal tsunami monitoring system

Since the Great East Japan Earthquake, wireless communication networks have attracted attention as a regional information infrastructure that supports disaster prevention and supports disaster-resistant safe and secure urban development. Further, with the acceleration of wireless communication networks and the spread of wireless terminals, demand for wireless communication network systems for various applications has been increased year by year. For example, in local governments and central government agencies, it is used for monitoring coastal tide levels and monitoring river water levels. And in communication carriers, road operators, railway operators, utilities companies such as electricity, gas and water, and various manufacturing industries, they are used for business efficiency improvement, management of facilities and structures, disaster prevention and disaster countermeasures, etc. Conventionally, in construction of a backbone communication network, a local area communication network, a sensor network, etc., it is necessary to design system individually according to applications, there are various problems such as complication of equipment selection, installation space, workability, cost, etc. Under these circumstances, Panasonic constructed the coastal tsunami monitoring system using the multi-access concentrator that aggregates the developed 5 GHz long-distance relay communication unit, wireless LAN base station, and

920 MHz specified low power radio functions as shown in Fig. 1. In this system, a wireless network configuration with solar power source was realized. Images from cameras arranged at various places and wave height data by a tide level observation device are collected by 920 MHz specified low power radio, and these data are transmitted to a monitoring center via multi access concentrators. And the system realized various kinds of information gathering / distribution function on the site by wireless LAN.

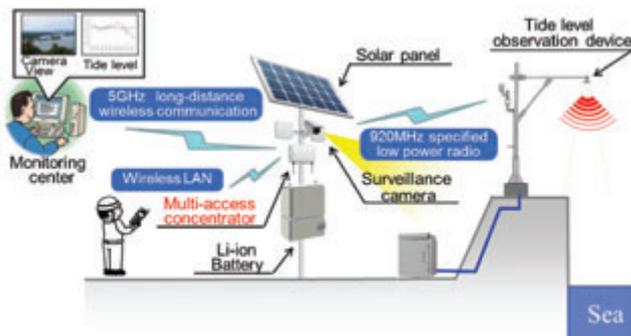


Fig. 1 A construction of a coastal tsunami monitoring system (© Panasonic Corporation)

As shown in Fig. 2, the 5-GHz long-distance wireless communication unit in the multi-access concentrator enables multistage connection and branch connection with two ports and covers wide range. ARIB STD-T 71 [1] compliant 4.9 GHz band (IEEE 802.11 j / n) [2,3] is used and registration is required based on the Radio Law for operation.

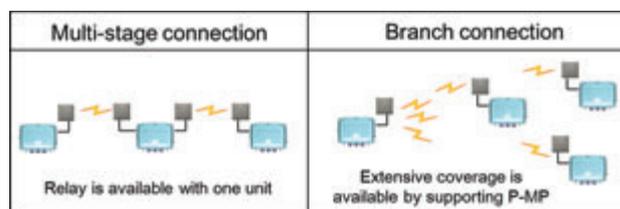


Fig. 2 Connection types of 5-GHz long-distance wireless communication unit (© Panasonic Corporation)

3 MIMO directional antenna (high gain type / low gain type), omnidirectional antenna, and parabola antenna are prepared. For large capacity maximum transmission speed of 450 Mbps is realized and for

long distance transmission, maximum of 50 km transmission is realized.

The wireless LAN base station supports dual bands of 2.4 GHz (13 channels), and 5 GHz (W 56, 11 channels), and is compliant to IEEE 802.11n (3 MIMO, up to 450 Mbps). In order to realize scalability to various applications, we realized simultaneous accommodation of multiple services with multiple SSID and correspondence with VLAN (Virtual LAN) [4] and multi-user authentication as shown in Fig. 3.

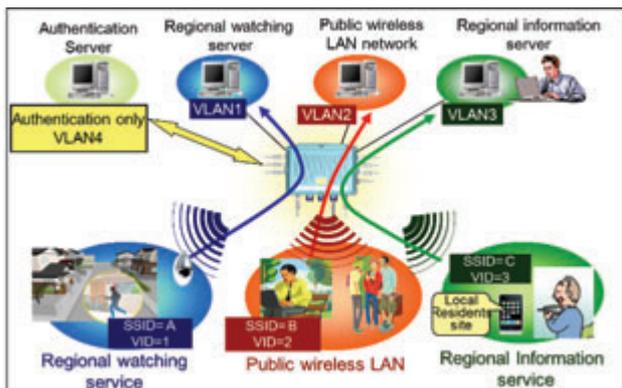


Fig. 3 Wireless LAN that realizes multi service platform (© Panasonic Corporation)

Furthermore, it has multi-hop function, and has optimum route selection function and automatic detour route setting function. It has a function to allocate bandwidth to relay traffic and terminal traffic independently, and it is possible to improve operability and capital investment efficiency by virtually separating the network for each application.

2.2 Field Pickup Unit (FPU) system

FPU system that wirelessly transmits program materials (video and audio) from a coverage area to a broadcasting station is operated in program production sites of television broadcasting. Particularly in the case of mobile relaying, as shown in Fig. 4, FPU transmitter is connected to a video camera mounted on a vehicle and the video / audio signals are transmitted to FPU receiver installed in a broadcast station or a relay base station, and it is possible to transmit program materials in wide range to a broadcasting station with high quality and in real time. And it is indispensable for sports broadcasting and news programs.

FPU uses UHF bands (800 MHz band, 1.2 GHz band, 2.3 GHz band) and SHF bands (5.9 GHz band, 6.5 GHz band, 10.3 GHz band, etc.) as shown in Table 1. Among others, 800 MHz band has been used for mobile relaying such as marathon relay because the band has good propagation and diffraction characteristics.



Fig. 4 Wireless transmission system FPU of broadcast program materials

However, in the frequency reorganization action plan of the Ministry of Internal Affairs and Communications (MIC) revised in September 2011, 800 MHz band was allocated to mobile phones, etc. and the mobile relay FPU was required to move to 1.2 GHz band and 2.3 GHz band.

In 1.2 GHz / 2.3 GHz bands, not only that the frequency is higher than 800 MHz band but also the point that the frequency is shared with other systems such as the amateur radio and the specified low power radio station is greatly different. And so, frequency sharing is one of the technical challenges for FPU to realize high quality real time transmission.

Table 1 Frequency assign in FPU

	Frequency	Purpose
800 MHz Band※1	770 MHz~806 MHz	Mobile relaying
1.2 GHz Band※2	1.24 GHz~1.3 GHz	
2.3 GHz Band※2	2.33 GHz~2.37 GHz	
B Band	5.85 GHz~5.925 GHz	Fixed relaying
C Band	6.425 GHz~6.57 GHz	
D Band	6.87 GHz~7.125 GHz	
E Band	10.25 GHz~10.45 GHz	
F Band	10.55 GHz~10.68 GHz	
G Band	12.95 GHz~13.25 GHz	
42 GHz Band	41.0 GHz~42.0 GHz	
55 GHz Band	54.27 GHz~55.27 GHz	
120 GHz Band	116 GHz~134 GHz	

※1: until 31st March 2019
 ※2: Assigned as alternative to 800 MHz band in April 2012

Although analog systems (FM system) were originally used for FPU transmission systems, digital systems (QPSK / QAM system) were adopted along with digitization and high definition of the television broadcasting, and currently OFDM based systems are mainly used. FPU in 1.2 GHz / 2.3 GHz band was specified as ARIB STD - B 57 [5], and both SISO (Single - Input Single - Output) - OFDM system and MIMO (Multiple - Input Multiple - Output) - OFDM system were specified.

Space-Time Trellis Code (STTC) scheme is adopted as MIMO scheme, and 2×2 MIMO using two transmitting antennas and two receiving antennas improves transmission rate and reliability.

Highly reliable high-definition video transmission is realized in mobile relay environment, which is

more severe propagation environment than fixed relaying environment. Fig. 5 shows the basic configuration of the MIMO-OFDM scheme in ARIB STD-B57.

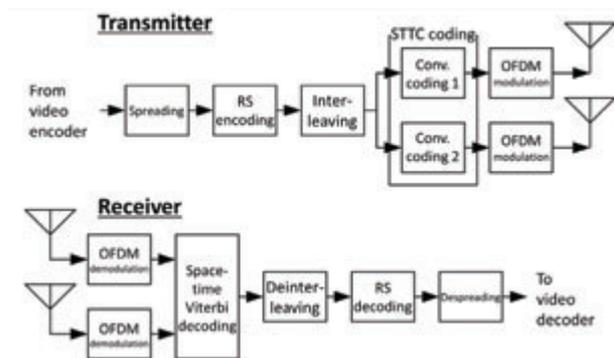


Fig. 5 Basic configuration about MIMO-OFDM scheme in FPU

The current FPU system has been described above, and researches and developments for further advancement of FPU systems for future ultra-high definition (4 K / 8 K) television broadcasting are actively carried out. In March 2015, ARIB STD-B65 [6] was specified as an FPU which is capable of transmitting uncompressed 8K video in 120 GHz band, and other 8K-FPU specifications using 42 GHz band, 6 GHz / 7 GHz bands are planned to be specified.

Furthermore, research on the 8K-FPU in the 1.2 GHz / 2.3 GHz band for mobile relaying is also being advanced mainly by NHK Science & Technology Research Laboratories aiming for practical application in 2020, and Panasonic is also participating in the research. In order to maintain transmission rate at which 8K video signals can be transmitted even while propagation quality under mobile environment changes from moment to moment, adaptively switching coding rate of error correction code and adaptive modulation scheme and eigenmode transmission by 4×4 MIMO using Time Division Duplex (TDD) bidirectional transmission, are studied for realizing higher rate and higher reliability.

We are also researching and developing methods for detecting the existence of other systems that interfere with FPUs with high accuracy, methods for changing to other frequencies immediately and methods for improving interference tolerance in order that video signals will not be interrupted even in the presence of interference because 1.2 GHz / 2.3 GHz bands are shared with other systems as described above.

On the other hand, it is also necessary to minimize interference from FPUs to other systems, and we are studying frequency sharing technology as a comprehensive countermeasure against given interference and received interference. For FPUs that

do not be allowed "best effort" unlike wireless LAN and cellular phone networks, there are many problems to realize 8K video transmission in mobile environment / frequency sharing environment, but we will continue consideration to realize those systems.

2.3 MCA radio · IP radio dual system

MCA radio systems [7], which are private-operated radio systems, are business wireless communication systems which shares plurality of communication channels by many users, and services are provided for the purpose of efficient use of frequencies in mobile work. They are often used as business support systems for various transportation work and are widely used for municipal disaster prevention management administrative purposes.

In MCA radio systems, a mobile station installed in a vehicle or the like and a command station installed in a business establishment are wirelessly connected via a control station, and a voice call with pushing press talk button or a data communication is performed.

A control station, which is generally located on top of a mountain or a skyscraper with a clear view, controls a large zone system, and covers wide area. In recent years, it has been required to cover various places where are conventionally out of service areas such as underground shopping areas, buildings and tunnels due to the diversification of operations.

Efforts to cover locations that were outside the service area by realizing dual operation by combining IP radio systems and MCA radio systems as an approach to make these dead areas as service areas are under way.

As shown in Fig. 6, an IP radio system uses a cellular phone network based on 3G / LTE. A control server that performs call control, operation monitoring, and user management is connected to a P-GW (PDN-Gateway) [8] that is a network terminating gateway of a cellular phone network, and it collects and manages information via mobile stations in a MCA radio system.

The P-GW provided by the L2 connection type MVNO and the control server are connected via a dedicated line for IP radio system and the connection is configured not to be influenced from the outside. For dual operation of MCA radio system and IP radio system, mobile stations in the MCA radio system's area simultaneously transmit via both MCA radio system and IP radio system. In the case of voice information, the voice codec used in the MCA radio system is shared. Upon reception, it receives voice information or data from the MCA radio or IP radio according to a predetermined priority mode.

Mobile stations outside the MCA radio system's area transmit and receive using IP radio systems. The voice information or data transmitted through the IP radio system is temporarily transmitted to the control server and transmitted to the destination mobile

station or command station set by the control server. Communication directed to destinations set as grouping is also handled by the control server.

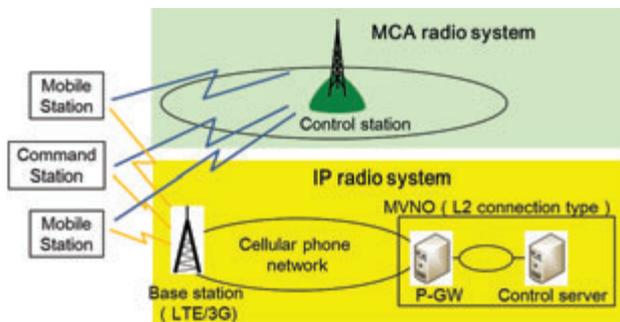


Fig. 6 MCA radio / IP radio dual system configuration

With these mechanisms, it is possible for users to seamlessly use MCA radio systems which is circuit switched type and IP radio systems of best effort type without consciousness. As cellular phone systems are considerably advancing service areas, it is possible to be used in areas where were conventionally dead areas in MCA radio systems. Moreover, by performing dual operation between MCA radio system and IP radio system, more reliability can be realized even when a failure occurs in each system.

2.4 Field work support system / Video surveillance system

(1) HD com Live

By connecting a wearable camera and an Android smartphone to a video conference system via LTE networks, multiple sites (up to nine places) and a center with video and audio signal can be connected in order to improve efficiency and safety management about work on sites.

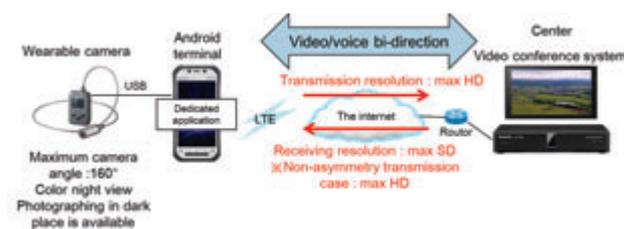


Fig. 7 Overview of HD com Live system (© Panasonic Corporation)

By sending videos from a site, the situation can be quickly and accurately grasped in a center side. From an administrator, work instructions and materials (drawings, instructions, procedures, etc.) in PCs are sent to workers in sites to support work accurately. Also, it is possible to send images to another site, and cooperative work on multiple sites can be improved.

Furthermore, since the video conference system is used at the center side, the situation from the site in

the video can be shared and smoothly give appropriate instructions by consultation. The aggregated on-site video can be recorded together with the voice of the instruction, and the operation record can be acquired simultaneously with the situation grasp and work instruction.

LTE lines and the Internet are best-effort lines, and congestion of the lines causes discontinuity or disturbance in video and audio streams, which markedly deteriorates the operational efficiency for users.

Therefore, the flow rate of the stream to be transmitted is adjusted according to the available bandwidth between each site to prevent losses and delays. In addition, it compensates for packet loss, plays smoothly against jitter, and minimizes delay when the line is stabilized. These three functions are collectively called "AV-QoS function" [9]. With this function, video and audio streams are controlled from high-resolution to low-resolution according to the line conditions and are transmitted to the center.

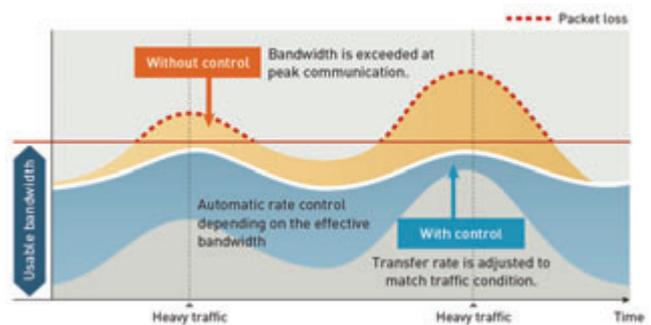


Fig. 8 AV-QoS function overview (© Panasonic Corporation)

In the adaptive bit rate control, the effective band is estimated by monitoring transmission conditions in detail. The compensation function for packet loss combines FEC and ARQ (retransmission) according to line conditions. The delay control function optimally controls the amount of buffer accumulation in accordance with the amplitude of jitter and increases the accumulation amount when ARQ is required to prevent the discontinuity. When the line is stable, the playback speed is increased, and the accumulation amount is continuously decreased, and so the delay amount is reduced.

This system is applied to works in which supporting personnel at headquarters, centers and other bases direct, supervise, and manage workers in field sites, and their application fields are disaster countermeasures, patrols, plant maintenance, infrastructure inspection, and so on.

(2) Cloud recorder

It is a system for supporting low-cost and smooth site operation. In the system, video signals from surveillance cameras which are set up on sites, are constantly recorded on the cloud using wired or wireless lines, and the stored information are delivered to managers and administrators as necessary.

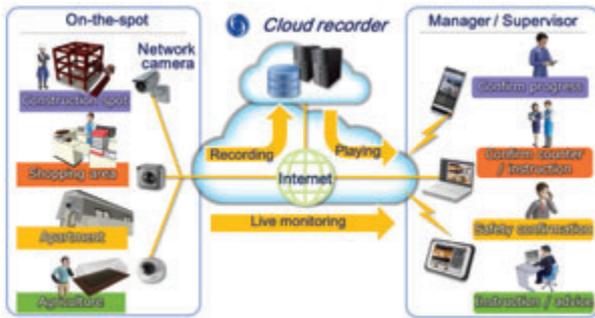


Fig. 9 Overview of Cloud Recorder (© Panasonic Corporation)

When an accidental case occurs, real-time stream is delivered to an administrator with low delay, and it can enable prompt response. Fig. 10 shows the screen sample when the administrator uses a smartphone.

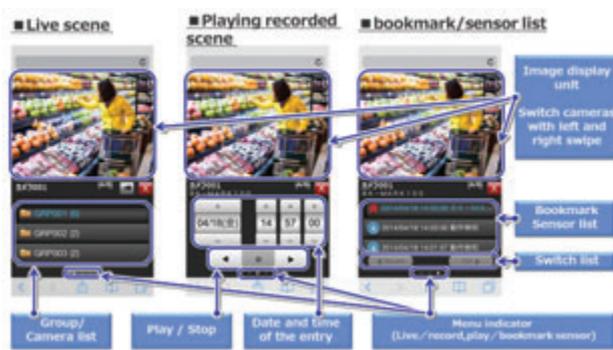


Fig. 10 Samples of display about Cloud Recorder (© Panasonic Corporation)

This system can be utilized in many ways, such as progress management and safety management in the construction industry, reduction of introduction cost when deploying multiple stores in the distribution industry, remote monitoring in the disaster prevention work, remote monitoring in the real estate management industry, video confirmation at the occurrence of the incident, remote monitoring in farms and sharing information with external consultants and administration. In Fig. 11 application examples of Cloud Recorder are described.



Fig. 11 Application examples of “Cloud Recorder” (© Panasonic Corporation)

(3) Applications in 5G

Research and development on the 5th generation mobile communication system (5G) is now being actively carried out to start commercial service in 2020. In September 2015 ITG-R M. 2083-0 defined 5G's target performance requirements [10]. In addition to improve efficiency of existing business systems utilizing a mobile communication system due to greatly improved communication performance, it is also expected as a means of realizing a new business system such as an automatic driving support system and a business support system by mobile VR.

When introducing 5G to business systems, it is important that communication applications used in business systems can fully utilize the benefits of 5G high communication performance. For mobile video that is predicted to occupy 75% of mobile traffic worldwide in 2020, Panasonic has been studying issues and measures to introduce mobile video by 5G to business systems.

In heterogeneous 5G networks, many frequency bands and various wireless LAN systems are overlaid. Higher frequency small cells will be planned to be used in heterogeneous 5G networks, and communication speeds will be assumed to be widely varied. When a user moves in 5G network, communication speed changes greatly as the connection to base stations is changed.

It is assumed that large communication speed fluctuations, which cannot be followed by traditional AV-QoS, occur and even if a terminal is connected to a high capacity small cell, it cannot be realized to fully utilize its large capacity. To prevent the problem, Panasonic has been developing video communication applications that can quickly transmit high quality real-time mobile video after connecting to high capacity small cells [11].

It is expected to be applied to a monitoring service system using mobile surveillance video taken with wearable cameras or cameras installed in drones and to a broadcasting system with live relay video.

3. Conclusions

We introduced a part of the business wireless system that Panasonic is working on.

The coastal tsunami monitoring system, FPU, is realized as a system that uses dedicated frequencies, although there are sharing conditions, in order to transmit video information in real time. The MCA radio / IP wireless dual system is realized as a system combining cellular phone systems in order to realize area expansion, which was a problem for conventional MCA radio systems with practical cost.

Also, in the field work support / video surveillance system, it is realized as a system that secures QoS of video and audio by making maximum use of the mobile phone system. It can be seen that it is an example realized by a combination of optimum technologies according to characteristics required for each application. We will continue to promote technical studies for various business wireless communication systems required in the market.

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Acknowledgement

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This paper is based on “A tutorial of communication technologies for business wireless communication systems” [12], by the same authors, which appeared in the IEICE Communications Society Magazine, Copyright(C)2017. The material in this paper was presented in part at the IEICE Communications Society Magazine [12], and all the figures except Fig.1,2,3,7,8,9,10,11 of this paper are reused from [12] under the permission of the IEICE.

Report on Communications Society Special Talk and Awarding Ceremony at 2018 IEICE Society Conference

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Directors of General Affairs, IEICE Communications Society



1. Introduction

IEICE Communications Society awards people who have made a great contribution to the Society every year at the IEICE Society Conference. In this article, we report an overview of the Communications Society Special Talk and Awarding Ceremony held at Kanazawa University, Kanazawa, Japan on September 12, 2018.

In the awarding ceremony, Prof. Shigeo Urushidani, President of the IEICE Communications Society, presented two awards: The Outstanding Contributions Award and the Distinguished Contributions Award.

In the special talk, we offer various topics every year, this year we set up a lecture by Dr. Kou Miyake, a Corporate Executive Adviser and Executive Technology Adviser of NTT DATA INTELLILINK Corporation as well as a former President of the IEICE Communications Society. The title of the talk was “The singularity and artificial intelligence (AI).”



Fig. 2 Prof. Shigeo Urushidani, President of the IEICE Communications Society, gave opening address



Fig. 1 Participants at the Special Talk and Awarding Ceremony at the 2018 IEICE Society Conference

2. Opening Address

Prior to the awarding ceremony, Prof. Shigeo Urushidani, President of the IEICE Communications Society, gave opening address. He reported that the impact factor of *IEICE Transactions on Communications* in 2017 reached 1.09, and he thanked the contributions of the people in the venue. He concluded his address with his congratulations to the awardees.

3. Awarding Ceremony

The Outstanding Contributions Award was given to the ex-Editor-in-Chiefs of *IEICE Transactions on Communications*, *IEICE Communications Express (ComEX)*, and *Communications Society Magazine (Japanese Edition)*, and the ex-Representatives of fourteen Technical Committees, respectively.

The Distinguished Contributions Award was given to those who has largely contributed to managing, planning,



Fig. 3 Outstanding Contributions Award presented by Prof. Shigeo Urushidani



Fig. 4 Assist. Prof. Mai Ohta acknowledged on behalf of the awardees

and editing activities in the Communications Society, and peer reviewing of a number of papers. This year, 117 members were awarded for their significant contributions to the Communications Society until 2017. At the end of the ceremony, Assistant Prof. Mai Ohta of Fukuoka University expressed her gratitude as a representative of the awardees.

4. Special Talk

After the awarding ceremony, Dr. Kou Miyake, a Corporate Executive Adviser and Executive Technology Adviser of NTT DATA INTELLILINK Corporation, was introduced as a speaker of the Special Talk. The title of the special talk was “The singularity and AI.”

He started his talk by mentioning the book titled “The singularity is near” written by Ray Kurzweil. According to his summarization, this book states that it will be possible to replace all human intellectual activities with “machines” by 2045 as the IT technology progress is accelerated exponentially in the future. He said that this book has been criticized as absurd assertions from the viewpoint of engineers, but it is also true that the advancement of IT technology has had a great influence on the general society in recent years.

Then, he talked about the feasibility of hardware that surpasses the brain’s information processing ability that supports the intellectual activities of human beings, and the feasibility of general-purpose AI that simulates intellectual activities. He concluded his talk by saying that although the human intellectual activities will not be completely replaced with machines, mutual understanding of individual experts and sharing of goals are increasingly necessary.

5. Conclusions

In this article, we reported the IEICE Communications Society Special Talk and Awarding Ceremony. Communications Society Special Talk and Awarding Ceremony ended with closing address by Prof. Tomoaki Ohtsuki,

President-Elect of the Communications Society. He emphasized that it is important for the Communications Society to activate interdisciplinary activities in the future. IEICE Communications Society will continue to support members’ activities in various fields.



Fig. 5 Special talk by Dr. Kou Miyake from NTT DATA INTELLILINK Corporation



Fig. 6 Closing address by Prof. Tomoaki Ohtsuki, President-Elect of the IEICE Communications Society

Report on ICM English Session at 2018 IEICE Society Conference – BS-7, Network and Service Design, Control and Management –

Yoshiaki Kitaguchi

Session Organizer, Tokyo Institute of Technology



1. Introduction

The 2018 IEICE Society Conference was held at Kanazawa University in Kanazawa, on September 11-14, 2018, where three Societies of Engineering Sciences Society (ESS), Communications Society (CS), and Electronics Society (ES) joined.

In the Conference, the IEICE Technical Committee on Information Communication Management (ICM) [1] hosted a full English Session entitled “Network and Service Design, Control and Management” as one of 8 Symposium Sessions which focused on special topics of advanced technologies.

2. Background of ICM English Session

ICM has been hosting English session every year since 2004. The purpose of this English session is to contribute to the globalization of IEICE by offering the chance of the presentation and discussion in English to the foreign researchers/students living in Japan and the overseas researchers/students.

Figure 1 shows the change in the number of contribution papers since 2004. When the session began in 2004, only 15 papers were submitted. Since then, the number of papers has gradually increased and it reached 55 papers in 2013. Although it decreased in these years, it keeps over 30 after 2008.

The holding period of the session in the 2004 was one and half days, and that in this year was 4 days, i.e. whole period of the IEICE Society Conference.

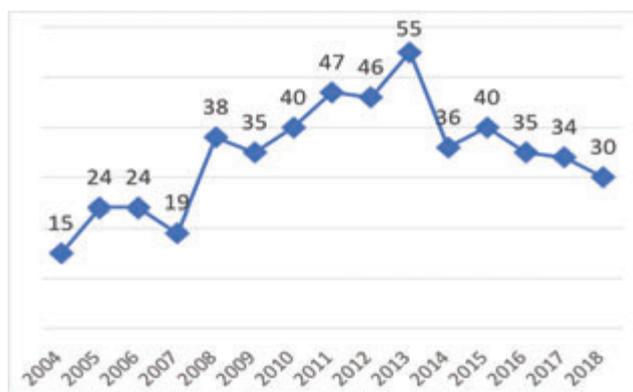


Fig. 1 The number of contribution papers since 2004

3. Presentations in ICM English Session

The contribution papers were classified into 9 sub-sessions according to the topics and set up every day during the Society Conference. Various topics are discussed in each sub-session every year.

Figure 2 shows the number of papers corresponding to their topics. 8 papers were especially concerning wireless-related topics, such as Internet of Things (IoT), Wireless Sensor Network (WSN) and mobile networks. And 4 papers were about Data analysis including Machine Learning (ML). It collected the most papers with various topics in this year.

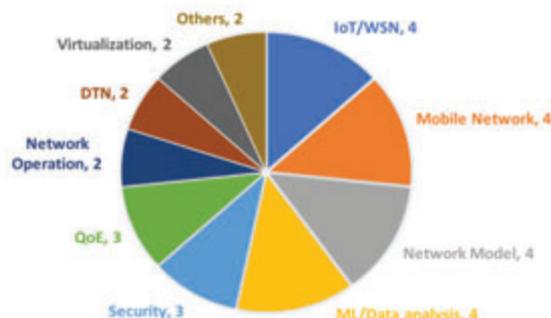


Fig. 2 The number of contribution papers corresponding to their topics

4. Authors

Figure 3 shows the number of papers corresponding to the categorization of the presenter's affiliations. 83% of the speakers belonged to the university, and remained 17% belongs to the industries. The situation in which the contribution from the university occupied the majority did not change.

Although most of speakers were international students studying in Japan, 10 presenters were Japanese students or researchers. The number of Japanese speakers has increased compared with the last year. In this symposium, ICM expects the open contribution from not only the university but also enterprise, and expects the various presenters from not only the international students and the foreign researchers but also Japanese students and researchers, too.

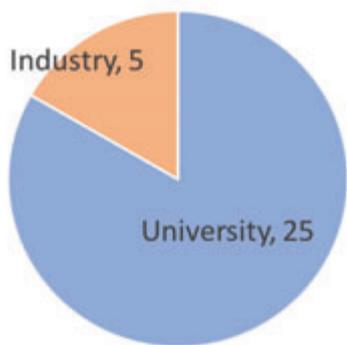


Fig. 3 The number of papers corresponding to the categorization of the speaker's affiliations

Every speaker and audience enthusiastically discussed the ideas and opinions in the time assigned for question and answer (Fig. 4). Since the assigned time passed quickly, some speakers and questioners continued their discussion here and there even into the break time.



Fig. 4 ICM English session in 2018

5. Award of ICM English Session

ICM will select the best papers and award a prize of the session in the near future to encourage their continuous activities. The best papers will be awarded in the upcoming ICM workshop in March 2019.

Table 1 shows the awarded papers presented in the 2017 IEICE Society Conference in March this year [2-3]. Its awarding ceremony took place in the last ICM workshop (Fig. 5).

6. Conclusions

ICM English session in 2018 successfully finished with a lot of excellent presentations and a very active discussion. The organizer believes that this session became fruitful for all people and was able to contribute to the globalization of IEICE. He wishes that more papers will be contributed to the session in the next year.

Table 1 English session Awardees of ICM Committee

Awardees:	Van Cu Pham, Yuto Lim, Yasuo Tan (JAIST)
Title:	Cloud-based Solution for Connecting Multiple Home Networks using universAAL Space Gateway
Awardees:	Weiwei Jiang, Zhu Haichao, Sasatani Takuya, Narusue Yoshiaki (The Univ. of Tokyo), Fukomoto Masaaki (Microsoft Research), Kawahara Yoshihiro (The Univ. of Tokyo)
Title:	A design of an asymmetric resonator for wirelessly powered wearable ring device



Fig. 5 Winner of ICM English session award

7. Acknowledgement

The organizer would like to thank Prof. Yoshiaki Tanaka at Waseda University, who made a great contribution in soliciting papers, utilizing his nationwide academic authority and human relations. He 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.

8. References

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Report on the IEICE CS workshop on “IoT; Getting Out of Hype Cycle”

Hideyuki Shimonishi[†], Akihiro Nakao^{††}, and Takanori Hayashi^{†††}
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^{†††}Hiroshima Institute of Technology



1. Introduction

The IEICE CS workshop on “IoT; Getting Out of Hype Cycle” was successfully held at the University of Tokyo, on 15th March, 2018. This workshop was sponsored by IEICE Communication Society and co-sponsored by Interfaculty Initiative in Information Studies of the University of Tokyo. The executive committee of the workshop was organized by representatives from 11 Technical Committees of IEICE Communication Society to stimulate cross-cutting discussions on IoT. This workshop consisted of 10 invited talks and a panel discussion to discuss latest technologies and business use cases of IoT. The number of participants was 86 including 25 non-members of IEICE. This article reports the outline of the workshop and active discussions.

2. Scope and Objective

Research and development of IoT technologies have been promoted as a national policy in Japan, and IoT Acceleration Forum has been organized to center the promotion. Evolutions in business development, as well as technical development, of IoT has been accelerated globally. On the other hand, an analysis of Hype Cycle of IoT [1] indicates that IoT is now on the peak of excessive expectations, and predicted to go into disillusionment phase.

In this workshop, with the expectation for “getting out of hype cycle” and further success, success stories of leading-edge IoT businesses, as well as technical problems towards further development, have been discussed. The discussion is not limited within technical areas in sensors and wireless communications, but also covered with various technical areas around IoT. More specifically, quality in wide aspects, such as communication quality, subjective qualities of end users, service quality, data quality, control quality, reliability, security, and so on, and requirements for network infrastructures to support such quality requirements, are discussed to stimulate crosscutting

discussions among researchers and engineers in various areas in communication technologies.

3. Invited Talks

The workshop was started by opening talk by Prof. Nakao (Fig. 1), followed by 10 invited talks in technology, application, and government policy areas. Overview of the venue during the talk is shown in Fig. 2.

- ✧ Toshiyuki Kanoh, NEC Corp.
Future outlook of IoT – Revolution in information and economics driven by IoT, AI and SDN
- ✧ Susumu Takahashi, SORACOM, Inc.
Business cases with IoT platform directly connected to clouds
- ✧ Moriyasu Miyazaki, Mitsubishi Electric Corporation
Centimeter order high-precision positioning services with quasi-zenith satellite, and its application to IoT services
- ✧ Shunsuke Hara, Osaka City University
Problems and technologies towards real-time biometric information monitoring system for children, students, and professional athletes in physical education classes and sport activities
- ✧ Hideo Fuseda, Ministry of Internal Affairs and Communications
Trends in technology policy of IoT
- ✧ Hiroyuki Kumagai, Fujitsu Limited
Precedents and Fujitsu activities on IoT in manufacturing area
- ✧ Shunsuke Saruwatari, Osaka University
Application of IoT technologies and wireless communication technologies in the space of building structure
- ✧ Eiji Okamoto, Nagoya Institute of Technology
Non-orthogonal multiple access scheme for massive IoT device communication in 5G uplink
- ✧ Shigeichiro Yamasaki, Kinki University
Proposal of resource possession on blockchain and three-layered structure of code game, and low enforcement

◇ Tetsuya Yokotani, Kanazawa Institute of Technology
Communication platform for the spread of IoT

4. Panel Session

The panel session was organized by Mr. Kanoh of NEC and 5 invited speakers are invited as panelists. Figure 3 shows intensive discussions in the panel session. In this session, various technologies on hype cycle were introduced to discuss the past, present, and future of Internet-of-Things and IoT Platform. And keys to shift from peak of inflated expectation to slope to enlightenment, such as technology, applications, and business success stories, were also discussed. The session then continued to discuss research trends in United States and prescriptions to Japan to catch-up to global leaders.

5. Acknowledgement

This workshop has been organized by cooperation of 11 Technical Committees of IEICE Communication Society, including technical committee on Communication Quality (CQ), Network Systems (NS), Communication Systems (CS), Ambient Intelligence and Sensor Networks (ASN), Information and Communication Management (ICM), Internet Architecture (IA), Information Network Science (NetSci), Information-Centric Networking (ICN), Healthcare and Medical Information Communication Technology (MICT), Information Network (IN), and Software Radio (SR).

6. Reference

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Workshop web site:

http://www.ieice.org/~cq_ac/jpn/iot_ws/iot_ws_01/



Fig. 1 Opening talk



Fig. 2 Overview of the venue



Fig. 3 Panel session

Activities of Technical Committee on Optical Fiber Technologies (OFT)



Masateru Tadakuma *, Hiroshi Watanabe **

Furukawa Electric Co., Ltd. *, NTT **

Web page: <http://www.ieice.org/cs/oft/jpn>



1. Introduction

The Optical Fiber Technologies (OFT) committee, which was established in April 1998, is one of the technical committees of the Communications Society of the IEICE. One of the most important aims of our committee is to contribute to technological innovation in relation to optical fiber technologies for the development of industrial applications. We do this by focusing on the technologies from cross-sector viewpoints with reference to communication engineering, measurement technologies, optical devices, and materials. When OFT committee was established, optical fiber was applied in practical use. Since then, there is a great interest in optical fiber application such as sensing, signal processing, energy transport and the progress in the study is expected in the future.

Our topics of interest mainly include optical fiber sensing, optical fiber devices, optical fiber systems, optical fiber wiring/installation, maintenance/operation, and the design of optical fiber/cables. We discuss optical devices that are applied to actual communication equipment. OFT covers research areas ranging from basic optical technology to actual maintenance.

2. OFT Activities in FY 2017

2.1 Technical meeting

We hold one- or two-day technical meetings six times a year. Many researchers participate in the meetings, and they report their latest results. The schedule in FY 2017, which consists of six regular technical meetings, is shown in Table 1. Three meetings are co-organized with other committees and there were wide range of presentations including optical communication, broadcasting, optical-electronics and laser. Seventy-six papers were presented at our regular meetings in FY 2017.

2.2 Special events of OFT in FY 2017

We held a tour of data center as a special event in 2nd technical meeting in Hokkaido. This tour was realized by support of SAKURA Internet Inc. and there was a tour of data center facility in Ishikari city and a presentation.

In the 5th technical meeting in Kumamoto where the earthquake occurred in April 2016, we had a special session of disaster recovery and maintenance of communication facilities. There were a verity of presentations such as trends of international standard

for natural disaster, disaster restoration technologies for optical transmission system and maintenance technology of manhole for communication.

Table 1 Technical meetings schedule for FY 2017

Date	Venue	Joint committee
2017 5/25 th - 26 th	Shimane Univ. (Shimane)	
2017 8/31 st - 9/1 st	Hokkaido Univ. (Sapporo)	OCS, LSJ
2017 10/12 th - 13 th	Kochi Prefectural Culture Hall (Kochi)	
2017 11/23 rd - 24 th	Kansai Univ. (Osaka)	IEE-CMN, ITE-BCT, OCS
2018 1/18 th - 19 th	Kumamoto Civic Hall (Kumamoto)	
2018 2/15 th - 16 th	Okinawa Prefectural Museum & Art Museum (Okinawa)	OPE, OCS

2.3 Poster session for students

We held the poster session for students in the 1st technical meeting (Shimane Univ.). The aim is to hold a meeting for students to present easily and to enhance the discussion between students. There were fourteen presentations. This session got a good reputation from presenters and audiences and we are going to hold a poster session in 2018.

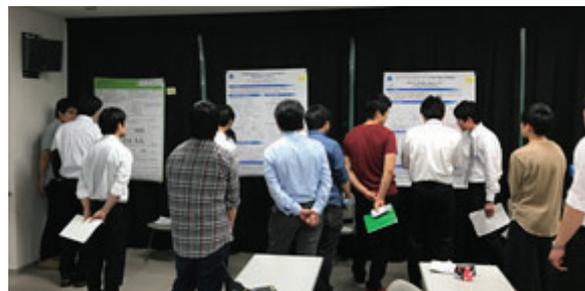


Fig. 1 Student poster session

2.4 OFT Encouragement Award in 2017

Since the program was launched in 2011, OFT has encouraged the research activities of younger researchers. This program has two awards for younger researchers and students. The winners of the Young Researcher Award were Shingo Ohno (NTT) and Shintaro Yamasaki (Furukawa Electric) who both presented papers [1,2]. The winners of the Young

Researcher Award for Students were Akihiro Maeda (Osaka prefecture Univ.), Takuya Arakawa (Shimane Univ.), Yusuke Sagisaka (Shimane Univ.), Kento Nishimura (Mie Univ.) and Heeyoung Lee (Tokyo Tech) who also presented papers [3-7].

2.5 Activities of IEICE Society and General Conferences

Fifty-eight papers were presented at the IEICE Society and General Conferences in FY 2017. We organized the symposium “Optical fiber and wiring technologies expected for data center application” on 12th September at the IEICE Society Conference 2017 (September 12th - 15th, 2017, Tokyo city Univ., Tokyo). Six outstanding speakers were invited, and they gave talks on topics about data center application. Another symposium, “Install technologies of optical fiber and cable for a variety of use and environment” was organized on 20th March at the IEICE General Conference 2018 (March 20th - 23rd 2018, Tokyo Denki Univ., Tokyo). There were seven invited talks and the directionality of cable install technologies was discussed.

2.6 The 20 year anniversary round-table talk

At the time of OFT committee’s twenty years anniversary, we held a round-table talk with successive chairpersons to have a chance to impart knowledge to the young. We had a good chance to hear the meaning of this committee and the efforts in the past in the optical fiber application field directly. We made a 20th anniversary memorial magazine including the contents of this round-table talk and distributed to many people who support the OFT committee in the 20th anniversary symposium held in 2018.



Fig. 2 The 20 year anniversary round-table talk

3. Technical Meetings in FY 2018

We plan to hold six successive technical meetings as shown in Fig.2. The 5th technical meeting in next January is going to be held in Tanegashima and we are planning a tour of Tanegashima Space Center. We would welcome your submissions to and/or participation in our conferences [8].

4. Conclusion

This report has summarized the activities of the Technical Committee on Optical Fiber Technologies. To conclude, we would like to thank all the speakers and participants for their contributions.



Fig. 3 Regular technical meetings in FY 2018

5. References

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Report on the 2018 Asian Workshop on Antennas and Propagation (AWAP2018)

Kentaro Saito
Tokyo Institute of Technology



1. History of AWAP

The Asian Workshop on Antennas and Propagation (AWAP) has been organized since 2014 to provide an international forum for the exchange of information on the progress of research and development in antennas, propagation, and related fields. It is also an important objective of this meeting to promote mutual interaction among participants. The history of AWAP is as follows.

- AWAP2014: May 14th-16th, 2014, Kanazawa, Japan
- AWAP2015: Jun. 17th-18th, 2015, Bangkok, Thailand
- AWAP2016: Jan. 27th-29th, 2016, Busan, Korea
- AWAP2017: Jun. 28th-30th, 2017, Hokkaido, Japan
- AWAP2018: Jul. 25th-27th, 2018, Pattaya, Thailand

The workshop has been managed by Technical Committee on Antennas and Propagation (TCAP) of the Institute of Electronics, Information and Communication Engineers (IEICE), Technical Group on Antennas and Propagation of the Korean Institute of Electromagnetic Engineering and Science (KIEES), and Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology Association of Thailand (ECTI Thailand).

2. Report on AWAP2018

In this year, the workshop was organized by ECTI Thailand and technically co-sponsored by IEICE TCAP and KIEES. It was held from July 25th to 27th at AVANI Pattaya Resort & Spa in Pattaya, Thailand. The workshop program is as follows.

July 25th

- Poster Session
- Welcome Reception

July 26th

- Opening Ceremony
- Keynote Invited Session
- Invited Session
- Young Scientist Award and Closing Ceremony
- Banquet

July 27th

- Technical Discussion

The number of participants was 69 (Japan: 20, Thailand: 28, Korea: 21). The participants exchanged their research activities eagerly and enjoyed the discussion in the sessions.



Fig. 1 Poster and Invited sessions

3. Award

The following three presenters won the Young Scientist Award.

➤ **Tanan HONGNARA (King Mongkut's University of Technology North Bangkok)**

Tanan HONGNARA, Sarawuth CHAIMOOL, Prayoot AKKARAEKTHALIN, “Highly Unidirectional Slot Antenna Using Transmissive and Reflective Metasurfaces for WiFi and WiMAX Applications”

➤ **Yuka ISHII (National Defense Academy)**

Yuka ISHII, Naobumi MICHISHITA, and Hisashi MORISHITA, “Design of Broadband Radar Absorbent Material by Using NSGA-II”

➤ **Yong-Hyeok LEE (Seoul National University of Science and Technology)**

Yong-Hyeok LEE, Seung-Ho KIM, and Jae-Young CHUNG, “Negative L and C Reconfigurable Non-Foster Circuit by Controlling Bias Voltage”

4. Banquet

The banquet was held after the session. The participants from each country introduced their traditional liquors of their country. The participants enjoyed delicious dishes, a variety of liquors, and friendly communication.

5. Future schedule

The next AWAP2019 is planned in Seoul, Korea from April 24th to 26th. We wish a variety of researchers in Asian countries will join the workshop to enlarge the friendship of the antenna and propagation research society.



Fig. 2 The award ceremony and banquet



Fig. 3 Group photo of all participants

Report on the 10th International Conference on Ubiquitous and Future Networks (ICUFN) 2018

Seong-Ho Jeong*, Takeo Fujii*, Sanghwan Lee**

*Organizing Chairs of ICUFN 2018, ** TPC Chair of ICUFN 2018



1. Introduction

The 10th International Conference on Ubiquitous and Future Networks (ICUFN) 2018 was held at Prague, Czech Republic, from July 3 to 6, 2018. This conference was supported by Korean Institute of Communications and Information Sciences (KICS) and technically cosponsored by the IEEE Communication Society and IEICE Communication Society.

2. Organization

The organizing committee of ICUFN 2018 was formed with the Honorary Conference Chairs, Noel Crespi (Institut Mines-Télécom, France), Ilyoung Chong (HUFS, Korea), Sungchang Lee (Aerospace Univ., Korea), Pascal LORENZ (Univ. of Haute Alsace, France), and Seung Ku Hwang (ETRI, Korea), and the Organizing Chairs, Seong-Ho Jeong (HUFS, Korea), Takeo Fujii (Univ. of Electro-Comms, Japan), Jun Heo (Korea Univ., Korea), Zary Segall (KTH, Sweden), and Zdenek Becvar (Czech Technical Univ. in Prague, Czech).



Fig. 1 A Keynote Speech by Prof. Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST))

The technical program was organized by Technical Program Committee Chairs, Sanghwan Lee (Kookmin Univ., Korea), Xin WANG (Fudan Univ., China), Howon Kim (Pusan National Univ., Korea), Suguru Kameda (Tohoku Univ., Japan), and Kun Yang (Univ. of Essex, UK). More than 170 technical program committee (TPC) members were involved in the review process.

3. Conference Program

The conference consists of one opening session, two keynote speeches, and 27 technical sessions. The opening session started with a brief introduction by Prof. Seong-Ho Jeong (OC Co-Chair), followed by two welcome addresses by Prof. Chung G. Kang (President of KICS) and Prof. Zdenek Becvar (Czech Technical Univ. in Prague, Czech, OC Co-Chair).



Fig. 2 After the opening event

After that, two keynote speeches from Prof. Mohamed-Slim Alouini (King Abdullah University of Science and Technology (KAUST)) and Prof. Choong Seon Hong (Kyung Hee University) were delivered. In the technical sessions, we had 213 presentations (selected from more than 440 submissions) with approximately 300 participants from more than 40 countries of the world, such as Korea, China, Japan, Taiwan, United Kingdom, India, Germany, Italy, USA, and so on. With regard to these technical sessions, there were 27 sessions including 4 poster sessions and the program covers a variety of topics on wireless and wired communication and networking technologies, including cognitive radios, wireless sensor networks, Internet of Things (IoT), broadband wireless communications, future network issues, mobile multimedia networking, Big data, Cloud computing, and other important technologies.

The Welcome Reception and Banquet were held at Grandior Hotel Prague. At the welcome reception, Prof. Pascal LORENZ (University of Haute Alsace, France) and Prof. Sungchang Lee (Korea Aerospace Univ., Korea) delivered welcome speeches. At the banquet, Prof. Sang Hong Lee (Dankook University, Former

President of IITP) delivered a banquet speech focusing on the efforts of Korean Government for the 4th Industrial revolution. Furthermore, to celebrate the 10th anniversary of ICUFN, Prof. Yeong Min Jang (Kookmin Univ., Korea, OC Chair of ICUFN for many years starting from the first ICUFN) provided a brief history of ICUFN. We also had a cake cutting ceremony. The best paper award ceremony was held simultaneously during the banquet session.

- Best Paper Award
 - “A Quality Selection Mechanism Using a Deep Q-Network for Seamless Video Streaming Services,” Iseul Kim, Seongjun Hong, Sungwook Jung (School of Computer Science and Engineering, Kyungpook National University, Korea), and Kyungshik Lim (Kyungpook National University, Korea)
 - “Improving Physical Layer Security of NOMA Networks by Using Opportunistic Scheduling,” Kyusung Shim (Hongik University, Korea), Tri Nhu Do (Hongik University, Sejong Campus, Korea), and Beongku An (Hongik University, Korea)
 - “Beamformer Design and Power Allocation for Two-Cluster Two-User NOMA System,” Carlo Piccoli, Stefano Tomasin (University of Padova, Italy), and Eduard Jorswieck (TU Dresden, Germany)
 - “Localization of Submerged Sensors with a Single Beacon for Non-Parallel Planes State,” Anisur Rahman and Vallipuram Muthukkumarasamy (Griffith University, Australia)

4. Conclusion

We believe that ICUFN 2018 was a truly successful conference in the area of communication and networking. On behalf of the organizing committee, we would like to thank our sponsors, KICS, IEEE Communications Society, and IEICE-CS for their kind support to this successful event. In addition, it is our pleasure to announce that ICUFN 2019 will be held at Split, Croatia, July 2 (Tue.) ~ July 5 (Fri.), 2019. (for more details, please visit <http://www.icufn.org/>).

Report on 2018 IEEE Photonics Society Summer Topicals Meeting Series: SDM and Beyond

Tetsuya Hayashi¹, and Ben Puttnam²

1: Optical Communications Laboratory, Sumitomo Electric Industries, Ltd.

2: National Institute of Information and Communications Technology (NICT)

1. Introduction

IEEE Photonics Society Summer Topicals Meeting Series (IEEE Summer Topicals) is “the premier conference series for exciting, new areas in photonic science, technology, and applications; creating the opportunity to learn about emerging fields and to interact with the research and technology leaders in an intimate environment [1],” which is held annually, and was held on July 9th to 11th at Hilton Waikoloa Village, Waikoloa, Hawaii, USA, in this year. IEEE Summer Topicals calls for topics from researchers, and topic contributors serve as topic (co-)chairs. Each topic invites prominent speakers in related fields, and accepts contributed papers. Selected topics are organized in parallel sessions. The selected topics for 2018 IEEE Summer Topicals were:

- Integrated Mid-Infrared Photonics (IMP)
- Machine Learning-Assisted Software-Defined Optical Networks (MLSDN)
- Non-Hermitian and Topological Photonics (NTP)
- Quantum Networks (QN)
- Quantum Optical Phenomena in Optoelectronics (QOPO)
- SDM and Beyond (SDMB)

Technical Committee on Extremely Advanced Optical Transmission Technologies (EXAT) technically cosponsored the SDMB topical. In total, there were 222 attendees and 235 oral and poster presentations. The geographical distribution of attendee is shown in Fig. 1.

2. Programme Outline

The SDMB topical comprised 11 contributed papers, 27 invited speakers, and 1 Tutorial. The type of contributions for SDMB and all the topicals is shown in Fig. 2.

The aim of the SDMB topical was to bring together researchers from different fields who use spatial diversity in their work, but may rarely attend the same meetings. As such the program was broken down in to 4 sub-topics with the aim to have under 50% of content based on SDM for communications.

- SDM for Communications — 5 sessions
- Modeling, non-linear effects and temporal dynamics in spatial diversity systems — 2 sessions
- SDM for Imaging — 2 sessions
- Astro-Photonics and Quantum Optics — 2 sessions

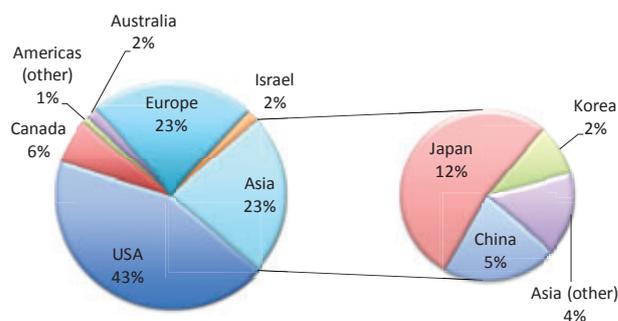


Fig. 1 IEEE Summer Topicals attendees by region [2]

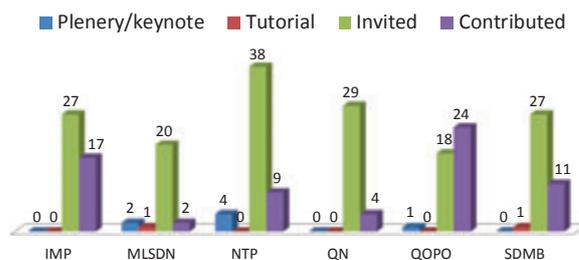


Fig. 2 Numbers of the speakers in each topical [2]

The talks on communications comprised the majority of EXAT related speakers. The tutorial talk was given by Dr. Yoshinari Awaji (NICT, the Chair of EXAT) about SDM research activities within EXAT initiative, as shown in Fig. 3. The invited talks included Dr. Itsuro Morita (KDDI Research, shown in Fig. 4), Dr. Taiji Sakamoto (NTT), Dr. Nikolaos Diamantopoulos (NTT), who presented material from his research at Osaka University, Dr. Ruben Luis (NICT), Dr. Ryuichi Sugizaki (Furukawa Electric), and Tetsuya Hayashi (Sumitomo Electric).

The Modeling section was mostly focused on multi-mode fiber (MMF) systems and contained a number of interesting talks from Prof. Cristian Antonelli (Univ. L'Aquila), Prof. Joseph Kahn (Stanford Univ.), Prof. Siddharth Ramachandran (Boston Univ.), and Prof. Demetrios Christodoulides (CREOL), who applied principles of thermo-dynamics to non-linear systems with many modes.

The Imaging section included talks by Prof. Joel Carpenter (Univ. Queensland) on Multi-Plane Light Conversion and Prof. Tomas Cizmar (Leibniz Inst. Photon. Technol.) on the use of MMFs for Microscopy.

Finally, a Session on Astro-Photonics had 2 speakers, Prof. Olivier Guyon (Univ. Arizona) and Dr. Barnaby

Norris (Univ. Sydney) currently working at the Subaru Telescope situated on Mauna Kea on Hawaii Island and described the roles of adaptive optics within large telescopes.

Besides the technical sessions, the welcome reception was held on the first day, jointly with the poster session. Participants enjoyed Hawaiian fire dance (Fig. 5) performed during the reception

At the last session of the conference, expert panel discussed the challenges, exciting technologies, and a dream device/component in the SDM field (Fig. 6).



Fig. 3 Dr. Yoshinari Awaji of NICT, presenting SDM research activities in “EXAT Initiative”

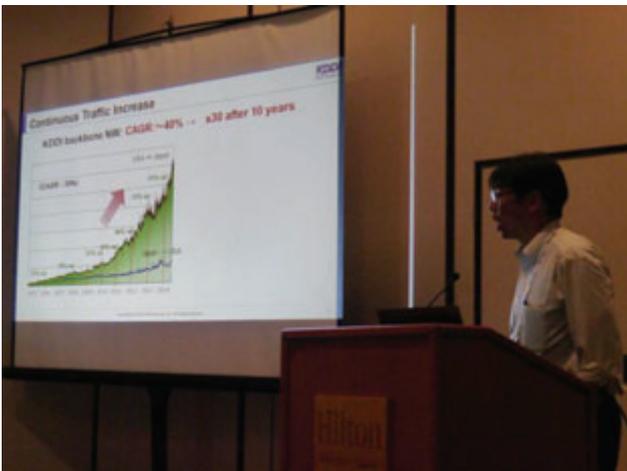


Fig. 4 Dr. Itsuro Morita of KDDI Research, giving his invited talk on the record-breaking high-capacity 10-Pb/s transmission



Fig. 5 Hawaiian fire dance demonstrated at the welcome reception



Fig. 6 Expert panel discussed the SDM technologies

3. References

- [1] <https://www.ieee-sum.org/>
- [2] B. Puttnam, “Report on ‘SDM and Beyond’ and IEEE Summer Topicals,” IEICE Tech. Rep., EXAT2018-1.

Report IEICE Information and Communication Technology Forum 2018

Piotr Zwierzykowski
Poznan University of Technology, Poland



1. Introduction

The sixth edition of the IEICE conference Information and Communication Technology Forum was held in Graz (Austria) on 11 - 13 July, 2018. The conference was hosted, for the first time in its history, by the Institute of Microwave and Photonic Engineering of Graz University of Technology. Graz is the capital of Styria and the second-largest city in Austria after Vienna. Graz has a long tradition as seat of universities and its six universities have about 60,000 students. The Old Town in Graz is one of the best preserved city districts in Central Europe and listed in the UNESCO World Heritage List.

The principal organizer of the conference was the European Section of the Institute of Electronics, Information and Communication Engineers (IEICE). The other organizers of the conference, though on a smaller scale, also included the Poznań Division of the Polish Association of Telecommunication Engineers and the Institute of Microwave and Photonic Engineering of (Graz University of Technology). In addition, the ICTF2018 was sponsored by the Communications Society of IEICE (IEICE-CS).



Fig. 1 Graz University of Technology

The 2018 IEICE ICTF aimed at encouraging the collaboration of researchers in academia and industry. The Forum gathered the researchers, professors, Ph.D. students and experts from industry to exchange ideas and discuss major trends and challenges in information and communication technologies. In the course of the conference, participants focused on presenting trends in the Future Communication Technologies and Applications. Furthermore, the aim of the conference was to promote the organizational activities of IEICE in Europe.

The opening session of ICTF 2018 was chaired by the Prof. Erich Letgeb from Technical University of Graz, General Co-chair of the conference. The conference was officially opened by the Rector of Graz University of Technology, Prof. Harald Kainz. Having welcomed the guests, Prof. Kainz in his speech briefed the participants on the history and major achievements of the University. He also pointed at the need for cooperation between different research environments. In conclusion, Prof. Kainz wished all participant of the conference success and fruitful work. In the opening ceremony his speech had also Prof. Mariusz Głąbowski from Poznan University, Chair of the IEICE Europe Section. During the speech he present the conference statistics and the biref history of ICTF conferences.

The first session of the ICTF 2018 was augmented by the very interesting presentation of Prof. Iwao Sasae entitled “Expectation to smart ICT society by accelerating research and educational activities in universities and enterprises”.

2. Conference Program

Seventeen presentations were given during the conference. Their thematic scope included: Engineering/Fundamentals, Information Processing, Electronics and Communications. The conference was attended (30 persons in total) by representatives of academia (from Japan and Europe) and industrial research centers. The presentations were organized in 5 sessions, which provided the opportunity for the participants to discuss the presentations with the rest of the audience in more detail.



Fig. 2 Ms. Aye Mon Htun from Sasase Laboratory during the conference presentation



Fig. 3 Gala Dinner hosted by the government of Styria

The participants of the conference had an opportunity to publish their expanded versions in the quarterly *Journal of Telecommunications and Information Technology* (1/2019). JTIT is a periodical published by The National Institute of Telecommunications in Warsaw (www.itl.waw.pl/publikacje/kwartalnik-jtit). Access to the articles to be published will be free of charge.

But the ICTF conference is not only about research presentation and discussions on the current issues in IT! The underlying goal of the conference was also to help promote the activity of IEICE in Europe. Therefore, during the conference, the IEICE members attending the conference (from Japan, in particular) provided answers to a variety of questions related to the activity of IEICE and IEICE Europe.



Fig. 4 Dr. Dragana Krstic during invited talk

On the first day of the conference the participants enjoyed a guided tour of the Old Town in Graz. This sightseeing excursion was to provide the participants with practical experience with the history and culture of the city of Graz. The participants were given extensive information on a number of the city's landmarks. In the evening conference guest participated in the Welcome Reception which was organized in Lord Mayor Graz.

The conference was concluded on July 13th. During his closing remarks, Prof. Mariusz Głabowski invited all participants to attend the next year's ICTF conference to be held in Bydgoszcz (Poland). After the official conclusion of the conference the participants were offered an excursion to the Austrian Open-Air Museum Stuebing near Graz in a trip through time right across Austria. In the Museum the 97 original farm buildings tell the exciting stories of construction, living, working and celebrating the life of the farming population of days gone by.



Fig. 5 Austrian Open-Air Museum Stuebing

3. Future Event

The next edition of ICTF conference will be held in Bydgoszcz (Poland) in September 2019. The conference will be hosted by the Faculty of Telecommunication, Information Technology and Electrical Engineering at the University of Science and Technology in Budgoszcz. The web page of the conference will be available at www.ictf2019.ieice-europe.org. The web page is regularly updated with current information related to the conference. As usual, all presented papers will be invited to post-conference special issue of the international journal. We invite everyone interested to participate in the conference.

Report on the 2018 IEEE International Workshop on Electromagnetics: Applications and Student Innovation Competition (iWEM 2018)

Kazunari Kihira
Secretary of iWEM 2018, Mitsubishi Electric Corporation



1. Introduction

The 2018 IEEE International Workshop on Electromagnetics: Applications and Student Innovation Competition (iWEM 2018) was held at Nagoya Institute of Technology, Nagoya, Japan, on August 29-31, 2018 [1]. Nagoya is the fourth largest city in Japan and a city with strong cultural, historical and industrial identity. Prof. Nobuyoshi Kikuma (Nagoya Inst. of Tech., Japan) and Prof. Yoshihiko Kuwahara (Shizuoka Univ., Japan) served as General Co-Chairs. This workshop was organized by the IEEE AP-S Nagoya Chapter, and technically co-sponsored by IEEE AP-S Tokyo/Fukuoka/Kansai Chapters, IEEE Nagoya Section, and IEICE Communications Society.

2. History of IEEE iWEM

iWEM started in Taipei in 2010 for the first time as “International Conference on Applications of Electromagnetism and Student Innovation Awards” (2010 ICAE/SIA), and it then continued but renamed in Taipei in 2011 as “IEEE International Workshop on Electromagnetics: Applications and Student Innovation Competition” (2011 IEEE iWEM). Supported by IEEE, this workshop series will be held in rotation in Taiwan, China, Hong Kong, and Japan. The iWEM 2018 is the 9th workshop in its series and mainly focused on innovation competition for young scholars and students in the field of electromagnetic theory, antennas including terahertz frequency, wireless communications, and related applications/topics such as wireless power transmission, metamaterial devices and so forth.

Different from other recognized conferences and/or workshops, this workshop series focuses more on student innovation competition and runs in a single session format. It provides not only an international platform for scientists and engineers to exchange their ideas, but also a good venue for young scholars and students to demonstrate their innovative results.

3. Workshop Overview

The technical session was started after the opening ceremony (Fig. 1). The technical program of iWEM 2018 consisted of 2 keynote speeches, 7 oral sessions and 2 poster sessions (Fig. 2, 3). The 121 regular papers and 6 invited papers were accepted. The total number of registered participants reached 161.

In the keynote session, the following speeches were presented;



Fig. 1 Opening ceremony



Fig. 2 Oral session



Fig. 3 Poster session

- Dr. Kazuo Sato (Toyota Central R&D Labs., Inc. Japan), “Electromagnetic Technology for Automotive Applications”
- Prof. Young Joong Yoon (Yonsei University, Korea), “Reflectarray Design Techniques for Millimeter Wave Applications”



Fig. 4 Awarded presenters



Fig. 5 Banquet



Fig. 6 Closing ceremony

The titles of the technical sessions are as follows.

1. Recent Progress in Metamaterial and Its Inspired Antennas
2. Advanced Small Antennas and Related Topics
3. Millimeter-wave Antenna Technologies
4. Antennas and Propagation Considering Human Body
5. Novel Antenna Techniques for Wireless Applications
6. New Trend in Mobile Propagation
7. EMC Related Topics

4. Awards

The Poster Session was held for two days. 72 students presented their papers as first authors and applied for the “Student Presentation Awards”. The winners were selected according to the vote by all attendees except for students (Fig. 4). We hope to report excellent studies for the prize winners in future.

1. Lingling Wang
Qingdao University of Technology, P.R. China
“Kanji Patch Antennas”
2. Daijiro Hiyoshi
Chiba University, Japan
“Development of localization method corresponding to both polarized waves in a capsule endoscope”
3. Ayano Mikunide
University of Fukui, Japan
“SLL Reduction of Circular Array by Weighting using Gamma Function”
4. Ryotaro Taniguchi
Niigata University, Japan
“A Proposal of Spatial and Temporal Propagation Model for Massive MIMO Based on Measured Propagation”

5. Toshiya Nasu
Nagoya Institute of Technology, Japan
“Performance Improvement of DOA Estimation Using Conjugate Gradient Method with Subtraction Scheme”
6. Jun Gi Jeong
Yonsei University, Korea
“Analysis of Element Design for Folded Reflectarray”
7. Tuan Thanh Nguyen
Nagoya Institute of Technology, Japan
“Via-hole Arrangement for Bandwidth Extension of Planar Microstrip-to-Waveguide Transition”
8. Yu-Jen Chen
National Sun Yat-sen University, Taiwan
“Electrostatic-Discharge Behaviour and Analysis of a Power Management IC”

5. Banquet

As a social event, the welcome reception was held at the first night, and delightful banquet party was held at the Rose Court Hotel in the evening of the 2nd day. Participants enjoyed the delicious Japanese food and string quartet music (Fig. 5).

6. Conclusion

The organizing committee of iWEM 2018 thanks all participants and people related the workshop. We believe that all participants were satisfied with the workshop. We look forward to meeting many researchers in next iWEM [2].

7. References

- [1] <http://sites.ieee.org/iwem-2018/>
- [2] <http://www.bitcomtech.com/IWEM2019/Index.html>

Report on Japan-China Workshop on the Next Generation Mobile Communication Technology and Application 2018

Satoshi Suyama
NTT DOCOMO, INC.



1. Introduction

Japan-China Workshop on the Next Generation Mobile Communication Technology and Application 2018 (JC-WS 2018) was organized in conjunction with FuTURE MOBILE COMMUNICATION FORUM, Japan-China ICT Technology Forum, and YRP R&D Promotion Committee, and was held in Qingdao, China, on August 19th-21st, 2018. JC-WS 2018 is technically cosponsored by IEICE Communication Society. The workshop focused on the latest 5G system trials and evaluation results in Japan and China and radio access technologies for beyond 5G and future mobile communication systems.

2. Workshop Program

Technical presentations of the workshop were held on August 19th-20th for two days. There were 20 presentations including keynote presentations. The first keynote presentation in the morning session was provided by Prof. You from Secretary-General of FuTURE FORUM. His keynote presentation was titled “AI for 5G: Some Research Directions”. The second keynote presentation was given by emeritus Prof. Yoshida as Chairman of 5G Mobile Promotion Forum (5GMF) in Japan. His keynote titled “Overview of Recent Activities of 5GMF in Japan”. In addition to the keynote presentations, Special Session “5G Trial in Japan” was organized by Technical Committee on Radio Communication Systems (RCS) of IEICE.



Fig. 1 Keynote presentation by emeritus Prof. Yoshida

3. Special Session of Technical Committee on RCS

The workshop consists of three special sessions in addition to regular technical presentations; 5G Trial, 5G Trial in China, 5G Trial in Japan. There were about 40 participants and intensive discussions were held. Five speakers of IEICE RCS’s Special Session are from NTT DOCOMO, INC., Fujitsu Laboratories Ltd., Panasonic Corporation, Mitsubishi Electric Corporation,

and NEC Corporation, Japan. The topics include the follows;

- Overview of 5G R&D projects and 5G field trials founded by The Ministry of Internal Affairs and Communications (MIC), Japan
- Latest activities to co-create 5G new applications and services including field experiments and system trials in cooperation with a wide range of vertical industries
- High-capacity technologies for 5G ultra high-density distributed antenna systems and field experimental results
- Optimal small cell selection technology in 5G heterogeneous networks and evaluation results using system-level simulator
- Real-time high-quality video transmission technology for 5G and evaluation results using trial equipment
- Indoor experimental trial on hybrid beamforming for high SHF wide-band Massive MIMO in 5G
- Experimental and system trials using low SHF band Massive MIMO system for 5G
- Experimental and system trials using 28 GHz band Massive MIMO system for 5G

4. Acknowledgement

We would like to give thanks to speakers, participants, and staffs of JC-WS 2018.



Fig. 2 Keynote presentation by Dr. Okumura

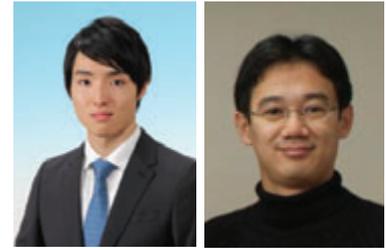


Fig. 3 Group photo

Report on Workshop on Smart City Based on Ambient Intelligence (SCAI 2018)

Kentaroh Toyoda
Keio University

Hiraku Okada
Nagoya University



1. Introduction

Smart City based on Ambient Intelligence (SCAI) Workshop was held in Hakodate, Japan on Aug. 28th, 2018, in conjunction with the 24th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA) and the 7th IEEE Non-Volatile Memory Systems and Applications Symposium. This workshop is technically co-sponsored by Keio University, Ambient Intelligence Research Center and the IEICE technical committees on Ambient Intelligence and Sensor Networks (ASN).

2. Aim of SCAI

“Ambient Intelligence” refers to the ambient environment containing ICTs to realize a smart city. Ambient intelligence is based on various ICT related technologies, such as sensors, networks, pervasive computing, artificial intelligence, and so on. In ambient intelligence sensing environments and obtaining data about them are essential tasks. Sensed data are locally processed and/or transmitted to the place, “Cognition” where useful information is extracted from the transmitted data. Sensing environments and transmitting the sensed data are referred to as IoT or sensor network, depending on where we talk about them. The sensed data are often referred to as big data. Based on the information extracted from the collected sensed data, ambient intelligence adaptively changes the environments and/or presenting the useful information to enhance and/or assist human activities, that is, to realize smart city.

Toward future generation, it is important to realize a smart city based on ambient intelligence. From this point of view, we planned to hold a workshop “Smart City based on Ambient Intelligence”.

3. Workshop Overview

The SCAI workshop had three research presentation sessions and two keynote sessions. In the keynote sessions, Prof. Takaya Yamazato, who is a professor of Nagoya University, Japan, gave a talk about “Vehicle-to-Everything (V2X) Communications,” and Prof. Polly Huang, who is a professor of National Taiwan University, presented her research topic entitled “YuShanMAC: Realizing Fine-Grained Time Synchronization and TDMA-fashioned MAC for Mission-Critical DTSNs”. In the research presentation sessions, 12 technical talks were given. Their topics widely cover the technologies about Ambient Intelligence.

In the Workshop, we had about 35 participations including attendees from the main conferences and students. Most of them joined the Workshop dinner, and deepened their friendship with delicious foods and drinks.

4. Conclusions

In this report, we briefly introduced the SCAI workshop, which was held on Aug. 28th, 2018. We believe that all participants were satisfied with the presentations and social events in the workshop.

The Ambient Intelligence Research Center of Keio University and ASN are planning to hold the Vietnam-Japan Joint Workshop on Ambient Intelligence and Sensor Networks in Hanoi on Nov. 29th – Dec. 1st, 2018. You can see the details of the workshop on the website: http://www.ieice.org/~asn/2018_Vietnam_WS_eng.php Please join the workshop, and have fun together!



Fig. 1 Keynote talk by Prof. Yamazato



Fig. 2 Audiences of SCAI 2018

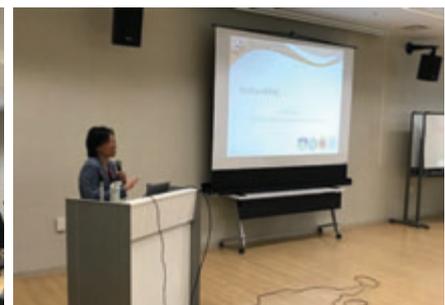


Fig. 3 Keynote talk by Prof. Huang

IEICE-CS Related Conferences Calendar

Date	Conference Name	Location	Note
26 Oct. – 30 Oct. 2020	2020 International Symposium on Antennas and Propagation (ISAP2020)	Osaka, Japan	TBD
28 July – 2 Aug. 2019	IEEE International Geoscience and Remote Sensing Symposium 2019 (IGARSS 2019)	Yokohama, Japan	Submission due: 8 January 2019
7 July – 11 July 2019	The 24 th Opto-Electronics and Communications Conference / International Conference on Photonics in Switching and Computing 2019 (OECC / PSC2019)	Fukuoka, Japan	Submission due: 28 February 2019
3 June – 7 June 2019	2019 Joint International Symposium on Electromagnetic Compatibility and Asia-Pacific International Symposium on Electromagnetic Compatibility, Sapporo (EMC Sapporo & APEMC 2019)	Sapporo, Japan	Submission due: 24 December 2018
29 May – 31 May 2019	International symposium on extremely advanced transmission technology (EXAT 2019)	Ise, Japan	Submission due: 15 March 2019
20 May – 23 May 2019	International Conference on DC Microgrids (ICDCM2019)	Matsue, Japan	Submission deadline: Closed
8 April – 10 April 2019	The 14 th International Symposium on Autonomous Decentralized Systems (ISADS2019)	Utrecht, Netherlands	Submission deadline: Closed
11 Feb. – 13 Feb. 2019	2019 International Conference on Artificial Intelligence in Information and Communication (ICAIIIC 2019)	Okinawa, Japan	To be held soon
16 Dec. – 18 Dec. 2018	International Japan-Africa Conference on Electronics, Communications and Computations 2018 (JAC-ECC 2018)	Alexandria, Egypt	To be held soon
4 Dec. – 6 Dec. 2018	International Conference on Smart Grids (icSmartGrids2018)	Nagasaki, Japan	To be held soon
26 Nov. – 27 Nov. 2018	Internet Conference 2018 (IC2018)	Tokyo, Japan	Done
12 Nov. – 14 Nov. 2018	The 24 th Asia-Pacific Conference on Communications (APCC2018)	Ningbo, China	Done
6 Nov. – 9 Nov. 2018	2018 Asia-Pacific Microwave Conference (APMC 2018)	Kyoto, Japan	Done
23 Oct. – 26 Oct. 2018	2018 International Symposium on Antennas and Propagation (ISAP2018)	Busan, Korea	Done
22 Oct. – 24 Oct. 2018	2018 IEEE 7 th International Conference on Cloud Networking (CloudNet2018)	Tokyo, Japan	Done
17 Oct. – 19 Oct. 2018	International Conference on Information and Communication Technology Convergence 2018 (ICTC2018)	Jeju Island, Korea	Done
14 Oct. – 17 Oct. 2018	International Conference on Renewable Energy Research and Applications (ICRERA2018)	Paris, France	Done

Date	Conference Name	Location	Note
19 Sep. – 21 Sep. 2018	Photonics in Switching and Computing 2018 (PSC 2018)	Limassol, Cyprus	Done
29 Aug. – 31 Aug. 2018	2018 IEEE International Workshop on Electromagnetics: Applications and Student Innovation Competition (iWEM 2018)	Nagoya, Japan	Reported on this issue
28 Aug. 2018	Smart City based on Ambient Intelligence (SCAI 2018)	Hakodate, Japan	Reported on this issue
18 Aug. – 21 Aug. 2018	Japan-China Workshop on the Next Generation Mobile Communication Technology and Application 2018	Qingdao, China	Reported on this issue
11 July – 13 July 2018	2018 IEICE Information and Communication Technology Forum (2018 IEICE ICTF)	Graz, Austria	Reported on this issue
9 July – 11 July 2018	IEEE Photonics Society 2018 Summer Topicals Meeting Series (IEEE Summer Topicals 2018)	Hawaii, USA	Reported on this issue
3 July – 6 July 2018	The 10 th International Conference on Ubiquitous and Future Networks (ICUFN 2018)	Prague, Czech Republic	Reported on this issue
2 July – 6 July 2018	The 23 rd Opto-Electronics and Communications Conference (OECC 2018)	Jeju Island, Korea	Done

Please confirm with the following IEICE-CS web site for the latest information.
<http://www.ieice.org/cs/conf/calendar.html>

EMC Sapporo & APEMC 2019

2019 Joint International Symposium on Electromagnetic Compatibility and
Asia-Pacific International Symposium on Electromagnetic Compatibility, Sapporo

Sapporo Convention Center, Sapporo, Japan

June 3 -7, 2019

- After five years of EMC'14/Tokyo -

Organized Session Proposal Deadline: October 26, 2018

Paper Submission Deadline: December 24, 2018

<http://www.ieice.org/~emc2019/>



First
Call for Papers

OECC/PSC 2019

24th Optoelectronics and Communications Conference/
International Conference on Photonics in Switching and Computing 2019

July 7-11, 2019
Fukuoka, Japan



Fukuoka International Congress Center, Fukuoka, Japan

<http://oeccpsc2019.org>

Paper Submission Deadline: February 28, 2019

Sponsored by:  IEICE Communications Society  IEICE Electronics Society

Technically Co-sponsored by:  IEEE Photonics Society  OSA (The Optical Society)

In corporation with:  PHOTONIC INTERNET FORUM  OITDA  CIAJ  IEEE  ITE  SICE  The Japan Society of Applied Physics  Information Processing Society of Japan  OSJ

IEEE Communications Society Tokyo/FK/HR/NG/SP/SK/SE Joint Chapter

WELCOME MESSAGE

OECC

It is our great pleasure to welcome you to the 24th Optoelectronics and Communications Conference (OECC 2019) which will be held from July 7th to 11th 2019 at Fukuoka International Congress Center, Fukuoka, Japan. OECC is one of the foremost international conferences held annually in the Asia-Pacific region for the researchers and engineers working in the fields of optoelectronics, optical fiber transmission, and photonic network systems. It has been providing the best international forum to present and discuss the progress in research and development of these areas.

In addition, OECC 2019 is planning to be held jointly with Photonics in Switching and Computing (PSC) at Fukuoka, a city of a gateway of Japan to Asia from ancient times. We believe that this joint conference attracts a lot of related engineers and researchers for most of the opto-electronics and communication field.

On behalf of the organizing committee, we would like to express our hearty welcome to all of you who are participating in OECC 2019, and hope you all will have a pleasant stay and experience in Fukuoka.

SCOPE

OECC

01. Core/Access/Data Center Networks and Subsystems
02. Transmission Systems and Subsystems
03. Optical Fibers, Cables and Fiber Devices
04. Optical Active Devices and Modules
05. Optical Passive Devices and Modules

PSC

- P1. Photonics in Switching Technologies, Systems, and Architectures for Communications and Networking
- P2. Photonics in Switching Technologies, Systems, and Architectures for Computing and Big Data

PAPER SUBMISSION GUIDELINES

Authors are requested to submit the paper electronically through the online submission interface no later than **February 28, 2019**.

- The paper submission procedure will be managed via online paper submission system.
- Each author is requested to submit a 35-word abstract and a three page-long summary in PDF file (single space with single columned).
- Copyright form must be submitted together with the paper. Copyright form is provided as part of your submission in our online submission system.

NOTE: Authors must create a PDF file according to the IEEE PDF Specification for IEEE Xplore. All submissions MUST be IEEE Xplore compliant and the best way to insure this is to use IEEE PDF express. (<http://www.pdf-express.org/>)

Important Date:

Paper Submission starts December 2018
Paper Submission due date February 28, 2019 (JST, UTC+9)
Acceptance Notification End of April, 2019
Post Deadline Paper (PDP)
Submission due date June 21, 2019
PDP Acceptance Notification July 7, 2019

For more details, please visit our website:
<http://oeccpsc2019.org>

PSC

The Photonic in Switching and Computing (PSC) conference welcomes you to Fukuoka, Japan in July 2019. PSC is a unique conference which addresses all aspects of optical networks including: i) optical systems and subsystems, ii) optical components and devices, and iii) network control and management for telecom, datacom, high performance computing (HPC), and big data. The main focus is on optical switching technologies for networking and computing systems with emphasis on vertical integration from technologies to systems and architectures. Some of latest research in PSC areas will be presented in a stimulating environment with in-depth and open discussions of the latest trends in this area.

PSC is the successor of the well-known Photonics in Switching (PS) conference which has been running annually since 2001 alternating location between North America, Europe and Asia. PSC 2019 is the second conference edition, explicitly integrating emerging computing topics. PSC 2019 will be jointly held with OECC. We strongly believe that this joint conference will provide attendees with a great opportunity to explore the wide spectrum of research topics spanning from device to networking technology and their integration. We encourage all of you to submit your up-to-date research results to PSC 2019.

See you in Fukuoka.

Call for Papers



**IGARSS
2019**

2019 IEEE
International Geoscience and
Remote Sensing Symposium

July 28 - August 2, 2019 Yokohama, JAPAN
Pacifico Yokohama

ORGANIZERS



Invitation to IGARSS 2019 in Yokohama

Hosted by the IEEE Geoscience and Remote Sensing Society, the International Geoscience and Remote Sensing Symposium 2019 (IGARSS 2019) will be held from Sunday July 28th through Friday August 2nd, 2019 at the Convention Center "PACIFICO Yokohama" in Yokohama, Japan. The conference main theme highlights "Disasters and Environment."

On behalf of the IEEE Geoscience and Remote Sensing Society and the IGARSS Organizing Committee, we invite you to participate in IGARSS 2019, the world's premier symposium on geoscience, remote sensing and related topics. We look forward to meeting you in Yokohama during IGARSS 2019.

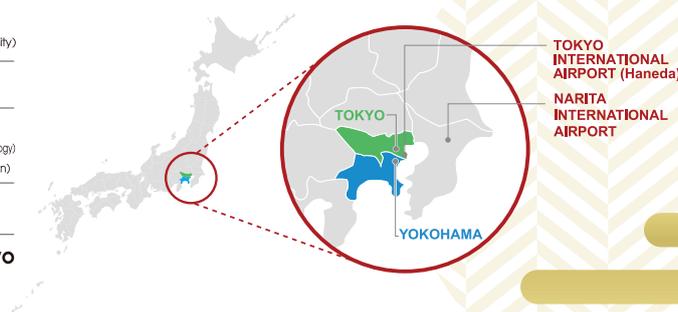
I Organizing Committee

General Chair	Akira Hirose (The University of Tokyo)
Technical Program Co-Chairs	Irena Hajnsek (ETH Zurich, DLR) Akira Iwasaki (The University of Tokyo) Hiroyoshi Yamada (Niigata University)
Finance Chair	Takeo Tadono (JAXA)
Local Arrangements Chair	Kei Suwa (Mitsubishi Electric Co.)
Sponsorship Chair	Shouhei Kidera (Univ. Electro-Commun.)
Publicity Chair	Ryo Natsuaki (The University of Tokyo, DLR)
Publications Co-Chairs	Takuya Sakamoto (University of Hyogo) Junichi Susaki (Kyoto University)
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I Important Dates

Invited Session Proposal Deadline	5 October 2018
Invited Session Acceptance Notification	5 November 2018
Paper Submission System On-line	12 November 2018
Tutorial Proposal Deadline	12 November 2018
Tutorial Proposal Acceptance Notification	10 December 2018
Paper Submission Deadline	8 January 2019
Student Paper Competition Deadline	8 January 2019
Travel Support Application Deadline	8 January 2019
Submission Status Available On-line	29 March 2019
Registration Open	29 March 2019
Final Submission Deadline	27 May 2019
Early Registration Deadline	27 May 2019
IGARSS 2019	28 July - 2 August 2019

I Location of Yokohama



I Technical Program

IGARSS is a premier event in remote sensing and provides an ideal forum for obtaining up-to-date information about the latest developments, exchanging ideas, identifying future trends and making networking with the international geoscience and remote sensing community.

The IGARSS 2019 technical program will include the following general themes:

- | Data Analysis Methods
- | Atmosphere
- | Cryosphere
- | Oceans
- | Land
- | Missions, Sensors and Calibration
- | Data Management and Education

In addition special scientific themes will be addressed, including:

- | Monitoring of natural disasters and hazards
- | NewSpace initiatives in remote sensing
- | Big data and machine learning
- | Identification of Remote Sensing indicators for climate change

I Student Paper Competition

IEEE Geoscience and Remote Sensing student members are invited to submit a paper to the IGARSS Student Paper Competition. The selection of the finalist papers will be done by a committee of experts and the selected students will present their papers during a special session at the Symposium.

I Publication of Proceedings

Accepted papers will be published in the proceedings on IEEE Xplore only if presented at the Symposium by one of the listed authors duly registered.

I Paper Submission

Authors who wish to give a presentation are requested to submit a paper (minimum of two pages; maximum of four pages). A link to submit the paper online will be available at the Conference website beginning November 12, 2018.

I Welcome to Yokohama, Japan!

Yokohama is a waterfront city located adjacent to the capital city of Tokyo and is just half an hour from Haneda Airport. The city can also be promptly and comfortably accessed from Narita Airport by train or bus. There is Japan's largest convention center "Pacifico Yokohama" in the harbor area. International conferences, exhibitions and events are held throughout the year, and many tourists visit from home and abroad. In addition, since the port opening in 1859, international cultures have been cultivated in Yokohama. You can enjoy your stay visiting historic sights, sightseeing spots and shopping areas pre and post IGARSS 2019.



<http://igarss2019.org>



International Symposium

EXAT 2019



CALL FOR PAPERS

**SUBMISSION DEADLINE: MARCH 15, 2019
(POSTER ONLY)**

Place: Lifelong Learning Center ISETOPIA, Ise, Japan

Date: May 29 (Wed) – May 31 (Fri) 2019

This is the 5th EXAT international symposium after EXAT 2008/2013/2015/2017 held in Tokyo, Sapporo, Kyoto and Nara. Its objective is to discuss the current status and challenges for practical implementation of 3M (multi-core, multi-mode, multi-level transmission) technologies.

For more details please visit <http://exat-sympo.org>

Co-sponsor



Technical co-sponsor



Special Section Calendar of IEICE Transactions on Communications

Issue	Special Section	Note
Oct. 2020	New Era of Satellite Communication / Broadcasting / Application Technologies	Submission due: 1 October 2019 See page 41
Sep. 2020	Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019	Submission due: 1 October 2019 See page 40
Apr. 2020	Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure	Submission due: 13 May 2019 See page 39
Jan. 2020	Internet Architecture, Applications and Operation Technologies for a Cyber-Physical System	Submission due: 15 February 2019 See page 38
Dec. 2019	No special section this issue	
Nov. 2019	No special section this issue	
Oct. 2019	Exploring Drone for Mobile Sensing, Coverage and Communications: Theory and Applications	To be issued
Sep. 2019	Enhancing Information Centric Networking Technologies Towards Real-world Infrastructure	To be issued
Aug. 2019	Technology Trials and Proof-of-Concept Activities for 5G and Beyond	To be issued
Jul. 2019	Communication Technologies and Service Qualities in Various Access Networks	To be issued
Jun. 2019	Healthcare, Medical Information and Communication Technology for Safe and Secure Society	To be issued
May 2019	European ICT R&D Project Activities on Broadband Access Technologies in Conjunction with Main Topics of 2016/2017 IEICE ICT	To be issued
Apr. 2019	Sensing, Wireless Networking, Data Collection, Analysis and Processing Technologies for Ambient Intelligence with Internet of Things	To be issued
Mar. 2019	Network Virtualization and Network Softwarization for Diverse 5G Services	To be issued
Feb. 2019	Recent Progress in Antennas and Propagation in Conjunction with Main Topics of ISAP2017	To be issued soon
Jan. 2019	No special section this issue	
Dec. 2018	No special section this issue	
Nov. 2018	No special section this issue	
Oct. 2018	Wireless Distributed Networks for IoT Era	Vol. E101-B, No. 10

Please confirm with the following IEICE web site for the latest CALL FOR PAPERS
<http://www.ieice.org/event/ronbun-e.php?society=cs>

----- **Special Section on Internet Architecture, Applications and Operation Technologies
for a Cyber-Physical System** -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Internet Architecture, Applications and Operation Technologies for a Cyber-Physical System" in the **January 2020** issue.

The Internet has become an important social infrastructure which underpins human activities, it is now widely integrated into society as a part of our lives. In the future, data will be generated from all kinds of places, people, things, and various data distribution and utilization will be further accelerated.

Establishing a "cyber-physical system" which creates new value for society will become increasingly important by collecting various data in the real (physical) world with the sensor network or the Internet and analyzing and knowledge using large-scale and distributed data processing technology. To deploy the cyber-physical system widely in society, it is important to establish multilateral solutions including not only the design of the Internet architectures and protocols but also the contributions against security issue between the real world and cyberspace. Platform technologies that enable to collect, storage and analysis various data using distributed computing, cloud edge computing, etc. are also indispensable. The network management and operation technologies should be sophisticated to feedback the analysis results obtained by these platforms from cyberspace to the real world. Because of such reasons, we call for publications (scheduled to appear in the January 2020 issue) to further promote research and development of Internet architecture, applications and operation technologies for a cyber-physical system.

1. Scope

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

- * Architectures and protocols for the CPS(Cyber-Physical System) / IoT(Internet of Things)
 - routing and traffic control technologies for large and complex networks
 - software-defined networking, network function virtualization, information centric networking, delay tolerant networking
 - sensor network, vehicular network, data center network
 - network security
- * Platform technologies for the CPS(Cyber-Physical System) / IoT(Internet of Things)
 - distributed computing, grid computing, cloud computing, edge computing, inter-cloud technologies
 - bigdata/social data analysis platform, test bed system
 - M2M network, P2P network
- * New applications in cyber physical society
 - IoT applications, bigdata analysis applications, simulation, embedded applications, applications of artificial intelligence
 - case studies involving implementations and experiments adapted to cyber physical society
- * Network management and operation technologies / experiences to accelerate the CPS
 - IoT device management methods
 - QoS/QoE support mechanisms, management methods for huge devices, access control technologies
 - security technologies, e.g., authentication, authorization and accounting mechanisms, intrusion detection

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.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site https://review.ieice.org/regist/regist_baseinfo_e.aspx by February 15, 2019(JST). Authors should choose the **Internet Architecture, Applications and Operation Technologies for a Cyber-Physical System** as a "Journal/Section" on the online screen. Do not choose [Regular EB].

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* The accepted papers will be published online soon after notification of acceptance on the web site of Transactions Online. For detailed information, please visit http://www.ieice.org/eng/shiori/page2_cs.html#8

Call for Papers

----- Special Section on Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure" in the April 2020 issue.

To realize the "Industry, innovation and infrastructure" and "Sustainable cities and communities" adopted as the parts of the SDGs (Sustainable Development Goals), the achievement of "Society 5.0" concept, which brings us the broad range of innovations resulting from the data-driven cooperation between various services and industries, is essential. For this achievement, since the amount of traffic transmitted in several kinds of networks increases significantly and the traffic pattern also becomes more diversified than ever, it is indispensable to build up a new sustainable social information infrastructure network that can accommodate such huge and diversified traffic, while providing the flexibility, the robustness, and the intelligence for dealing with all kinds of situation. Therefore, emerging new network resource control and management technologies that can utilize in the wide range of environments such as wireless access networks, wireless core networks, substrate networks, and cloud networks, are expected. Theoretical performance analysis, simulation/emulation experiments, and experimental evaluations are also important to deploy the promising technologies for sustainable social information infrastructure.

Besides, in welcoming the 2020 Tokyo Olympic and Paralympic, a special section is being planned (scheduled to appear in the April 2020 issue) to further promote the above-mentioned researches and technologies for sustainable social information infrastructure. We thus call publications to discuss and develop the network resource control and management technologies including not only the emerging technical fields such as AI/Machine-Learning, IoT/IoE (IoX), 5G, Mobile Edge/Fog Computing, network virtualization/softwarelization/programmability, optical transport network, wireless access/core network, and infrastructure/cloud network, but also the promising application fields such as big data, cooperation in different fields, and utilization of data.

1. Scope of Network Resource Control and Management

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

- Artificial Intelligence (AI)
- Machine Learning (ML)
- Internet of Things/Everything (IoT/IoE: IoX)
- 5th Generation (5G)
- Fog Computing
- Multi/Mobile Edge Computing (MEC)
- Network Function Virtualization (NFV)
- Network Programmability
- Software-Defined-Network (SDN)
- Network Slicing
- Network Softwarization
- Microservice Architecture/API
- Energy-Efficient/Green Network
- Big Data
- Data Utilization
- Fixed Mobile Convergence (FMC)
- Cross Field Cooperation
- Wireless Access/Core Network
- Network Infrastructure
- Cloud Networking
- Optical Network Architecture
- Mobile Networks
- Security/Privacy
- Information/Content Centric Networking (ICN/CCN)
- Performance Analysis/Simulation/Experiment

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.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site https://review.ieice.org/regist/regist_baseinfo_e.aspx by **13th May 2019 (JST)**. Authors should choose the "Network Resource Control and Management Technologies for Sustainable Social Information Infrastructure" as a "Journal/Section" on the online screen. Do not choose [Regular EB].

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* The accepted papers will be published online soon on the web site of Transactions Online after the payment of page charges has been completed. For detailed information, please visit http://www.ieice.org/eng/shiori/page2_cs.html#8

Call for Papers

----- Special Section on Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019 -----

The IEICE Transactions on Communications announces that it will publish a special section entitled " Special Section on Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019 " in the **September 2020 issue**.

In the Electromagnetic Compatibility (EMC) field, there are conventional research topics such as interference among electronic equipment and on telecommunications. Recently, there raises new research topics with rapid spread of information communication technology: security and interference issue in IoT and wireless technologies and wireless power transfer technology that improves our lifestyle. Moreover, relation between nature phenomenon and electromagnetic environment and bioelectronics interactions are still important topics. The EMC field becomes much important in several many academic and industrial fields. In the June 2019, an international symposium on EMC (EMC Sapporo & APEMC 2019) will be held in Sapporo, Japan and many EMC issues will be discussed there. Because of such reasons, a special section is being planned (scheduled to appear in the September 2020 issue) to further promote research and development of future EMC fields as follows.

1. Scope

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

EMC Management: *Laboratory Accreditation, EMC Education, EMC Measurements: Standards and Regulations, Radiated and Conducted Emission and Immunity tests, Emission limits, Test Instrumentation & Facilities, Electromagnetic Environment: Natural and Man-made noise source, Control Intentional and Unintentional Emissions, Electromagnetic Interference Control: Shielding, Grounding & Meta-materials, High Power Electromagnetics: ESD and Transients, Lightning EM fields and Currents, EMP and IEMI, Information Leakage, Spectrum Engineering: Adaptive Interference Mitigation, Communications System EMC, Antenna and Wave Propagations, Low Frequency EMC: Power System EMC, Renewables, Electric Vehicles, Energy Efficient Technologies, Computational Electromagnetics: Numerical Modeling, Signal and Power Integrity: Chip, Package, PCB & Cables, Transmission Lines, Nanotechnology & Advanced Materials: Nanomaterials, Nanotubes and Nanofibers for Gaskets and Absorbing Screens, EMC for Emerging Wireless Technologies: Wireless Coexistence, Intra-System Interference, Wireless Power Transfer, Smart Grid, Power Electronics EMC: Power Electronics Converters/Inverters EMI/EMC, Grid-Connected PV Systems, Wind Farms, Transportation & Vehicles EMC, EMF Safety & Biomedical Issues, Human exposure to ELF/RF EM fields, Biological Effects, Medical Application, Medical Devices & Hospital Equipment, Others.*

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.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site https://review.ieice.org/regist/regist_baseinfo_e.aspx by **October 1 2019 (JST)**. Authors should choose the [Special-MC] Special Section on Electromagnetic Compatibility in Conjunction with EMC Sapporo and APEMC 2019 as a "Journal/Section" on the online screen. Do not choose [Regular EB].

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Call for Papers

----- Special Section on New Era of Satellite Communication / Broadcasting / Application Technologies -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on New era of Satellite Communication/Broadcasting/Application Technologies" in the October 2020 issue.

Satellite communications have been mainly used for disaster-relief communications, backup communications and/or mobile communications on maritime ships and airplanes. Recently, due to remarkable technology progress on both satellite and terrestrial stations, HTS (High Throughput Satellite) systems consisting hundreds of multi-beams and/or thousands of small satellites have started to provide broadband services for earth stations in motions and as backhaul for cellular phone. On the other hand, as for satellite broadcasting, 4K/8K special technologies have been studied so as to be standardized. Its TV services will be widely spread all over the Japan toward 2020. Further, these developed technologies are applied to many other use for such as UAS (Unmanned Aircraft System), HAPS (High Altitude Platform System), Monitoring system using AIS (Automatic Identification System) and so forth.

This special section will provide an opportunity to summarize the recent research output on satellite communication/broadcasting/application technologies. Your contribution to this special section would be greatly appreciated.

1. Scope

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

- Satellite communications (fixed-satellite communications, mobile satellite communications, inter-satellite communications, optical satellite communications, deep space communications, HTS, MEO, LEO)
- Satellite broadcasting (BS, mobile broadcasting, 4K/8K)
- Satellite applications (Unmanned aircraft communications system, HAPS, AIS, Positioning)
- Others on the elementary technologies, the system/earth station technologies, the onboard technologies and the applications concerning the above topics.

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.

This special section will accept papers only by electronic submission. Submit a manuscript and electronic source files (LaTeX/Word files, figures, authors' photos and biographies) via the IEICE Web site https://review.ieice.org/regist/regist_baseinfo_e.aspx by **October 1, 2019 (JST)**. Authors should choose the [Special-CB] Special Section on Satellite Communication/Broadcasting/Application Technologies as a "Journal/Section" on the online screen. Do not choose [Regular EB].

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● IEICE Societies and Publications

Society	Transactions	Editorial Subject Indexes
A (Fundamentals of Electronics, Communications and Computer Sciences)	EA (English) A (Japanese)	Engineering Acoustics, Noise and Vibration, Speech and Hearing, Ultrasonics, Digital Signal Processing, Analog Signal Processing, Systems and Control, Nonlinear Problems, Circuit Theory, VLSI Design Technology and CAD, Numerical Analysis and Optimization, Algorithms and Data Structures, Graphs and Networks, Reliability, Maintainability and Safety Analysis, Cryptography and Information Security, Information Theory, Coding Theory, Communication Theory and Signals, Spread Spectrum Technologies and Applications, Mobile Information Network and Personal Communications, Intelligent Transport System, Image, Vision, Computer Graphics, Language, Thought, Knowledge and Intelligence, Human Communications, Neural Networks and Bioengineering, Multimedia Environment Technology, Communication Environment and Ethics, Concurrent Systems, Measurement Technology, General Fundamentals and Boundaries
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
Journal of IEICE (written in Japanese only)		

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Member (overseas)	1,400	7,000	3,500 / 1society	6,000
Member (overseas) with OMDP*	1,000	5,000	3,000 / 1society	6,000
Student member (overseas)	-	2,000	2,000 / 1society	6,000
Student member (overseas) with OMDP*	-	1,000	1,500 / 1society	6,000

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2. If you want to register other Societies and Transaction of web version, please check "Additional Society registration".

Example: If you want to subscribe to Transaction of EA and EB, please check **Society Registration** as "A", **Additional Society registration (optional)** as "B". Your membership fee amounts to 7,000+3,500 yen / 5,000+3,000 yen.

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Surface mail charge is included in the membership charge. Optional rapid mailing service is available by air mail or surface air lifted (SAL) mail. The additional charge per year periodical depends on the mailing address, as shown in the right table.

Areas	Air mail	SAL mail
Asia; Guam; Midway islands	5,600 yen	3,200 yen
Oceania; Near & Middle East; North & Central America; Europe	7,800 yen	4,400 yen
Africa; South America	11,000 yen	5,600 yen

Please contact the IEICE Membership Section: E-mail:member@ieice.org FAX: +81 3 3433 6659 Please fill out the application form printed on the next page.

IEICE Overseas Membership Application Form

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: First name _____ Middle name _____ Last name _____ **Nationality:** _____ Male
 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 _____

(For Student Member) Academic degree which will be conferred on you _____ Month & year when the degree will be conferred on you _____

Application Information

Membership: I want to apply for the following membership (check one item!)

- Member (Overseas) Student Member (Overseas)
 ◆ If you want to apply for OMDP, please check; OMDP (Overseas Membership Development Program)

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

- A: Engineering Sciences B: Communications C: Electronics D: Information and Systems

Additional Society (optional): A: Engineering Sciences B: Communications 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)

Journal subscription (optional): (Japanese)

Remittance

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

Admission charge.....¥ _____	Journal subscription (optional).....¥ _____
Annual charge.....¥ _____	Mailing option: <input type="checkbox"/> Air mail.....¥ _____
Additional Society (optional)..... ¥ _____	<input type="checkbox"/> 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

Endorsements by one IEICE Member application is required. If it is difficult to find endorsers, please contact the IEICE Membership Activities Section by sending this sheet, and we will help you.

I recommend this applicant for IEICE membership.

Endorser's name _____	Membership number _____	Endorser's signature _____	Date _____
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**IEICE-CS Overseas Membership with Special Annual Fees
for Sister Society Members**

To foster the cooperation between the Sister Society and the IEICE Communications Society (IEICE-CS), the Sister Society agreement enables members of each institution to become members of both societies by granting special annual fees.

A 10% - 20% discount* of the annual fees will be granted to the sister society members to become the IEICE-CS overseas members. The discounted fees will be applied for the individual members when the new membership is starting or the current membership is renewing.

* The discount does not apply to the optional items and services i.e. “Additional Society”, “Additional Transactions of paper version” and “Rapid Mailing Service”.

----- Please send the following Sister Society membership information, together with membership application form in the next page. -----

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)

From Editor's Desk

●Season's greetings

Hello, everyone! I'm Yohei Koga. In June of this year, I became the Director of Planning and Member Activities of IEICE-CS, and started editing the IEICE-CS GLOBAL NEWSLETTER (GNL). I would like to deliver attractive contents to you.

IEICE General Conference will be held at Waseda University, Tokyo, March 19th – 22nd, 2019. Complete English sessions are also scheduled in the conference to promote globalizations of IEICE's academic activities.

By the way, Waseda University is one of the most famous university in Japan. Waseda University was established by Shigenobu Okuma who was prime minister of Japan. There are two statues of Shigenobu Okuma in Waseda University. One of them has height of 3 meters. Please participate in IEICE General Conference and look for statues.

IEICE-CS GLOBAL NEWSLETTER Editorial Staff

Editorial Staff of this issue

No special order is observed.



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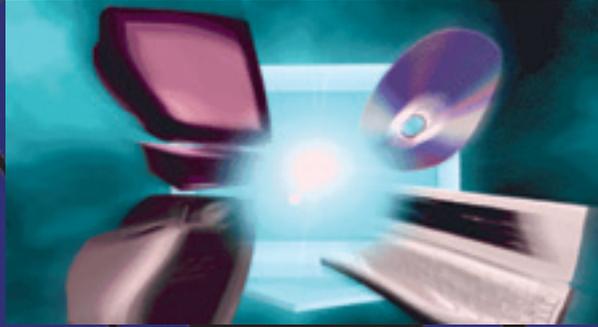


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To Probe Further and Keep Up-to-date with Communication Technologies

IEICE Communications Society



IEICE General Conference 2019

19–22 March 2019

Waseda University, Nishiwaseda Campus, Tokyo

Every spring, each Society organizes a General Conference to provide a forum where members can present their study results and exchange views. At present, four of the Societies -- the Engineering Sciences Society, the NOLTA Society, the Communications Society, and the Electronics Society -- hold their Society Conferences as a joint event. The Communications Society Conference includes English-language sessions in addition to the Japanese-language sessions.

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

Kikai-Shinko-Kaikan Bldg.,5-8, Shiba-Koen, 3, Minato-ku, Tokyo, 105-0011, JAPAN

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IEICE Communications Society: cs-secretariat@ieice.org