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Study of a Backup Service Concept Using Secure Distributed Networks

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1. Introduction

In the present advanced information society, most social activities are supported by the electronic data infrastructure. However, at this time, there is no technology to back up institutes' important file data in the event of an unexpected disaster. Given these circumstances, highly secure technology to address this issue needs to be developed at an affordable development and operational cost.

This paper presents a state-of-the-art backup service concept using high-speed strong cipher technologies to realize efficient and economical distributed network services by means of a threshold secret-sharing scheme. We have developed and partially commercialized a disaster recovery system and evaluated the feasibility of the distributed engines [1-2]. In order to provide the proposed backup service, a combination of the following technologies including spatial random scrambling of file data, subsequent random fragmentation of the file, encryption and duplication of each fragmented file at each encryption stage, and a corresponding encryption key code sequence (encryption metadata) can effectively realize a secure and prompt file backup service. In the event a disaster impacts a data backup center, prompt data recovery can be easily and securely achieved by making use of a very large number of widely distributed wired PCs and mobile phones in addition to cloud computing environments [3-5]. Finally, we also propose future technologies for preventing an insider attack in order to guarantee a safe backup service.

2. Related work and Comparison with Our Concept

In the field of file recovery services, there have been numerous research reports and many commercial products have been released onto the market. Most file recovery systems include data replication functions using stand-by servers in remote locations. In contrast, the proposed file recovery system using High Security-Disaster Recovery Technology (HS-DRT) uses a secure distributed data backup scheme. By making use of the HS-DRT mechanism to achieve a reliable backup scheme, we have been able to provide a system product at a reasonable price to both individual users and companies. In the field of secure data backup systems, other related studies have included the

concept of a distributed file backup system [6-7]. However, in these studies, a practical network service system is not clearly described.

In the field of intrusion tolerance, a file server should introduce such functions as encryption, fragmentation, replication, and scattering [8]. The core technologies of HS-DRT resemble those of a persistent file server, except for the spatial scrambling and random dispatching technology. By effectively combining these technologies, deciphering the encrypted message by a third party becomes almost impossible.

In contrast, the proposed HS-DRT is applicable to other communication service fields including secure video streaming services and secure real-time delivery confirmation services. By making use of HS-DRT to achieve a reliable backup service, we have been able to provide a system product at a reasonable price to both individual users and companies. Fig.1 shows the concept of the proposed network service compared with a conventional backup system using leased lines.

3. Basic Configuration of the HS-DRT Engine

The HS-DRT file backup mechanism has three principal components, as shown in Fig.2.

The main functions of the proposed network components, namely, data center, supervisory server and various client nodes, can be specified as follows. The client nodes at the bottom of Fig.2 are PCs, smartphones, network attached storage (NAS) devices, digital signage and cloud-based storage services.

They are connected to a supervisory server in addition to the data center via a secure network. The supervisory server (on the right in Fig.2) acquires the history data, which includes the encryption key code

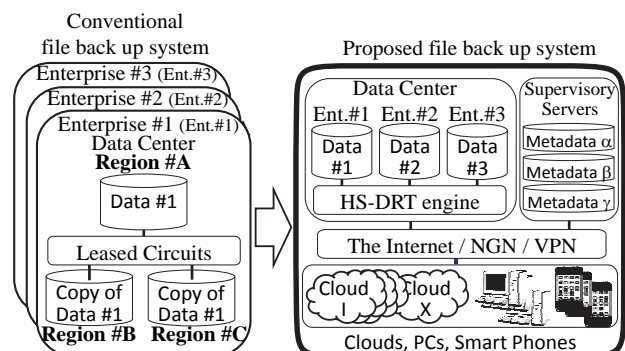


Fig. 1 Comparison with a conventional backup system

sequence (metadata) from the data center (on the left in Fig.2) via a network. The basic procedure in the proposed network system is described in the following paragraph.

It is appropriate for the data center to incorporate a secret sharing scheme for sending encryption metadata to the supervisory servers deployed in several different locations for deciphering the original file data. To enhance security, it is preferable to send the metadata using a virtual private network (VPN). This mechanism makes it quite difficult to discover any sequence in the encryption metadata itself. From a disaster recovery perspective, a secret sharing scheme with some appropriate “thresholds” should be introduced into the proposed system. If the system adopts a (3, 5)-threshold scheme, the system will use five supervisory servers, and can tolerate the simultaneous failure of two servers. On the other hand, from a cyber-terrorism viewpoint, if the system uses a (3, 5)-threshold scheme, a cracker has to gain access to at least three encryption metadata servers and one live/valid information server at the same time [11].

3.1 Backup Sequence

When the data center receives the data to be backed up, it encrypts the data, scrambles it, and divides it into fragments, and thereafter replicates the data to the extent necessary to satisfy the required recovery rate according to the pre-determined service level. The data center encrypts the fragments again in the second stage and distributes them to the client nodes in a random order. At the same time, the data center sends the metadata to be used for deciphering the series of fragments to the supervisory servers. The metadata comprises encryption keys (for both the first and second stages), and several items of information related to fragmentation, replication, and distribution. When a block cipher is used for encrypting a data file, the required processor and memory costs increase in an exponential manner with increasing data volume. However, with a stream cipher, the input data is simply operated on a bit-by-bit basis, using a simple arithmetic operation, and high-speed processing becomes feasible.

We propose a simple, high-speed message encryption

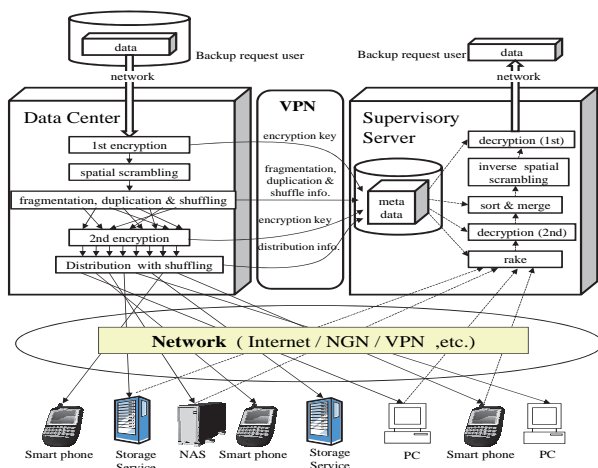


Fig. 2 Basic mechanism of HS-DRT

algorithm called spatial random scrambling as follows. Fig.3 shows the algorithm for spatial random scrambling introduced in the HS-DRT engine. This scrambling procedure can be realized by executing the algorithm using a C language description. Here, operator “ \oplus ” indicates a reversible operation, such as exclusive-or, binary addition, or binary subtraction. It is strongly recommended to repeat this process several times. De-scrambling can be achieved simply by performing the same operation in reverse order. By introducing this spatial random scrambling, deciphering original data becomes almost impossible because of the random distribution of fragments in several unpredictable locations. An effective approach is to combine the use of several technologies, specifically, the spatial scrambling of all data files, the random fragmentation of the data files, and the corresponding encryption/replication, in addition the distribution of each file fragment.

The security level of HS-DRT depends not just on the cryptographic technology but also on the method by which the three specified factors are combined, that is, spatial scrambling, fragmentation/replication, and a shuffling algorithm such as Fisher-Yates shuffle [9]. Because of these three factors, nobody is able to decrypt the data without collecting all relevant fragments and sorting the fragments into the correct order. Even if some fragments are intercepted, nobody is able to decrypt any part of the original data from such fragments.

3.2 Recovery Sequence

When a disaster occurs, the supervisory server initiates the recovery sequence. The supervisory server collects the encrypted fragments from the relevant clients in a manner similar to a rake reception procedure. When the supervisory server has collected a sufficient number of encrypted fragments, these are decrypted, merged, and descrambled in the reverse order of that performed during the second stage of encryption, and the decryption is then complete. Through these processes, the supervisory server can recover the original backed-up data.

Let us consider the probability of successful recovery, which can be estimated from the following equation. Fig.4 describes the principle of the arithmetical method

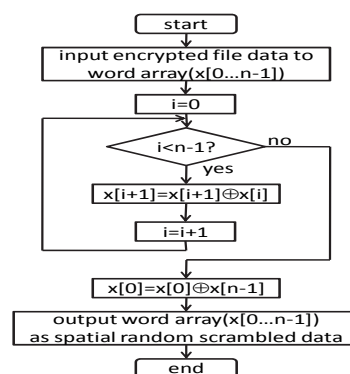


Fig. 3 Algorithm of spatial random scrambling

for file backup.

$$\begin{aligned} \text{Probability of recovery} &= (1 - P^n)^m \cong 1 - mP^n \\ \text{Probability of recovery failure} &\cong mP^n \end{aligned}$$

Here, P is the failure rate of each client node, m is the number of fragments, and n is the number of duplicates of each fragment.

Fig.5 shows the calculated file recovery rate on the condition that each file fragment's failure rate, P, is assumed to be 0.2, and the original file is divided into 30/50/100 fragments, and at most 30 replications are made of each fragment. In this example, the probability of recovery failure becomes less than 10^{-19} , which is commercially accepted standard for high reliability. The above case applies to the use of smartphones, cellular phones, or PCs. The failure rate of such devices can be estimated to be 0.2 by considering their connectivity and reliability, however, the number of duplications can be drastically decreased when cloud computing resources are used, for which unavailability is usually less than 0.005. Here, the size of users' important data is roughly classified into two types, called Type1 and Type2. The data size of Type1 is at most around several tens of gigabytes, while that for Type2 is up to several terabytes. Considering a smartphone's memory capacity to be 32 Gbytes, these are used for Type1 based on the assumption that less than 1% of the vacant memory resource in the terminals available would be used to support the backup service. This percentage can usually be measured by the user's self-check monitoring and the monitored result can be transmitted to the remote supervisory center. The value of 1% is an example of the conditions to be temporarily assigned to encourage people to participate. Several cloud storage resources can be effectively utilized for

Type2 data. When cloud storage is used, then a much higher level of reliability will be commercially available.

3.3 User-friendly Service Level Assurance

It is very important to respond promptly to the various service level demands from users, which tend to change frequently, to ensure reliable and economical backup services. It is desirable for the backup services have the flexibility needed in order to accommodate the frequent changes in service level requirements, such as security strength and/or guaranteed recovery rate, by effectively utilizing the available network resources. In this case it is necessary to provide a user-friendly Web interface to realize the above-mentioned requirements [10]. We can establish appropriate network architecture that can deliver the necessary service levels and will incorporate both the security strength level and recovery rate parameters shown in Fig.6.

Service level	Security strength and recovery rate	(Number of fragments) × (Degree of duplication)
Low level	Encryption Strength: more than 2^{60} Recovery rate: more than $1-2 \times 10^{-19}$ (when $p=1/5$)	20 × 10
Medium level	Encryption Strength: more than 2^{100} Recovery rate: more than $1-4 \times 10^{-13}$ (when $p=1/5$)	40 × 20
High level	Encryption strength: more than 2^{160} Recovery rate: more than $1-8 \times 10^{-30}$ (when $p=1/5$)	80 × 30

Rate of file data recovery = $1 - mp^n$ (when $p=1/5$)
 Degree of duplication for each fragment: n
 Failure rate of each client node: p
 Number of fragmented files: m

Fig. 6 Disaster recovery service levels

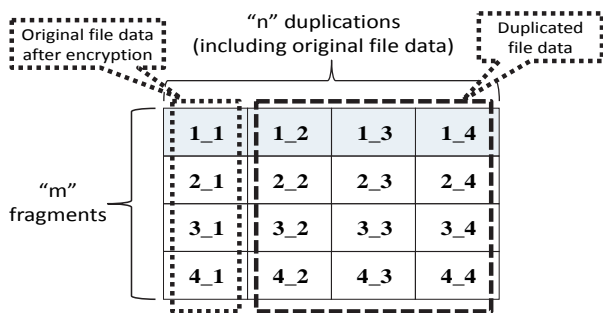


Fig. 4 Principle of the arithmetical method for file backup

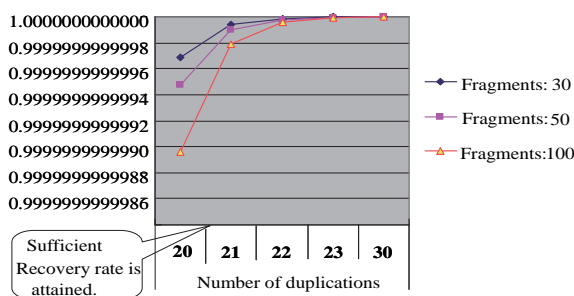


Fig. 5 File recovery rate characteristics

3.4 Computational Safety

The main purpose of encryption is to prevent a third party from deciphering encrypted data, thereby ensuring computational safety. However, if the computing power available for deciphering becomes higher, the safety of the encryption process will be threatened. For example, the present encryption technologies, such as RSA cryptography, elliptic curve cryptography, and ElGamal cryptography cannot be assumed to be 'forever safe' because they are based on computational difficulty such as integer factorization and the discrete logarithm problem. In addition, since conventional encryptions are applied to communications between one fixed site and another. This means that it is generally quite easy to identify the locations in which data are stored.

One of the innovative ideas of the proposed backup mechanism is that it requires a unique correct combination of all the required fragments from all the local sites to recompose the essential sequence of fragments. If the number of fragments is N, then hackers would need to capture all the fragment packets and try to recompose them about $N!/2$ times to take even the first step towards deciphering the information. Therefore, it is impossible to discover any clues about meanings or even the relations among the fragments. Let us consider a case requiring 100 fragments to be recomposed. It would be necessary to calculate for 10^{146} s ($= 3 \times 10^{138}$ years) even if each deciphering step required just 1ps using a quantum computer.

For example, if Grover's algorithm [14] is run on a quantum computer, a search that would require time

$O(N)$ on a classical computer can be completed in just $O(\sqrt{N})$. Grover's algorithm can be used to examine multiple fragments of a message simultaneously by adjusting the phases of various operations to form an extremely large array of data in which the fragments are randomly deployed, with no known relationship among them.

Let us consider a case in which the number of deciphering steps N is certain to be quite safe in the current computational environment. If the hacker attacks the encrypted distributed data using Grover's algorithm, then the required calculation will be decreased to $O(\sqrt{N})$, making it possible to decipher the file in a short time. However, by making use of the proposed technology we only need to increase the number of fragments from N to $2N$ to increase the required deciphering steps to $O(\sqrt{2N})$.

Here, after $2N$ divisions of the data, the computational complexity can guarantee a sufficiently high difficulty barrier even for a quantum computer. This is because the following formula is easily proved.

$$(\forall n \in \mathbb{N}) : n! < \sqrt{(2n)!}$$

This fact leads to the safe application of the proposed system to a future encrypted backup service even when quantum computers become common. We believe that our proposed disaster recovery system is NP-complete [13], and that kind of system is expected to be safe against attacks launched from quantum computers.

4. Practical and Innovative Application Services

This section describes practical experimental systems that could be realized by making use of the proposed HS-DRT in cloud computing environments [12]. It is preferable to use the web applications in a SaaS environment. The client user terminal can make use of the application services, which are provided through a web applications server. For example, when a user wants to utilize one of the web application functions for storing individual specific data automatically, the user selects the applicable function such as "store", or "store automatically" as shown in Fig.7. The HS-DRT engine, which also has a web application function, executes the encryption, spatial scrambling, and division of the corresponding files. In succession, it sends and stores the corresponding encrypted fragmented data to a public or private storage cloud. As to whether it should use a private or public cloud, it

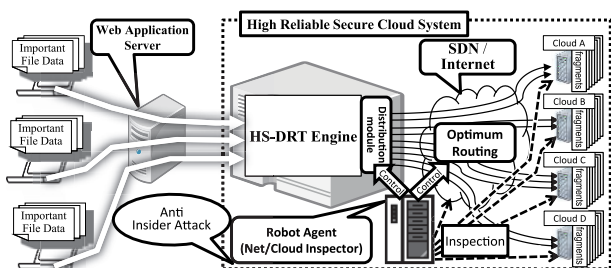


Fig. 7 File backup service mechanism using cloud environments

acts in accordance with a pre-determined criterion depending on the type of web application. It is very important to note that an HS-DRT processor can easily improve its processing efficiency by increasing its web cache memory. We should consider the scalability of the engine, since it may become a bottleneck in a very large system owing to the number of clients and the amount of storage required. In such cases, the HS-DRT processor may use a key/value database. The secrecy of the system is maintained because there is no plain raw data stream anywhere in the entire data processing procedure.

HS-DRT can be applied to a variety of network services, including secure video streaming services. Fig.8 shows a sample implementation of a secure camera monitoring system using HS-DRT. In the streaming sender (on the left hand side of Fig. 8), the picture frames or GOP of the MPEG video from the camera are encrypted, scrambled, and divided into "m" pieces. Thereafter, each of the "m" pieces is further divided into "n" fragments. These $(m \times n)$ fragments are sent via $(m \times n)$ TCP/UDP streams. At the time of sending, each fragment is assigned the appropriate destination TCP/UDP flow port number by using the shuffle table. In the streaming receiver (on the right of Fig.8), the "m" pieces are assembled by sorting and merging $(m \times n)$ fragments. The receiver merges and descrambles them in the reverse order, and decrypts "m" pieces to recover the original captured data. This implementation is considered to be a special case, because the cloud storage resources and the supervisory server were integrated in the streaming receiver on the right. In this implementation the sending and the receiving side have to share the secret keys. These shared secret keys consist of the encryption key, the information regarding fragmentation, and the shuffle tables.

5. Insider Attack on Block Ciphers

5.1 Background

We need to consider the case of an insider attack, in which a malicious vendor of a security system attacks his clients by using his cipher program, which is generally a block cipher. It can be shown that the Initial Vector (IV) mode [11][12] of the block cipher is vulnerable to an insider attack. However, we will propose a countermeasure to this attack.

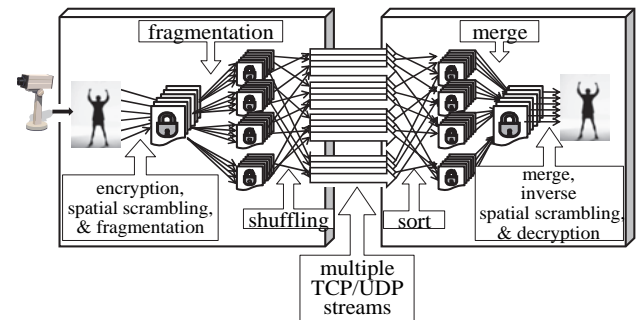


Fig. 8 Secure video streaming system with HS-DRT

While we are planning to provide a safe and secure system for data backup, a client may be uneasy because the data might be stolen through an unexpected insider attack. To prevent this situation, we need to introduce the original block cipher mode, solely for this purpose.

In an attack on the block cipher based on the IV mode, the vendor, as the supplier of the cipher program, is assumed not to have any malicious intentions towards clients. The safety of block ciphers like the Advanced Encryption Standard (AES) has been discussed under such assumptions.

The cipher-block chaining (CBC) mode or counter mode are recommended as safe methods to take the place of the electronic code book (ECB) mode. Since the AES actually exhibits steady performance and reliability, it has been adopted as a world standard. However, if an insider were motivated to conduct an attack, one would usually be unaware of the fact. What sort of program could an ill-intentioned vendor produce to yield a successful insider attack? This is a serious concern in a disaster recovery service environment that makes full use of cloud computing systems. We need to resolve this kind of problem when we offer disaster recovery services.

First of all, let us define a model of an insider attack on a block cipher.

1) The vendor of a cipher program attacks a user of that program.

2) The cipher program outputs only the cipher text through the client user's input of key and message data. However, the cipher program itself is inaccessible to the network.

3) The user can preserve the cipher text, and he can always confirm its content by decoding according to the publicized coding method.

4) The attacker can obtain only the cipher text.

But the initialization vector (IV) mode of the block cipher is not safe, as follows.

Here, we show an example of an insider attack in Fig.9. Let K_u be a user's 128-bit Key and K_e be the attacker's secret key. The attacker writes the encryption program, and the user executes this program as follows.

1. The program is passed the plaintext X and K_u .
2. The program factors K_u into K_1, K_2, K_3 and K_4 , where $K_i (\forall i = 1, 2, 3, 4)$ are each 32 bits long.
3. The program generates 32-bit random number R , and replaces K_4 with R . Let D be (K_1, K_2, K_3, R) .
4. The program calculates $IV = Enc(K_e, D)$, where $Enc()$ should be the block cipher, and uses this IV as the initial vector in the CBC(Cipher Block Chaining) mode encryption of X . Let Y be $(IV, C = Enc(K_u, X))$. IV appears to be a random number.
5. The attacker gets Y from the network.
6. The attacker can get K_u by a brute-force attack on R within an hour.

When this method is implemented with hardware, it is especially difficult to detect such an attack. This type

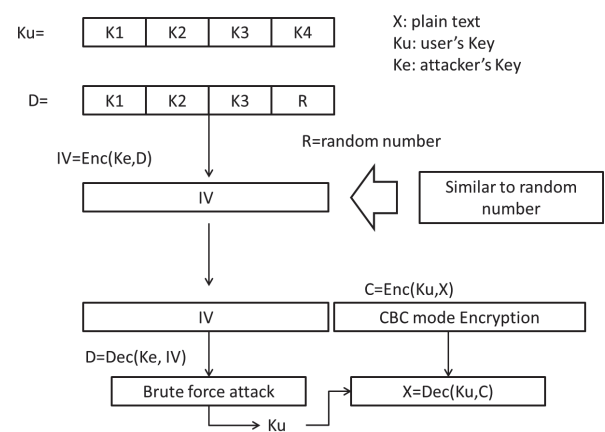


Fig. 9 Encryption mechanism of an insider attack

of attack is not addressed by protocol analyzers such as AVISPA or Scyther since in their treatment of cryptographic primitives they adopt the so-called black box approach. Even if we could detect the insider attack by using a protocol analyzer and reverse engineering a cryptographic primitive, it would be extremely difficult to identify the same attack for another primitive. However, we propose an integration mode for block ciphers, as described below, which can prevent all insider attacks.

5.2 Innovative Model of an Insider Attack on Block Ciphers

Now, we propose an encryption mode that is not vulnerable to an insider attack. This encryption mode does not have redundancy, and has the specific characteristic of not being vulnerable to an insider attack. Moreover, it has greater security than the block cipher that was originally used.

We can provide a proof for this using a non-trivial one-to-one correspondence $f : M \rightarrow f(M)$ (integration transform).

Let $Enc(K_u, M)$ and $Dec(K_u, C)$ be the encryption and decryption, respectively, of the ECB mode of a safe block cipher. In $Enc(K_u, M)$ we adjust the length of M by zero padding. At this time, the encryption and decryption are defined by $C = Enc(K_u, f(M_0))$ and $f^{-1}(Dec(K_u, C))$, respectively, where M_0 denotes the zero padding of M . In what follows, let $Length(M)$ be the number of bits of any message M .

Theorem 1. If the block cipher $Enc(K_u, M_0)$ is safe then $Enc(K_u, f(M_0))$ is also safe.

(For the proof, see [12].)

Theorem 2. $Enc(K_u, f(M_0))$ is safe against an insider attack. (For the proof, see [12].)

As mentioned above, client users of the disaster recovery system are generally vulnerable to a potential insider attack by the system vendor.

However, use of the method proposed here can avoid this kind of vulnerability by using the AES or ECB integration mode.

6. Conclusion

In this paper, we clarified the widely distributed innovative file backup service concept by combining a series of technologies such as the spatial scrambling of a file, fragmentation, random distribution of a fragmented file, and secure supervisory servers deployment using a threshold scheme. By making use of cloud storage, widely distributed PCs and smartphones, a secure file backup service can be realized economically. Using the proposed mechanism makes illegal data restoration by third-party tapping impossible, and very secure and cost-effective data backup services can be realized.

We also proposed a network architecture that can realize user-friendly service level control, and clarified what the situation will be when quantum computers become available. We introduced practical network service applications not only for a disaster recovery service, but also for a secret video streaming service. Finally, we proposed future technologies that can prevent an insider attack and guarantee a safe backup service.

7. Acknowledgements

This work has been partially supported by the study (Issue number: 151) of the National Institute of Information and Communications Technology (NICT) of Japan.

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Life after Japan: the Danish Case

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1. Introduction

I am happy to read many letters about the experiences of IEICE members residing in Japan; most times, these letters put a smile on my face as I also found the experience memorable. This is the reason I felt compelled to write about an aspect foreigners face sometimes: life after Japan. I lived in Japan from 2006 to 2011, first through a Japanese Society for Promotion of Science scholarship and hosted by Osaka University, and then at Hitachi Central Research Laboratory. I never learnt as much as I did during this period, surrounded by brilliant people who mentored and took a personal interest on me.

In late 2011, I joined the Technical University of Denmark, where I am currently an Associate Professor in the area of Photonic Communications. And against the odds, I have found ways to stay in touch with Japan. I will explain how in the next sections.

2. Denmark and Japan

I first need to describe Denmark a bit; Japanese people know Denmark mainly because of the pastry shops (Andersen), cutlery (Royal Copenhagen) and toys (Lego). However, there is more than this. Denmark is a main supplier to Japan of high quality pork, shrimps and cheese, diabetes drugs and off-shore wind mills. Minimal in size in comparison with other western countries, this presence is huge when considering Denmark has a population of 5.5 million people (think Hokkaido with half the space). This good relation has been identified and is nurtured in Denmark. For example, the Copenhagen Business School [1] offers a Bachelor in Asian Studies specialized in Japan: students in this program study Japanese language to a business level, along with culture, economics and sociology. Aarhus University offers not only the bachelor, but also a Master program specialized in Japan.

The academic presence of Japan is not only limited to tertiary education. Young graduates from high school in Denmark can spend time in Folk High Schools such as Bosei, a formerly Japanese boarding school under Tokai University, and now focusing on teaching youngsters through Japanese fine arts and sports.

3. Bringing Japan to Denmark and participating

This interest for Japan translates in many events and networks with a Japanese flavor happening in Copenhagen. Every year, the Sakura festival [3] is organized next to the Little Mermaid, and it includes demonstrations of ikebana, tea ceremony, traditional

dances, mochi making and serving, haiku, martial arts and even karaoke.

Local city halls often dedicate season long cultural activities about Japan (see Japansk Forår in Gladsaxe Kommune [4]).



Fig. 1 Events related to the Sakura Festival next to the Little Mermaid.

4. Scientific opportunities – a way to stay in touch

The European Commission already identified and financed joint projects in the area of ICT during the FP7 (2007-2013), and has laid out a roadmap of joint activities in the framework of Horizon2020 [5]. For the last years, the EC in liaison with the NICT has launched twin calls in the area of optics and photonics, enabling the possibility to jointly tackle scientific challenges. Beyond research activities, also education had found its way through Erasmus Mundus Master programs – last year I had the chance to spend a month at Osaka University as MAPNET Scholar. MAPNET is a Master of Photonics provided by different top European universities and Japanese industrial actors [6].

Education reaches PhD students too, and our group is happy to collaborate with the Director of Japan Studies at the Asia Research Center of CBS, Prof. Clausen, in providing training in cross-cultural management. This is done in the framework of a Marie Curie action, which are training projects funded by the European Commission with the aim of preparing the next generation of researchers. Marie Curie actions are in essence open to Japanese organizations [7].

Copenhagen is also home for OFS, a Furukawa company dedicated to optical fiber. The local OFS branch, dedicated to specialty fibers lays close to DTU campus and the department has a solid and fluid communication with managers and researchers.

The existing opportunities to collaborate impact not only me, but young students too: last year one of my students enjoyed the opportunity to do research in Japan through the MiniLab Frontier program for a month and attended the OECC 2013 conference, which was held in Kyoto. In a more extended manner, the Japan Society for Promotion of Science, have been actively supporting European scientist to spend time in Japan at top research-oriented organizations [9].

The Danish government is equally aware of the importance of maintaining good bilateral relations with Japan, and has been consistently funding the International Network Programme [9]. This program provides funding to host bilateral workshops or start bilateral scientific networks.

5. Conclusions

Leaving Japan is not an easy cookie, as the country offers excellent research facilities and is pooled by top engineers and scientist. Besides, many aspects of the daily life are very convenient and designed to please the costumer. However, leaving is not the end of the world, as there are many opportunities around to remain in touch professional and personally with Japan.

6. Acknowledgements

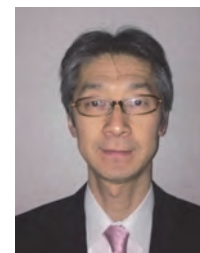
I must acknowledging Prof. Kenichi Kitayama from Osaka University, for his long standing support and mentorship, and Dr. Kenichi Sakamoto from Hitachi CRL for his superb leadership skills and friendly personality.

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Annual Report of Technical Committee on Network Systems



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1. Introduction

This report covers the annual activities of the IEICE Technical Committee on Network Systems (NS). It describes activities at the monthly technical meetings, recent research topics of the committee, and the research awards for 2013.

2. Technical Meetings

The schedule from April 2013 to March 2014 consists of 10 technical meetings and one workshop (as shown in Table 1). Several meetings are co-located with the OCS (Optical Communication Systems), PN (Photonic Network), RCS (Radio Communication Systems), ASN (Ambient intelligence and Sensor Networks), SR (Software Radio), CS (Communication Systems), IN (Information Networks), ICM (Information and Communication Management), or CQ (Communication Quality) committees.

Recently presented papers mainly focus on technologies that support new generation network, SDN, network virtualization, cloud computing, green ICT, ad-hoc and P2P networking, traffic control /

measurement, quality of service (QoS), and security issues. At each technical meeting, we host lectures by invited speakers who are experts in their fields. During this fiscal year, we have had invited lectures on network simulator, smart housing, 100Gbps optical transmission, DTN, flexible mobile networks, network observation, TV white space, disaster recovery, and other topics. In fiscal 2013, we had 191 presentations from academia and 88 from industry.

Since June 2003, we have fostered the work of young researchers who have presented papers at technical meetings by inviting them to give a follow-up talk some months later. We call these the “incentive lectures.” We invited 6 young researchers to give such lectures in the past year. We will continue this activity.

In addition, we had a training camp where 37 students studied to use the network simulator ns-3.

3. Research Awards 2013

The Technical Committee selected recipients of the Network System Research Award from among 250 regular papers that had been presented at monthly

Table 1 Technical meeting schedule for fiscal 2013

Date	Location	Theme	Co-location with
April 18–19	Wajima Chamber of Commerce and Industry (Ishikawa)	Traffic, Performance Evaluation, Resource Management, Network Reliability	
May 16–17	Sokendai (Kanagawa)	Protocol, Multicast, Routing, P2P, Architecture	
June 20–21	Nihon University (Fukushima)	Photonic Network, Traffic Engineering, Ethernet, Optical Switching	OCS, PN
July 17–19	Act City Hamamatsu (Shizuoka)	FMC, Distributed MIMO, MANET, Sensor Network	ASN, RCS, SR
September 12–13	Tohoku University (Miyagi)	Post-IP Network, New Generation Network, TCP/IP, Network Modeling	IN, CS
October 17–18	Hokkaido University (Hokkaido)	Network Architecture, Scale Free Network, Active Network, Grid	
November 14–15	Fukue Lyceum (Nagasaki)	Network Quality, Network Virtualization, Network Measurement	CQ, ICM
December 18–20	Sunport Hall Takamatsu (Kagawa)	Mobile Network, Ad hoc Network, Access Network, Security	RCS
January 23–24	Ryukyu University (Okinawa)	Network Software, Distributed Control, SOA, IMS	
March 6–7	Phoenix Seagaia Resort (Miyazaki)	General, NS/IN Workshop (March 5–6)	IN

technical meetings from January to December 2013. The award is given to the authors of the three or four best papers of each year. The 2013 recipients attended the award ceremony at the NS/IN Workshop (Fig. 1) held in Miyazaki in March 2014. The abstracts of the four papers that won awards in 2013 are as follows.

Lu Chen, Shin'ichi Arakawa, and Masayuki Murata: “Sustainability Analysis of Topologies with Different Network Heterogeneity Described by Mutual Information of Remaining Degree” [1]

As the Internet becomes the social infrastructure, it is important to design the Internet that has adaptability and sustainability against environmental changes. However, dynamic interactions of various network-related protocols make the Internet into a complicated system. Therefore, a new network design method which has the adaptability against the failure of network equipment and has the sustainability against changes of traffic demand is becoming important. Since complex networks display heterogeneous structures that result from different mechanisms of evolution, one of the key properties to focus on is the network heterogeneity where, for example, the network is structured heterogeneous rather than homogeneous by some design principles of information networks.

In this paper, we investigate the diversity of router-level topologies by using mutual information of remaining degree. Here, the diversity of topology means how diverse the inter-connections are in any sub graphs chosen from the topology. In a study of complex networks, they calculated the mutual information of remaining degree and shown that they have relatively lower mutual information in biological networks. This means they are relatively diverse. Our results show that the mutual information is high, which means less diverse, at the most of router-level topologies, indicating that the router-level topologies are highly designed by, e.g., the network operators. We also generated topologies with different mutual information, and evaluate the sustainability against changes of traffic demand. We showed that the additional link capacity needed to accommodate a new traffic demand is higher in a router-level topology than that in a topology with lower mutual information.

Konomi Mochizuki, Hirofumi Yamazaki, and Akira Misawa: “Proposal on a Relocation Method of Virtual Machines for Edge Cloud Architecture” [2]

In the network, the edge functions including address translation, authentication and packet filtering are currently installed on the highly-functional routers and fixed on the certain locations. Since one highly functional router is needed even in an area with few users, the equipment cost increases. To solve this problem, we are investigating “Edge Cloud Architecture”, which is able to optimize the amount of the equipment and the location of the edge functions. By installing the edge functions on the virtual machines (VMs) and relocating those on the optimal equipment

using the live migration technology, electrical power saving and effective utilization of the equipment become to be possible.

In this paper, we propose a bandwidth control method and an order decision method of the live migrations to complete all migrations with the bandwidth guarantee of user traffic, in the case that the migration traffic and the user traffic use the common links. When the distributed VMs are migrated to the aggregation server, because the user traffic is being distributed to each server at the time the relocation starts, the bandwidth available for VM migration traffic is large. However, when all the VMs are concentrated at the aggregation server, the competition for bandwidth by the user traffic in the aggregation server becomes very intense. Therefore, the bandwidth that can be used for VM migration traffic is small at the end of relocation. Based on this tendency, the order of migration is set sequentially starting with the VM that requires the largest bandwidth for migration. The results of evaluation show that by using proposed method, a relocation, which is not realized by the random method, can be realized with the bandwidth guarantee of user traffic. The proposed method is effective when VM relocation carried out in a short time in the edge cloud.

Daisuke Ishii, and Michitaka Okuno: “A Study on Redundant Data Processing Units Reconfiguration Method in Scalable and High Reliable Communication Node” [3]

This paper proposes a redundancy reconfiguration method to in order to realize a scalable and high reliable communication node at low capital expenditure and at low operation expense.

By the rapid increase in volume of traffic with the spread of cloud computing and smart phones, telecommunication carriers have three problems. First one is to keep up with increasing traffic. For the increase of traffic, telecommunication carriers have excessive amounts of network resources like routers, switches, gateways, servers, and so on. Second one is to accommodate diversifying services. Telecommunication carriers are required to have enough network resources to satisfy peak performances of all services. Third one is to ensure reliability of the network system that is becoming sophisticated and complicated. Telecommunications carriers add extra networks resources for backup. These problems cause high initial capital expenditure and high operation expense.

A communication node with the proposed method consists of several interface units and several data processing units. Interface units receive packets from external networks and transmit packets to external networks. Data processing units process received packets for providing service like HTTP server, SIP server, and a mobile network gateway. The communication node has three advantages. First one is scalability to increase capacity easily by adding data

processing units. Second one is flexibility to select and add data processing units that have specifications for a target service. Third one is reliability to maintain redundancy after failure. The proposed method reduces data transmission for redundancy reconfiguration by replacing only backup data lost by failure. These advantages reduce capital expenditure and operation expense, and ensure high reliability of communication nodes.

By computer simulations, it is shown that, for the communication node with sixteen data processing units, the proposed method can reduce 80% smaller traffic for redundancy reconfiguration, and cut the reconfiguration time to 1/8, compared with a conventional method that initializes placement of backup data.

Taku Yamazaki, Ryo Yamamoto, Takumi Miyoshi, and Takuya Asaka: “A Block-based Transmission with Two-hop Reliability Control for Ad Hoc Networks” [4]

In ad hoc networks, frequent topological change, delay variation, and high packet loss rate are encountered as the result of unstable wireless communication. TCP/IP, due to its end-to-end control, hardly adapts to such an unstable network environment. For solving this problem, a block transmission method, such as HOP protocol and CNF-LL (Cache and forward – Link Layer), has been proposed. This method uses not packet-based transmission but block-based transmission that consists of a series of continuous packets. By assuring the hop-by-hop reliability and per-hop transmission, it achieves the reduction of control packets and retransmissions and therefore realizes an efficient transmission. However, most protocols for the block transmission method are designed for the adaptation to general unicast-based routing protocols such as AODV (Ad-hoc on-demand distance vector), from the viewpoint of hop-by-hop reliability control. Therefore, they hardly adapt to the broadcast-based routing protocol such as OR (Opportunistic routing). Moreover, all the terminals on the route need to receive the complete blocks to assure the hop-by-hop reliability, and that must cause the increase of retransmission and delay. In this paper, we propose an efficient block transmission method with 2-hop reliability control and broadcast-based routing. Different from the hop-by-hop reliability control, the proposed method allows the next-hop terminal to forward incomplete blocks and thus assures the transmission of complete blocks at the 2-hop neighbor ahead. It realizes variable transmission routes similar to a mesh transfer and autonomous distributed control within 2-hop neighbor terminals. The performance and the effectiveness of the proposed method were clarified by computer simulation. The simulation results showed that our proposed method achieves the reduction of control packets and transmission delay.

4. Future Plans

The Technical Committee will have also 10 technical meetings in this fiscal year. In addition, it will organize open Symposia in the IEICE Conferences, one of which will be on “Advanced Technologies in the Design, Management and Control for Future Innovative Communication Network” at the IEICE General Conference in March 2015.

(For more information, please see our home page.

URL: <http://www.ieice.org/cs/ns/index.html>)



Fig. 1 Research award recipients with former chair Prof. Urushidani

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Report on NFV & SDN Symposium in Okinawa

Takeshi Kinoshita
NTT Network Innovation Laboratories



1. Introduction

NFV & SDN Symposium in Okinawa was held on May 13, 2014, at Okinawa Jichikaikan (Okinawa Prefecture Municipal Center) in Naha city, Japan. IEICE Technical Committee on Network Virtualization hosted the symposium.

2. About the symposium

IEICE Technical Committee on Network Virtualization holds international symposiums every year, including ones that are planned regularly, for the purpose of facilitating cooperation among researchers and engineers of the technological field whereby advancing the technology development.

This year, NFV & SDN Symposium in Okinawa was planned specially for the same period and for the same area as the plenary meeting of European Telecommunications Standards Institute (ETSI) – Network Functions Virtualisation Industry Specification Group (NFV ISG), which makes standards of NFV technologies. Both the meetings were held in Okinawa Prefecture, Japan.

NFV & SDN Symposium invited six experts from in and outside Japan, including those who play an important role in the NFV ISG activities. In the symposium's sessions, latest research and development in the areas of network functions virtualization (NFV) and software defined networking (SDN) were introduced from the invited speakers. More than 30 people attended the symposium.

3. Program

The symposium started with the greeting by Prof. Akihiro Nakao of the University of Tokyo, chair of the IEICE Technical Committee on Network Virtualization. After that, two sessions were held.

In the first session, three speakers from outside Japan made presentations with the following titles:

- Margaret T. Chiosi (AT&T), “AT&T User Defined Network Cloud”
- Diego R. Lopez (Telefonica), “Moving Along the NFV Way”
- Marc Cohn (Ciena), “Open SDN and NFV Vision and Progress”

Both Ms. Chiosi and Mr. Lopez represented ETSI NFV ISG. In general, NFV enables network functions to be defined by software and minimizes dependence on hardware constraints. SDN, for its part, decouples control and data planes, thus making networks programmable. From the viewpoint of telecom carriers, the two speakers expressed their expectation that the technologies could ease deployment of new services

while lowering related costs, such as ones needed for provisioning and operation. In this regard, several use cases were presented. They also introduced the NFV ISG activities and the technology standards, such as NFV framework, that the organization is developing.

Mr. Cohn represented Open Networking Foundation (ONF). After introducing ONF's activities, he explained how SDN would relate to NFV. With regard to telecom use, he showed carrier-focused initiatives within ONF and their current issues.

In the second session, three speakers from Japan made presentations with the following titles:

- Akihiro Nakao (The University of Tokyo), “Lifting the Boundary between SDN and NFV”
- Atsushi Iwata (NEC), “Innovation for Network Businesses by the World's First SDN WAN Technologies”
- Kazuaki Obana (NTT), “SDN Software Switch ‘Lagopus’ and NFV Enabled Software Node”

As the only speaker from academia, Mr. Nakao introduced advanced concepts involving both NFV and SDN. With architectural visions and their implementation examples, he showed the possibility of ‘fusion’ of NFV and SDN. He also pointed the importance of network operations that are based on user applications.

In Mr. Iwata's speech, activities of O3 Project were explained. It is a project in which Japanese carriers and vendors take part with a common goal of developing open and user oriented SDN. Technological targets were explained with several examples of achievements, including operational systems that could be used in wide area, heterogeneous networks.

The last presenter, Mr. Obana, introduced development of a high-performance software switch, which would meet requirements of telecom carriers. Along with implementation details, he explained how the software switch could be used in combination with NFV applications.

In these six presentations, several points were noted by all the speakers. They include synergy of NFV and SDN technologies and the technological trend in which applications play an ever important role in defining network capabilities.

4. Conclusion

SDN and NFV have become essential for future networks. The symposium gathered key persons of the field and successfully presented emerging, as well as desired, directions for the technology development.

Report on the 2014 Asian Workshop on Antennas and Propagation (AWAP2014)

Kunio Sakakibara (Nagoya Institute of Technology)
Secretary of Technical Committee on Antennas and Propagation



1. Introduction

The 2014 Asian Workshop on Antennas and Propagation was held at the Kanazawa Theatre in Kanazawa, Japan from May 14 to 16, 2014. This workshop was organized by three institutes in three countries; Technical Committee on Antennas and Propagation 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). Attendee exchanged their technical information and friendship through oral and poster sessions and banquet party.

2. Historical Background of AWAP

AWAP is a former KJAP (Korea-Japan Joint Workshop on Antennas and Propagation) which is separated in 2012 from KJJC (Korea-Japan Joint Conference) on AP, EMC and EMT. AWAP2014 was the first AWAP and was grown from the joint conference KJAP of two countries to the Asian Workshop in which all researchers and students were welcomed from any countries from all over the world. The researchers from universities and industries were attended in AWAP2014 from four countries; Japan, Korea, Thailand and Indonesia. Co-chairs from three countries Prof. Arai (Yokohama Natl. Univ.), Dr. Kang (KRISS, Korea), Prof. Monai (KMITL, Thailand) and Guest Speaker Prof. Eko (Univ. Indonesia) gave talks in the opening ceremony as shown in Fig. 1.



Fig. 1 Opening Ceremony (Dr. Kang)

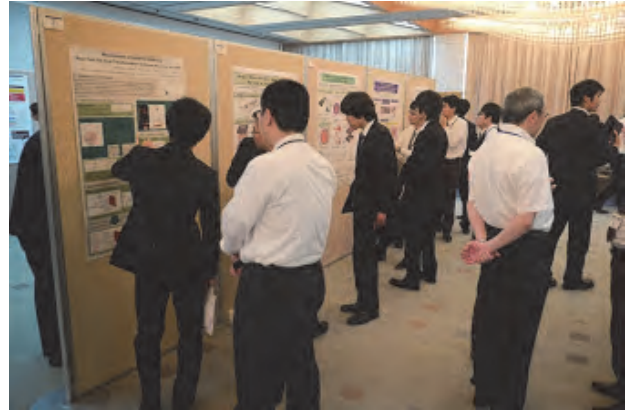


Fig. 2 Poster session

3. Technical Sessions

Just 100 papers were presented in the workshop. To accommodate this number of the papers, all the students' papers and some young engineers' papers were presented in the poster sessions as shown in Fig. 2. Rest regular papers were presented in the oral sessions. 21 presentations were from foreigners as shown in Table 1. Quite fruitful technical discussions were held in the sessions.

Table 1 Number of technical papers

	Oral	Poster	Total
Japan	18	61	79
Korea	10	5	15
Thailand	3	2	5
Indonesia	1	-	1
Total	32	68	100

The technical topics covered broad areas of the AP technologies from antenna hardware to the array signal processing and radio propagation technologies. The titles of the oral sessions are follows;

- Metamaterials and Meta-surfaces
- Antenna Measurements
- MIMO Systems
- Active Antennas
- Antenna Analysis
- Array and Planar Antennas
- Propagation and Target Detection
- Materials for Antennas

4. Attendee

Total number of the attendee was 129 from four countries; Japan, Korea, Thailand and Indonesia. This means the workshop was extended to the Asian workshop from the previous one as shown in Table 2. All the attendee including young engineers and students enjoyed talks and Kanazawa local foods and drinks in the banquet party as shown in Fig. 3. We took a photograph all together at the end of the party as shown in Fig. 4.

Table 2 Number of attendee

	Regular	Student	Total
Japan	43	58	101
Korea	14	7	21
Thailand	4	2	6
Indonesia	1	-	1
Total	62	67	129



Fig. 3 Banquet party served Kanazawa local foods and drinks

5. Conclusion

AWAP2014 was closed quite successfully. The AWAP steering committee meeting was held during the workshop. The committee decided that the next AWAP2015 will be held on June 17-19, 2015 in Bangkok, Thailand and the AWAP2016 will be held on January 27-29, 2016 in Korea. Co-chair Prof. Monai from Thailand announced the AWAP2015 in the closing ceremony as shown in Fig. 5.

See you in Bangkok!

6. Reference

- [1] IEICE Technical Committee on Antennas and Propagation web site,
<http://www.ieice.org/cs/ap/jpn/index.php>



Fig. 5 Closing ceremony where Prof. Monai (right) announced next AWAP2015 in Bangkok, Thailand (left TPC Chair Prof. Cho)



Fig. 4 All attendee (front row from the left, Prof. Min, Prof. Arai, Prof. Monai, Prof. Eko, Prof. Choi, Prof. Hori)

Technical Committee on Smart Radio

– A new stage for advancing the frontiers of wireless communications technology –

Kei Sakaguchi, Khanh Tran Gia,
Teppei Oyama, Mai Ohta,
Keiichi Mizutani, Masayuki Ariyoshi,
Kenta Umebayashi, and Osamu Takyu
Technical Committee on Smart Radio



1. Introduction

The new technical committee for advancing the frontiers of wireless communications technology is started. It is “**Technical Committee on Smart Radio (TCSR)**”. The TCSR gives you chances of discussions, presentations, publications, and exchanging among engineers for Smart Radio.

This article introduces attractive activities of the TCSR, which have not been widely famous for the technical field of wireless communication yet. It is composed of five sections. In the second section, the world of smart radio is introduced. The third section describes activities of the technical committee on software radio, which is the predecessor of the TCSR. The fourth section shows the special section of the transaction in IEICE and the international workshop (SmartCom 2014) as global activities of TCSR. The fifth section shows the plan for fiscal year 2014. The steering committee members of the TCSR in 2014 are shown below:

Chair: Kei Sakaguchi (Osaka Univ.)
Vice Chair: Takeo Fujii (Univ. of Electro-Commun.)
 Kenta Umebayashi (TUAT)
Secretary: Masayuki Ariyoshi (ATR)
 Suguru Kameda (Tohoku Univ.)
 Osamu Takyu (Shinshu Univ.)
Assistant: Kazuto Yano (ATR)
 Kentaro Ishizu (NICT)
 Mamiko Inamori (Tokai Univ.)
 Hiroyuki Shiba (NTT)

2. Let's Go to the World of Smart Radio

The technical committee on SR has changed its name from Software Radio to Smart Radio since this April in 2014, while keeping the short name as SR. Smart Radio is a general term for multi-functional wireless terminals or wireless networks that includes the concept of software radio, cognitive radio, and heterogeneous networks. Namely, this change is intended to expand the technical fields covered by of this committee for establishing an attractive technical group to open the way to the future wireless worlds. Actually, to

Table 1 Research Topics in TCSR

Areas	Major topics
Cognitive radio	spectrum sensing, white space, spectrum database, dynamic spectrum access, cognitive networks, media access control, load balancing, radio policy & regulation
Heterogeneous radio networks	heterogeneous radio systems, cooperative heterogeneous networks, multi-band / multi-mode, radio cognition, handover, carrier aggregation, radio resource management, traffic offload
Wireless distributed networks	carrier sense, spectrum sharing, interference control, adaptive resource control, distributed MIMO, cooperative and coordinated communication, access control, cross layer optimization
Software radio	software defined radio, wideband / multi-band transceiver, radio signal processing, GNU radio, reconfigurable processor, middleware, software download, radio regulation approval test

accommodate recent traffic growth due to smart phones and M2M communications, integration of different radio networks and utilization of higher frequencies or unused frequencies are necessary, both of which are major topics to be discussed in the TCSR.

The original technical committee on Software Radio was established in 1998 as the 2nd class technical committee in the IEICE Communications Society. The committee was promoted to the 1st class in 2005. In 2014, based on the past works for 16 years, we will expand our works in the field of Smart Radio including; 1) education of younger ages, 2) development of basic theories, 3) development of common strategies, 4) promoting research projects, 5) sharing research results, and 6) providing opportunities for international cooperation. You are very welcome to

participate in the TCSR. Table 1 shows the list of major topics to be discussed in the TCSR. If you have interests, please contact to the following e-mail address sr_ac-sec@mail.ieiec.org.

3. Recent Activities of TCSR in Fiscal Year of 2013

3.1 The 1st Technical Conference in May 2013

- ✓ Topics: Cognitive Wireless Network, Heterogeneous Network, Cross Layer Wireless Technologies, Panel Discussion
- ✓ Date: May 23-24, 2013
- ✓ Venue: Aster Plaza, Hiroshima
- ✓ Number of papers: 20 (Special invited talk: 1, Invited talk: 1, Panel discussion: 4, Regular talks: 14)
- ✓ Number of participants: 30

General Session

In the general sessions, 14 papers were presented and accompanied by fruitful discussions on the first and second days. The session included diversified topics e.g.

- IEEE802.15.4m compliant OFDM radio equipment for white space wireless smart utility network
- 1-bit Digital RF Transmitter
- Resource Allocation for Cognitive Radio Networks
- Spatial Spectrum Sharing
- System Handover for Heterogeneous Wireless Network
- TV White Space Utilization in Uplink
- Wideband Non-Contiguous OFDM Technology
- Location Estimation Method of Radio Source

Panel Discussion: “Is White Space really ready for use?”

The panelists consisted of 4 members from both academia institutes and industrial companies. Each respectively gave a 25-min presentation about their perspective toward the topic. Prof. Jun-ichi Takada (Tokyo Institute of Technology) explained about use of TV white space (TVWS) and feasibility of dynamic spectrum access in Japan as compared to that of FCC in US. Dr. Hiroshi Harada (NICT) first presented the overview, feasibility, technical issues, standardization activities, R&D items of white space then showed recent R&D progresses of NICT on the topic. From the viewpoint of regulation, Dr. Masayuki Ariyoshi (ATR) introduced about current study items on white space and its application in M2M communications, which are being investigated by Asia-Pacific Telecommunity (APT), a regional intergovernmental organization active in the field of communication, information and innovation technologies. Prof. Masahiro Umehira (Ibaraki University) on the other hand pointed out the problems needed to be solved in Japan for practical use of white space, regardless that white space is recognized worldwide as a promising technique for improving spectral efficiency. During the Q&A session, the panelists and the floor pursued the reasons preventing the realization of white space utilization in Japan and discussed its future outlook.

Special Invited Talk

On the second day, continued from the discussion in the panel discussion, Prof. Jun-ichi Takada (Tokyo Institute of Technology) gave an invited talk about “Use of TV White Space: Propagation, Interference and Coexistence - Idea, Reality, and Future”. He explained the main reason preventing the realization of white space and dynamic spectrum access is the lack of driving applications. In addition, Prof. Takada provides the insights of the current situation of TVWS based on the notification No. 640 of the Ministry of Post and Telecommunications in Japan. At the end this talk, he showed the views on higher frequency as a hint for solving the problem of frequency resource depletion.

3.2 The 2nd Technical Conference in July 2013

- ✓ Topics: Wireless Distributed Networks (WDN), M2M (Machine-to-Machine), D2D
- ✓ Date: July 17-19, 2013
- ✓ Joint TCs: ASN, NS, RCS, RRRC
- ✓ Venue: ACT City in Hamamatsu, Shizuoka
- ✓ Number of papers: 41 (Invited talks: 5, Poster talks: 32, Regular talks: 4)
- ✓ Number of participants: 408

Poster Sessions: Wireless Distributed Networks

Two poster sessions were held in collaboration with five TCs. The total 32 attractive posters were shown (Fig. 1). The session fields as follows:

- QoS Compensation (6 posters)
- Communication System Based on Movie and Camera (4 posters)
- Electric Power Transmission Systems (4 posters)
- Positioning System (3 posters)
- MAC Protocols (3 posters)
- Sensing and resource control for cognitive radio (3 posters)
- M2M/D2D (3 posters)
- Prototype Model for Experimental Study (3 posters)
- Study for Physical Layer (2 posters)
- Connection between wired and wireless communications (1 poster)

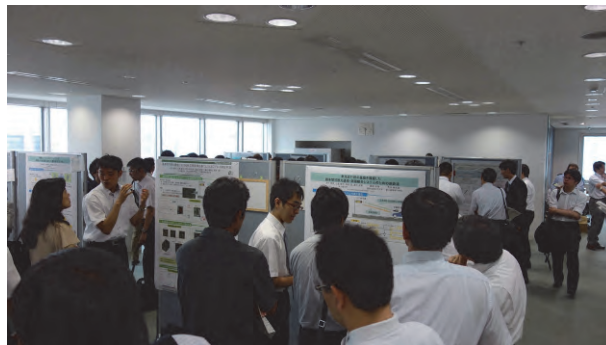


Fig. 1 Poster Session in the 2nd Conference

Invited Talk: M2M/D2D

- Prof. Tadahiro Kuroda (Keio University) talked about “Integrated system and ubiquitous sensor opened up by near-field wireless communications”.

- Prof. Jin Mitsugi (Keio University) talked about “Supply chain visibility system with unique ID and category ID of products”.
- Mr. Junichi Iwana (Renesas Electronics Corporation) talked about “Smart wireless utility network for smart grid : Wi-SUN -- WiSUN alliance outline and activity for smart wireless utility network --”.
- Prof. Koji Tsumura (The University of Tokyo) talked about “Distributed optimization of networked systems via generalized primal-dual algorithm”.
- Prof. Masato Tsuru (Kyushu Institute of Technology) talked about “The past, present and future of DTN research”.

3.3 The 3rd Technical Conference in October 2013

- ✓ Topics: Software & Cognitive Radio Technical Expo
- ✓ Date: October 24-25, 2013 (International Workshop CC-HetNet was held on Oct. 23)
- ✓ Venue: Nakanoshima Center, Osaka Univ., Osaka
- ✓ Number of papers: 20 (Invited talks: 2, Regular talks: 10, Technical exhibitions: 8)
- ✓ Number of participants: 122

General Session

In the general sessions, 10 papers were presented and fruitful discussions were conducted on the first day. These sessions included following technical fields:

- M2M communication
- Spectrum management and policy
- Spectrum sensing
- Propagation model of terahertz frequency
- TV white space communication systems

Software and Cognitive Radio Technical Expo 2013

TCSR hosted 8 technical exhibitions listed below and 5 product exhibitions in its 8th annual Software and Cognitive Radio Technical Expo (Fig. 2).

- Development of network simulator to enable network level performance evaluation of cognitive radio systems (KKE Inc.)
- Transmission experiment of MU-MIMO system using collaborative interference cancellation Technique (Kyoto Univ.)
- Experimentation and indoor emulation of primary user protection using one-segment Broadcasting (Kyushu Inst. of Tech.)
- White space communication network with IEEE 802.11af / IEEE 802.22 capable of primary user protection and secondary user coexistence (NICT)
- ASIC implementation and evaluation of frequency domain equalizer for dependable air (Tohoku Univ.)
- Experimental study on MIMO cognitive radio system using transmit/receive beamforming (Tokyo Inst. of Tech.)
- Radio receiver front-end using time-based ADC (NTT)

Invited Talks

On the first day, Prof. Seiichi Sampei (Osaka Univ.) presented “Toward more flexible heterogeneous wireless networking”. In this talk, frequency allocation techniques and the usage of millimeter-wave in HetNet were introduced. In the Q & A session, participants exchanged their ideas about future trends of wireless heterogeneous network. On the second day, Prof. Kazuhiko Kinoshita (Osaka Univ.) presented “Efficient spectrum sharing in heterogeneous wireless networks”. In this talk, various types of frequency sharing algorithms such as auction-based algorithm were introduced. He also mentioned that collaborations with different fields are needed for researches of future wireless technologies.



Fig. 2 Technical Expo 2013 in the 3rd Conference

3.4 The 4th Technical Conference in January 2013

- ✓ Topics: Cognitive Radio, Software Radio, M2M/D2D Communications, Standardization, Activation
- ✓ Date: January 23-24, 2014
- ✓ Venue: Tohoku University (Katahira campus), Miyagi
- ✓ Number of papers: 23 (Invited talks: 4, Panel discussion: 5, Regular talks: 14)
- ✓ Number of participants: 38

Invited Talks

On the first day, Dr. Kazuhiro Uehara (NTT) was invited in commemoration of the presentation of the fellow degree, and his contribution is “Research and development of software defined radio and cognitive radio technologies”. This invited talk presented about from starting of pioneering research and development of SDR and CR technologies to focused hot topics and future work.

On the second day, we had three invited talks on the M2M/D2D based the cognitive radio system and international standards for the dynamic spectrum access. The invited speakers and topics of presentations are listed as follows:



Fig. 3 Banquet in 4th Conference

- Prof. Hiroki Nishiyama (Tohoku Univ.), “Relay-by-smartphone: A novel approach for realizing autonomous decentralized network”
- Dr. Masayuki Ariyoshi (ATR), “Research and development of dynamic and reconfigurable M2M wireless network technology”
- Dr. Takashi Shono (IJKK), “International standards development on dynamic spectrum access –towards 5G Era –”

Panel Discussion: Profitable Wireless, Delightful Technical Committee, Fruitful Institute

In the panel discussion, we had five panellists, who are professional researchers in the field of the smart radio. The invited speakers and topics of presentations are listed as follows:

- Prof. Iwao Sasase (Keio Univ.), “Enjoy research and educational activities in academic society and university”
- Prof. Fumiyuki Adachi (Tohoku Univ.), “Toward flexible network era”
- Prof. Kei Sakaguchi (Osaka Univ.), “From software radio to smart radio – Six measures to improve activities of technical committee on SR –”
- Mr. Eisuke Fukuda (Fujitsu Lab.), “A proposal to re-invigorate activities of technical committee on software radio”
- Prof. Nobuhiko Miki (Kagawa Univ.), “Towards active discussion in technical committee on SR”

This is the second panel discussion on this series (the first one was held in the second technical committee in July 2012). In this session, many topics were discussed animatedly.

General Session

In the general sessions, 14 papers were presented and accompanied by fruitful discussions on the first and second days. These sessions included technical fields as follows:

- Spectrum sensing and environment measurement
- Heterogeneous cognitive radio systems based on C-RAN
- Capacity prediction
- V2V communications
- OFDM communications and FFT technologies

- Wireless clouds

The presenters and the attendees attend the banquet for the exchange of opinions (Fig. 3).

3.5 The 5th Technical Conference in March 2014

- ✓ Topics: Workshop on mobile communications
- ✓ Date: March 3-5, 2014
- ✓ Joint TCs: RCS SRW and CCS
- ✓ Venue: Waseda University, Tokyo
- ✓ Number of papers: 26 (Invited lectures: 5, Invited talks: 7, Special invited talk: 1, Regular talks: 13)
- ✓ Number of participants: 359

General Session

We annually cosponsor mobile communications workshop. In this year, we cosponsored the workshop with RCS, SRW and CCS. There were 13 presentations during the three days in workshop. Their technical fields are listed as follows:

- Spectrum sensing, signal detection, synchronization
- Array antenna systems for high-speed train
- Field experiments of TVWS systems
- Propagation loss model for TVWS systems
- Applied WLAN/Wi-Fi systems, control systems
- Distributed STBC for cognitive small cell networks

Invited Lectures (TCSR Organized session)

We had five invited lectures on the subject of TV white space, broadband spectrum sensing platform, public mobile communication system, and applied MIMO systems. The speakers and topics of the talks are listed as follows:

- Prof. Yoshihiro Hase (Univ. of Tokyo), “White space database with radio propagation simulator considering terrestrial topology”
- Dr. Hiroyuki Shiba (NTT), “Performance evaluation of a broadband spectrum sensing platform”
- Dr. Keiichi Mizutani (NICT), “Research and development of IEEE 802.11af system implementation”
- Dr. Masafumi Moriyama (UEC), “Characteristics of synchronization and bit error rate for public mobile communication systems employing heterogeneous cognitive radio”
- Prof. Gia Khanh Tran (Tokyo Tech), “Research and development of space-spectrum sharing MIMO network”

Invited Talks

(Organized Session: Heterogeneous Networks with Inter-frequency / Inter-system Coordination)

We had 5 invited talks in the session specialized on the heterogeneous networks with inter-frequency / inter-system coordination. The invited speakers and topics of presentations are listed as follows:

- Prof. Kei Sakaguchi (Osaka Univ.), “Smart radio world driven by cloud cooperated heterogeneous networks”
- Dr. Yoshio Takeuchi (ATR), “R&D activities on cognitive radio technologies”

- Dr. Hiroshi Harada (NICT), “Short range wireless communication systems in 5 generation heterogeneous mobile communication systems”
- Dr. Hiroki Harada (NTT DOCOMO), “Outline of 3GPP small cell enhancement and further sophistication for future deployment”
- Dr. Xiaoqiu Wang (KDDI R&D Labs.), “Standardization trends of WLAN/3GPP radio interworking”

Special Invited Talk

We had a special invited talk “A new type of RF circuit design for wireless communications” by Prof. Kiyomichi Araki (Tokyo Tech). He talked about a novel design of multi-band / multi-mode RF circuits for the future of wireless communication systems and enlightened us with his vast R&D experiences.

4. Attractive Plans of the New TCSR in 2014

4.1 Special Section on 5G Radio Access Networks in IEICE Trans. Commun. (October 2015 issue)

The TCSR has been regularly involved in publishing special sections on SR related topics in the IEICE Transactions on Communications. The next special section is set to be published in October 2015, with a topic of multi-RAT heterogeneous networks and Smart Radio technologies for 5G radio access networks. For this issue, we are dealing with a new challenge with respect to the following points. The special section on the “5G Radio Access Networks” is formed as a series of two issues. The part I focuses on aspects of radio access technologies and system design (to be published in August 2015), whereas the part II focuses on aspects of multi-RAT heterogeneous networks and Smart Radio technologies. The editorial committee for the part I is organized by TC Radio Communication Systems (RCS), and the one for the part II is by TCSR. This is the very first model case that plural editorial committees collaboratively publish such a series of special sections.

Our motivations for the special section came from the following technical trends and thoughts. Discussions on 5G system concepts and enabling technologies have been attracting much attention for 2020 and beyond. Key issues for the 5G system include support of exploding mobile traffic, high density cell deployment, and low-cost network operation. Integration of heterogeneous multi-RAT, e.g., cellular, WLAN, and short range communications in millimetre-wave bands, is expected as a practical solution to overcome these issues. Moreover, Smart Radio technologies are expected as promising enablers for the 5G system. This special section aims at promoting 5G related research and development activities, particularly on multi-RAT heterogeneous networks and Smart Radio technologies in the part II.

The submission deadline is 19th January 2015. More detailed information can be found in the call for papers from the following link:

http://www.ieice.org/eng/s_issue/cfp/2015_10EB.pdf. It can also be seen in page 39 of this issue. It is encouraged that many papers will be submitted to this special section.

4.2 Singapore - Japan International Workshop on Smart Wireless Communications (SmartCom 2014)

In the TCSR, we have had international activities such as international workshops with international research institutes and organizations. However, most of the activities of TCSR have been limited to Japan only. In order to enhance the international activities, as well as to create more attractive TCSR, we have planned to organize the international workshop, SmartCom, outside Japan in cooperation with research organizations in Singapore such as Institute for Infocomm Research (I2R).

SmartCom is targeting smart wireless communication and covering radio technologies, spectrum management, wireless network, communication theory, and flexible hardware. Due to the recent wireless technology advancement, ubiquitous connection becomes familiar with everyone. However, this also leads to the tremendous growth of wireless data traffic, demanding for higher data rate. Therefore, smart communication technologies to address this data crunch are urgently desired. Its solutions are keys for a sustainable future wireless world. In this workshop, we discuss the solutions targeting not only near future but also years beyond 2020.

In the workshop we will have three unique sessions, keynote sessions, special sessions, and poster sessions. The organizing committee wishes that the workshop provides a great opportunity for discussing a future wireless world and become an occasion to launch cooperative research and joint proposal to international standard. Details of the workshop are available in the following website <http://www.ieice.org/cs/sr/smartcom/>.

5. Conclusions

The Technical Committee on Smart Radio (TCSR) makes a strong effort to international collaborations with the research organizations of smart radio fields all over the world. In fiscal year 2014, we will plan five attractive conferences as follows:

- May 2014: Yokohama, Kanagawa Pref. (Technical Exhibition, has been closed)
- July 2014: Kyoto, Kyoto Pref. (Joint workshop, has been closed)
- October 2014: Singapore, (SmartCom2014)
- January 2015: Hakodate, Hokkaido pref.
- March 2015: Tokyo (Joint workshop)

TCSR welcomes contributions from newcomers. We are looking forward to meeting you at conferences.

More Information

Website URL: <http://www.ieice.org/cs/sr/eng/>

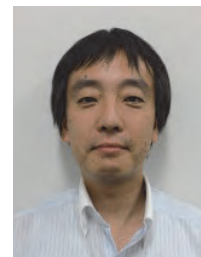
Contact email: sr_ac-sec@mail.ieice.org

Annual Report of Technical Committee on Communication Systems

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



1. Introduction

Technical Committee on Communication Systems (CS) actively organized seven technical conferences and one special workshop at various cities in Japan, in FY2013. In this report, we describe our activities which include seven technical conferences, Communication Systems Workshop (CSWS), special and general sessions on IEICE Society Conference 2013 and IEICE General Conference 2014, and CS Technical Committee's Prizes. Visit our web site (<http://www.ieice.org/cs/cs/>) to obtain the up-to-date information. Our topics of interest include (but are not limited to) the followings:

- Transport technology,
- Modulation, coding and signal processing,
- Network architecture,
- Wireless network and application,
- Network service and application.

We are welcome to make your presentations to our conferences.

2. Summary of CS Technical Committee in FY2013

In Table 1, we summarize the activities of CS Technical Committee in FY2011, FY2012 and FY2013.

The number of presented papers on technical conferences was more than 100 each year in three years. The total number of presented papers on IEICE Society and General Conferences is increasing every year and more than 130 papers had presented in FY2013. Special sessions on those conferences were very well attended

because there were latest technical topics and its trends. The number of participants of CS workshop was around 40 in average.

We had many interesting special invited talks by outstanding speakers in each conference. One of the most impressive talks was presented by Dr. Takeshi Yamada of NTT in CS technical conference on 18th April 2013 in Sadogashima Island (Fig. 1). He presented discovering latent structure by statistical machine learning methods with some case examples. Another talk, impressively embedded in our memory, was presented by Prof. Yuichi Kado of Kyoto Inst. of Tech in CS technical conference on 6th March 2014 at Osaka City Univ. in Osaka (Fig. 2). He explained human-body near-field communication technology. It achieves both convenience of wireless communication and good security by suppression of signal emission.

Through the FY2013, we had many valuable special invited talks. To refer them, please visit our archive web page (<http://www.ieice.org/cs/cs/special-e.html>).

3. Activities of CS Technical Committee in FY2014

3.1 Technical Conferences

We have already held July's conference on 3rd – 4th July 2014, in Tanegashima Island, successively, with four special invited speakers on ICT and space technology related to a space center located in the island, 21 invited and general session speakers, and more than 30 participants. First invited speaker, Dr. Masahiro Noguchi of Mitsubishi Electric presented

Table 1 Summary of CS Technical Committee Activities

	Number of presented papers		Special session on IEICE Society Conference (Number of participants)	Special session on IEICE General Conference (Number of participants)	Number of participants of CSWS
	Technical Conferences	IEICE Society/General Conferences			
FY2011	102	45/56 (101)	Latest trend and future vision of optical access network technology (40)	Latest trend of high speed Ethernet technology and forwarding technology (49)	36
FY2012	104	32/83 (115)	Current status and trend of optical access and wireless access network technologies (40)	Communication technology for M2M (45)	38
FY2013	110	61/76 (137)	Low power and energy efficient technologies for wired and wireless networks (44)	How to teach and learn ICT (30)	47



Fig. 1 Dr. Takeshi Yamada giving a special invited talk at CS technical conference in Sadogashima island on April 2013

next generation wideband satellite communication technologies for future satellite. Second invited speaker, Dr. Shiro Yamakawa of JAXA showed inter-orbit communication using optical communication technology. Third invited speaker, Prof. Hiromi Ueda of Tokyo Univ. of Tech. presented SDH /SONET technologies to record for the future. The last invited speaker, Prof. Akihiro Nakao of Univ. of Tokyo presented application-driven programmable networking that enhances software defined networking (SDN) and network functions virtualization (NFV).

We are planning to have seven conferences in this year, which are shown in Table 2. We appreciate your entry to them. You can obtain detailed information at our web site (<http://www.ieice.org/cs/cs/>).



Fig. 2 Prof. Yuichi Kado giving a special invited talk at CS technical conference in Osaka City Univ. on March 2014

3.2 Special Sessions on IEICE Society and General Conferences

CS Technical Committee will organize a tutorial session: “Low power and energy efficient technologies for wired and wireless Networks” on 24th September 2014, in the IEICE Society Conference 2014 (Sep. 23rd – 26th, 2014, Tokushima Univ., Tokushima). Outstanding five speakers will be invited.

For the IEICE General Conference 2015 (Mar. 10th – 13rd, 2015, Ritsumeikan Univ., Shiga), we are now planning to have a highly motivated tutorial session: “Application of ICT to traffic field”.

3.3 CS Workshop

CS Workshop 2014 will be held in Hokkaido, on 5th – 6th November 2014, please visit to the web site (<http://www.ieice.org/cs/cs/jpn/cs/ws/index-e.html>). The

Table 2 Technical Conferences schedule, May 2014 – April 2015

Date	Venue	Joint committee	Topics
Jul. 3 – 4	Minamitanecho Shoukokuai Kaigishitsu (Tanegashima Island)	–	Next Generation Networks, Access Network, Broadband Access System, Power-Line Communications, Wireless Communication System, Coding System, etc.
Sep. 11 – 12	Tohoku University	NS, IN	Post IP networking, Next Generation Network (NGN)/New Generation Network (NWGN), Contingency Plan/BCP, Network Coding/Network Algorithms, Session Management (SIP/IMS), Internetworking/Standardization, Network configuration, etc.
Nov. 6 – 7	Shiretoko (Hokkaido)	CSWS	Broadband Access Systems, Home Networks, Network Services, Applications for Communications, etc.
Dec. 4 – 5	Osaka University Nakanoshima Center	IPSJ-AVM, IE, ITE-BCT	Image Coding, Streaming, etc.
Jan. 22 – 23	Tokushima Univ.	OCS	Core/Metro System, Optical Access System/Next Generation PON, Broadband Access System, (Wide Area) Ethernet, Optical Transport Network (OTN), High-Speed Interface, Analog Optical Transmission, Quantum Communication, etc.
Mar. 5 (Unfixed)	Unfixed	CAS	Network Processor, Signal Processing for Communication, Wireless LAN/PAN, etc.
Apr. (Unfixed)	Unfixed	CQ	SDN (Software-Defined Network), Cloud, Network Virtualization, Service Quality, Contents Delivery, etc.

subject of the workshop is “Innovation of information and communication technology toward 2020.” Prof. Hidenori Nakazato, as General Chair of the workshop, invited eleven outstanding researchers for providing talks about state-of-the-art innovative ICT toward 2020.

3.4 CS Prizes

CS Technical Committee provides prizes to authors or speakers who made good presentations and excellent papers every year. The detailed information on the committee’s prizes is described in Table 3.

Table 3 CS committee’s prizes

Chairman’s prize	Summary: The aim of the chairman’s prize to the superior papers is activating investigations on communication systems engineering.
	Candidates: The paper must be submitted to the IEICE committee on communication systems. At least one of authors must be a member of the IEICE on the presentation day. Invited and special talks are excluded.
Encouraging prize	Summary: The aim of the encouraging prize to the excellent speakers is encouraging young researchers who are engaged in communication systems engineering.
	Candidates: The speaker must be less than 33 years of age and a member of the IEICE or a student on the presentation day. His/her paper must be submitted to the IEICE committee on communication systems.

The winners of the chairman’s prize in 2013 are the authors of three papers [1] – [3]. The speakers of the papers are Mr. Tomohiro Takahashi, Ms. Namiko Ikeda, and Dr. Junichiro Kawamoto.

The winners of the encouraging prize in 2013 are the speakers of four papers [4] – [7], Mr. Shohei Iijima, Ms. Hiroko Nomura, Ms. Narumi Kai, and Ms. Nozomi



Fig. 3 The prize ceremony 2013 in Tanegashima Island on July 3rd, 2014. From back left, Prof. Umehara, Mr. Iijima, Mr. Kawamoto, Prof. Tsuboi (CS Chair), Dr. Yokotani (CS Vice-Chair). From front left, Mr. Takahashi, Ms. Ikeda, Ms. Nomura, and Ms. Miyawaki

Miyawaki.

Six invited talks by the speakers of CS2013-26, CS2013-96, CS2013-138, CS2013-25, CS2013-44, and CS2013-139 were conducted and the prize ceremony 2014 was held at the banquet in the technical conference of Tanegashima Island on July 3rd, 2014. The ceremonial photograph is illustrated in Fig. 3.

4. Conclusion

This report has summarized activities of Technical Committee on Communication Systems. Any comments and feedbacks are appreciated to improve our activities. We welcome your submission to our conferences (<http://www.ieice.org/cs/cs/>).

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Report on IEICE Information and Communication Technology Forum

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Chair of Communication and Computer Networks



1. Introduction

The IEICE Information and Communication Technology Forum was held from 28th to 30th May, 2014 at Faculty of Electronics and Telecommunications of the Poznan University of Technology, in Poznan, Poland. The conference was a forum for the exchange of ideas among engineers, scientists and young researchers from all over the world on advances in information and communication technology and other related areas and to provide a focus for future research and developments. The conference was strictly related to the fields of Communication Engineering, Electronics Engineering and Computer Engineering.

The sponsors of the conference were: The Institute of Electronics, Information and Communication Engineers (IEICE), IEICE Communications Society (IEICE-CS), IEICE Europe Section, Poznan University of Technology (PUT), Polish Association of Telecommunication Engineers and CARMNET project.

2. The conference program

The workshop presentations started with the opening speech given by the President of IEICE Dr. Yuji Inoue and Dean of the Faculty of Electronics and Telecommunications PUT, Prof. Krzysztof Wesolowski. During the ICTF 2014 we had 41 presentations associated with related discussions, over three days, with about 60 participants. All participants contributed to success of the ICTF 2014.

There were six sessions organized as follows:

- ALIEN&CARMNET Projects Special Session,
- NEWCOM# Project Special Session,
- Communications,
- Mobile Networks and Systems,
- Information and Communications Technology,
- Electronics.



Fig. 1 President of the IEICE Dr. Yuji Inoue giving opening talk on IEICE ICTF 2014



Fig. 2 Prof. Fumiuyuki Adachi during keynote speech

The ICTF, except for the main track, also included keynote speakers from Japan and Poland presenting overviews of current research in important areas:

- Prof. Fumiuyuki Adachi (Tohoku University) “Recent Advances in Distributed Antenna Network for Gigabit Communications” – Fig. 2
- Prof. Toshitaka Tsuda (Waseda University) “ICT for the Resilient Society” – Fig. 3
- Prof. Maciej Stasiak (Poznan University of Technology) “Queuing Models for the Internet”.

At the conference several industry talk were given by speakers representing NEC (Kazue Sako), NTT (Shinji Matsuo), Alcatel-Lucent (Haris Gačanin, Mamoun Guenach, Fahim Kawsar), Samsung (Adam Panasiuk), Nokia-Siemens Networks (Reza Holakouei) and Mentor Graphics (Grzegorz Mrugalski).

During forum, invited speakers from Japan, USA and the five European universities also gave their speeches:

- Dr. Bamidele Adebisi, Manchester Metropolitan University, UK
- Prof. Aleksandra Pižurica, Ghent University, Belgium
- Dr. Osamu Muta, Kyushu University, Japan,
- Dr. Dejan Vukobratovic, University of Novi Sad, Serbia,
- Dr. Sinan Sinanovic, Glasgow Caledonian University, UK,
- Dr. Abolfazl Mehdodniya, Tohoku University, Japan,
- Dr. Guy Torfs, Ghent University, Belgium
- Kentaroh Toyoda, Keio University, Japan,
- Dr. Werner Prost, University of Duisburg-Essen, Germany,
- Dr. Ikpe Justice Akpan, Kent State University, USA,
- Dr. Darko Zibar, Technical University of Denmark, Denmark.

As a part of the conference two special sessions presenting results of the following three European projects has been presented:

- ALIEN - Abstraction Layer for Implementation of Extensions in Programmable Networks,
- NEWCOM# Energy - and Bandwidth-Efficient Communications and Networking,
- CARMNET - Multi-Service Network Management for Reliable Internet Access in Public Wireless Networks.



Fig. 3 Prof. Toshitaka Tsuda giving keynote speech

3. Acknowledgments

On behalf of the Local Organizing Committee I would like to thank all the authors, Technical Program Committee members and the reviewers for their contribution to the success of ICTF 2014.

We would like to thank IEICE and IEICE-CS for their financial sponsorship which ensured that the ICTF 2014 forum was open not only to the authors of the accepted papers and registered participants, but also to all students interested in ICT.

4. IEICE ICTF2015 Call For Papers

I want to announce with great pleasure that 2015 IEICE ICTF will be held on 3-5 June 2015 in Manchester, UK. We invite you to visit our web site www.ictf2015.ieice-europe.org for more details.



Fig. 4 Dr. Haris Gačanin during the industry speech



Fig. 5 Prof. Aleksandra Pižurica during the invited talk

Report on the 2014 International Symposium on Electromagnetic Compatibility (EMC'14/Tokyo)

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^{†3}Takashi Harada, ^{††1}Yukihisa Suzuki

^{*}Chairperson of EMC'14 Organizing Committee

^{**}Vice Chairperson of EMC'14 Organizing Committee

[†]Member of EMC'14 Steering Committee

^{††}Assistant Secretary of EMC'14 Steering Committee



1. Introduction

The "2014 International Symposium on Electromagnetic Compatibility" (EMC'14/Tokyo) [1] was held at "Hitotsubashi Hall (National Center of Sciences)", Chiyoda, Tokyo, from May 12th to 16th, 2014. EMC'14/Tokyo is the 7th "International Symposium on Electromagnetic Compatibility" organized by IEICE Technical Committee on Electromagnetic Compatibility (EMCJ), sponsored by

IEICE Communications Society. The Symposium was technically co-sponsored by the IEEE Electromagnetic Compatibility Society (EMC-S) and the Technical Committee on EMC of the Institute of Electrical Engineers of Japan (IEEJ). It was also technically cooperated by 15 national and international organizations related to academic and standardization activities on electromagnetic compatibility.

The Symposium started on May 12th, Monday with a Technical tour to "TOKYO SKYTREE". The scientific sessions were scheduled from May 13th to 16th. The Symposium covered all aspects of EMC technology. Fusion of energy and information in the systems has become a remarkable trend in recent technologies such as "Smart Community". Wireless power transfer is about to be introduced to the practical use in daily lives. The Symposium addressed those emerging technologies as well as the authentic issues of EMC including compatibility of man-made systems and countermeasures to the threats due to natural sources of disturbance to the systems of our lifeline.

2. Organization

The Organizing Committee (OC) of EMC'14/Tokyo was formed under IEICE-CS, with the chairperson Prof. Masao Taki (Tokyo Metropolitan Univ.) and vice chairperson Prof. Osami Wada (Kyoto Univ.). The OC consists of 19 officers, 9 advisors, 104 members, and 54 overseas members. The Steering Committee (SC) was established under OC, which was composed of general chairperson (Prof. Masao Taki), 6 vice chairpersons, 9 advisors, secretary (Dr. Soichi Watanabe), 2 assistant secretaries and 14 subcommittees.

3. Conference Statistics

Totally 510 persons, including 18 invited attendees, 54 students, and 21 accompanying persons, from 26 countries attended the Symposium. Attendees consisted of 339 persons from Japan and 171 persons from foreign countries. Total of 246 papers, that are 125

Table 1 List of attending countries

Country /Region	Regular Session Papers	Organized Session Papers	Workshop /Tutoria Presentations
Australia	0	1	0
Austria	0	1	1
Belarus	3	0	0
China	2	4	1
France	7	4	3
Georgia	0	0	1
Germany	4	6	2
Hong Kong	0	1	0
Italy	0	4	0
Japan	64	49	12
Korea	8	8	2
Malaysia	1	0	0
Poland	2	0	0
Romania	1	0	0
Russia	1	2	0
Singapore	1	0	0
Sweden	1	1	0
Switzerland	1	5	2
Taiwan	12	2	0
Thailand	1	0	0
The Netherlands	4	2	0
Turkey	1	0	0
Ukraine	1	0	0
United Kingdom	0	2	0
USA	2	9	4
Total	117	101	28

¹ Tokyo Metropolitan University

² Kyoto University

³ NEC Corporation

papers from Japan and 121 papers from foreign countries, were presented. Technical program of EMC'14 consists of regular sessions, organized sessions, workshops, and tutorial sessions. Table 1 shows the list of attending countries and the numbers of presented papers for each session. We note that approximately 1/2 of presented papers were from foreign countries.

4. Conference Schedule

The Symposium was held during May 12th-16th (5 days). The schedule is shown in Table 2. On May 12th, the SC organized the Technical Tour to "TOKYO SKYTREE". We had technical sessions from May 13th to 16th. In the afternoon on May 13th, Plenary Session was programed, and after the Plenary Session, the Welcome Party was held at Hitotsubashi Hall. More than 350 participants gathered and enjoyed their food, drink, and talk with their friends and colleagues (Fig. 1). In the morning on May 14th the Keynote Session was given. On May 15th, Banquet and Award Ceremony were held at Josui Kaikan from 18:30 to 21:00. In addition, public seminar on "Introduction to EMC" was conducted as an outreach activity of EMC'14/Tokyo.

5. Technical Program

The proceedings of EMC'14/Tokyo include 218 original papers in total in 28 regular sessions and 17 organized sessions. These papers and additional 28 presentations for workshops and tutorial sessions were presented in four parallel sessions. The technical topics and the number of papers and presentations in each session are listed in Table 3.

For regular sessions, 172 papers were submitted from 24 countries, and 117 papers were accepted. For the

organized sessions, 101 original papers were accepted. All the papers, except for two in regular sessions and two in organized sessions papers which were accepted but not presented at the symposium, will be included in the "IEICE Proceedings Archives", the "IEICE Knowledge Discovery (I-Discover)", and the "IEEE Xplore", based on the agreement between IEICE and IEEE.

Seventeen special topics were selected for organized sessions. In the preparation of the technical program of this symposium, we arranged four of the organized sessions as "Joint Workshops / Organized Sessions" which include original papers and some presentations related to the special topics, which could help attendees to get overviews of the recent trends and latest information.

The specific topics in EMC'14/Tokyo are "Biological Effect and Safety" (16.5 % of regular sessions and organized sessions papers) and "PCB and Device Level EMC" (15.6 %), though "EMI/EMC Measurement Technology" (17.0 %) has been the largest portion of the topics. In particular, IC and chip level EMC issues have become a focus of research. "Power System EMC" is another important topic with increase of papers related to Wireless Power Transfer.

6. Plenary Session and Keynote Session

The theme of the Plenary Session was "New Horizon of EMC Research", and was chaired by Prof. Masao Taki (Tokyo Metropolitan Univ), Prof. Hideaki Sone (Tohoku Univ.), and Dr. Takatoshi Shindo (Central Research Institute of Electric Power Industry). Two

Table 2 Conference schedule

	12th (Mon)	13th (Tue)	14th (Wed)	15th (Thu)	16th (Fri)
AM		Technical Sessions	Technical Sessions	Technical Sessions	Technical Sessions
		Lunch Break	Lunch Break	Lunch Break	Lunch Break
PM	**Technical Tour to "TOKYO SKYTREE" / Registration	Technical Sessions	Technical Sessions	Technical Sessions	Technical Sessions
		Welcome Reception (17:40-19:30)		Banquet & Award Ceremony (18:30-21:00)	



Fig. 1 Welcome Reception



Fig. 2 Plenary talk by Dr. Masao Sakauchi



Fig. 3 Plenary talk by Dr. Farhad Rachidi

talks were given. The title of the 1st talk was “A New Paradigm in ICT and the Role of EMC Research” by Dr. Masao Sakauchi, National Institute of Information and Communications Technology, Japan (Fig. 2). The title of the 2nd talk was “EMC Applications of Electromagnetic Time Reversal” by Dr. Farhad Rachidi, Swiss Federal Institute of Technology, Switzerland (Fig. 3).

The theme of the Keynote Session was “Overview of EMC Research Trends”, and was chaired by Prof. Osamu Fujiwara, Nagoya Institute of Technology, Japan. In the Keynote Session, following three talks were given. The title of the 1st talk was “EMC Research Trends in the USA” by Dr. Robert Scully, NASA, USA/President of IEEE EMC Society. The title of the 2nd talk was “EMC Research Trends in Europe” by Prof. Marcello D’Amore, Sapienza University of Rome, Italy. And the title of the 3rd talk was “Overview of EMC related Issues in Japan and Vicinity” by Prof. Liuji R. Koga, Okayama University, Japan.

7. Awards

Awardees were selected by Award Program Committee as follows.

- Risaburo Sato Award
“Forward Wave Analysis for EMC Power Supply Design above 1 GHz,” Umberto Paoletti, Yasumaro Komiya, Takashi Suga, Hideki Osaka. (Fig. 4)
- Excellent Paper Award
(1)“Relationship between Spatial-Averaged SAR and Temperature Elevation in Human Head Models from 1-10 GHz,” Akimasa Hirata, Shunya Ohta, Ilkka Laakso, Osamu Fujiwara.
(2)“Electromagnetic Radiated Emissions from a Wireless Power Transfer System using a Resonant Magnetic Field Coupling,” Sunkyu Kong, Jonghoon Kim, Bumhee Bae, Jonghoon J. Kim, Sukjin Kim, Joungho Kim.
(3)“Power and Ground Phase Relation in LSI Power Distribution Network at Common-mode Noise Reduction,” Takuro Murakami, Masaaki

Table 3 Session Topics and Number of Papers in EMC’14/Tokyo

"Technical Fields" (RS, OS, WS/TU)	Regular Session Papers		Organized Sessions and Workshop/Tutorial		
	Session Topics	RS	Session Topics	OS	WS/ TU
Biological Effect and Safety	Biological Effects, EMF Safety & EMC in Medical Applications and Safety	18	Recent Trends of Standardization Activities and Evaluation Techniques for the Electro-magnetic Exposure to the Human Body	7	
	Numerical Modeling/ Biological Effects	4	Active Implantable Medical Device EMI	7	
PCB and Device Level EMC	Chip, Package, PCB & Cables	19	Signal Integrity and Unintentional EM Radiation Related to Printed Circuit Boards	7	
			3D-IC and Packages	6	
			IC Chip Level EMC for Telecommunication	2	3
EMI/EMC Measurement Technology	EMC Management and Standards	4	[Tutorial]: Recent Topics of EMC Standardization - Role of ACEC		7
			Improving the Measurement Uncertainty of EMI Testing	8	
			Metrological Approach for Result Validation and Improvement of Measurement Quality	6	
			Photonics-applied Electromagnetic Measurement		5
Power System EMC	High Power & High Voltage EMC	5	Photonics-applied Electromagnetic Measurement for EMC	5	
			EMC Topics Related to Smart Grid	7	1
			Recent Trend of EMC on Smart Grid		6
			EMC Aspects of Wireless Power Transfer Systems	7	
Power Electronics & Vehicles	Power Electronics & Vehicles	8	Automotive EMC	7	1
			Aerospace EMC		5
Numerical Modeling	Numerical Modeling	14	Computational Techniques, Modeling, and Simulation for Electromagnetics	6	
			GPU Computing-based Acceleration of Electromagnetic Simulation	4	
EM Absorber and Shielding	Shielding, Grounding & Materials	11			
Immunity, ESD and Transient	Immunity / Susceptibility, ESD and Transients	8	Electromagnetic Noise Radiation and EMI Effects Caused by ESD	4	
Communication System EMC	Communication System EMC	7			
EM Information Leakage			EM Information Leakage	6	
Earthquake Prediction			Electromagnetic Phenomena Associated with Earthquakes: Earthquake Prediction	7	
Lightning			Recent Lightning Current Data from Instrumented Towers		5
	Sum	117	Sum	101	28

RS=Regular Session, OS=Organized Session, WS=Workshop, TU=Tutorial

Maeda, Yuichi Mabuchi, Tohlu Matsushima, Takashi Hisakado, Osami Wada.

(4)“The Advantages of Spatial Domain Probe Compensation Technique in EMC Near-Field Measurements,” Martin Schmidt, Manfred Albach.

Furthermore, 5 young authors, who were less than 33 years of age at the Symposium, were selected as winners of “Young Researcher Award”, and 2 student authors were selected as winners of “IEEE EMC Society Japan and Sendai Chapters Student Award”.

8. Technical Tour and Banquet & Award Ceremony

Technical Tour to TOKYO SKYTREE was held on May 12th, Monday (Fig. 5). More than 40 participants joined this tour. After taking lectures about broadcasting transmission systems and lightning observation equipment, we went up to the tower and enjoyed a great view of Tokyo Metropolitan Area from the Tembo Galleria at the height of 450m. The participants also looked around Asakusa, Sensoji Temple, and felt traditional cultures of Tokyo.

The social highlight of EMC'14/Tokyo was the Banquet & the Award Ceremony which was held on Thursday evening at Josui Kaikan (Fig. 6). The participants were about 220. The banquet began with Kagami-Biraki, which is Japanese traditional ceremony in which the lid of a sake barrel is broken open by mallets. We also experienced an exciting and fantastic Wadaiko (Japanese drum) entertainment performed by “Mugen”, a group of Wadaiko performers. At the Award Ceremony, which was held in the banquet, the winners were commended for their outstanding achievements.



Fig. 4 Winners of Risaburo Sato Award and Chairs



Fig. 5 Technical Tour to TOKYO SKYTREE

9. Technical Exhibition

A technical exhibition was performed at the symposium venue from May 13 to 16, 2014, by EMC-related companies and organizations. The number of exhibitors was 22 including 20 companies and 2 supercomputer-related public organizations.

10. Public Seminar

A seminar for general public on “Introduction to EMC” [2] was held on the last day of the symposium period. The number of public people attending the seminar was 71. The seminar began with an introduction to EMC by Prof. Masao Taki, and three lectures relating to EMC matters in plain words were given by Prof. Shuichi Nitta, Prof. Yoshio Kami, and Prof. Osamu Fujiwara (Fig. 7). A lively discussion was conducted among lecturers and attending people.

11. Conclusion

We believe EMC'14/Tokyo was a really successful event. We owe very much for this success to all those involved in the Symposium. The SC thanks for the contributions to the Symposium of all participants, all committee members, secretaries, and staffs for their hard work, and of all the technical and financial sponsors.

12. Reference

- [1] <http://www.ieice.org/~emc14/index.html>
- [2] http://www.ieice.org/~emc14/seminer_in_JP.html (in Japanese)



Fig. 6 Banquet & Award Ceremony



Fig. 7 Public Seminar

Report on WCSIT 2014

Cristian Andriesei

“Gheorghe Asachi” Technical University of Iasi, Romania



1. Introduction

The Workshop on Circuits, Systems and Information Technology (WCSIT) [1] is an international scientific event organized by “Gheorghe Asachi” Technical University of Iasi, Romania [2], Faculty of Electronics, Telecommunications and Information Technology [3]. Addressing young researchers only and being organized in cooperation with IEICE Communications Society (as technical cosponsor), it represents the first event of this kind organized in Romania. WCSIT 2014 was held in Iasi, at IDEO Business Center, on July 3-4, 2014 and gathered researchers from both Academia and Industry. Academia was represented by a French institute, one Italian university and other 4 Romanian universities, while Industry was represented by a Japanese company operating in Telecommunications field, therefore a total number of 4 countries participating to this event. The workshop gained full support of private companies operating on the Romanian market, facilitating free registration for all event speakers, a premier if reported to other scientific events organized in Romania. All technical papers were reviewed by WCSIT TPC members, each article having assigned a number of 2-5 reviewers. The review process was carefully managed by EasyChair [4].

2. Sessions and activities

The sessions of this workshop were organized based on a round table planning. There were 6 sessions gathering tutorials and technical papers on various topics, such as: Circuits, Systems, Information Theory, Signal Processing and Telecommunications.

This program outline left the impression of a round table where each speaker (professor or young researcher) had something to say. All presentations were of interest to the audience and many questions were addressed to speakers. In addition, the presence of a company manager activating in the Circuits field visibly raised the event quality with pertinent questions addressed from a practical point of view while offering useful insights on some design aspects. Furthermore, all presenters offered valuable insights on several emerging fields such as: Game theory (applied to telecommunications), Quantum computing, HEMT reliability, SOI technology, Phase retrieval (with use in Signal processing), Modern cryptography.

3. Awards

As a strategy to promote the IEICE society and its values, the organizers of this event offered to young researchers, in cooperation with IEICE-CS and event sponsors (AT&C Technology SRL, Microchip Technology SRL and Micro Edge SRL), four awards consisting in prepaid one year IEICE society memberships. Some papers awarded during this event were focused on Signal processing [5] and Circuits [6], [7] (Fig. 1).



Fig. 1 Award ceremony at WCSIT 2014

4. Conclusion

Even though being organized for the first time, the success of WCSIT 2014 has been confirmed by all participants who encouraged continuing with a second edition. In this regard, WCSIT 2015 is announced to be held in Japan, in cooperation with IEICE-CS. This mutual hosting aims to promote research in both countries, enforce cross-cooperation and increase researchers' visibility.

5. Reference

- [1] www.wcsit.eu
- [2] www.etti.tuiasi.ro
- [3] www.tuiasi.ro
- [4] www.easychair.org
- [5] L. Vieriu, “Real-Time Voice Activity Detection Using a Simple Webcam,” Proceedings of WCSIT 2014.
- [6] S. Savinescu, L. Goras, “On the Nonidealities of a Tunable CMOS Transconductor,” in Proceedings of WCSIT 2014, July 2014.
- [7] Z. M’Harzi, M. Alami, F. Temcamani, “Improvement of current mode controlled amplifier using current conveyors,” Proceedings of WCSIT 2014.

Report on the Thirteenth International Workshop on Assurance in Distributed Systems and Networks (ADSN2014)

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1. Introduction

The Thirteenth International Workshop on Assurance in Distributed Systems and Networks (ADSN2014) was held in Madrid, Spain on June 30, 2014 in conjunction with the 34th IEEE International Conference on Distributed Computing Systems (ICDCS). The ADSN series were sponsored by the IEEE Computer Society Technical Committee on Distributed Processing in cooperation with the IEICE Technical Committees on Information Networks and Dependable Computing. The details of the workshop are seen in [1].

2. ADSN2014 Organization

ADSN2014 organizers are as follows.

General Chair: Miroslaw Malek, University of Lugano, Vice Chair: Yoshiaki Kakuda, Hiroshima City University

Program Chair: Joerg Kaiser, Otto-von-Guericke-University of Magdeburg, Vice Program Chairs: Antonio Casimiro, University of Lisbon (FCUL), Portugal, Chin-Tser Huang, University of South Carolina, USA, Yukikazu Nakamoto, University of Hyogo, Japan

The Program Committee consists of 27 members from Asia, Europe and Americas.

3. ADSN2014 Program

Twelve papers have been submitted to the workshop. As a result of comprehensive reviews by the Program Committee, nine high quality papers were selected to be included in the program of ADSN2014 [2].

The program consists of the following five sessions.

Session 1: Keynote Speech (Chair: Miroslaw Malek)

Session 2: Network Performance and QoS assurance (Chair: Joerg Kaiser) 3 papers

Session 3: Security Aspects

(Chair: Yukikazu Nakamoto) 3 papers

Session 4: Dependable and safe embedded systems

(Chair: Jorge Cobb) 3 papers

Session 5: Panel Discussion on Lethal Threat to Assurance: Counterfeit Electronics - Exposure and Protection

(Moderator Miroslaw Malek) 2 panelists

About twenty participants joined the workshop.

4. Keynote Speech and Panel Discussion

In the keynote speech, Rolf Johansson, (Technical Research Institute of Sweden) presented speech whose title is “Assuring Functional Safety for Cooperating Automotive Systems” (see Fig. 1). In the panel discussion, the panelists Eitaro Kohno (Hiroshima City University) and Francesco Regazzoni (Advanced Learning and Research Institute) discussed hardware trojans / malicious hardware (see Fig. 2). They introduced how to detect them from the viewpoints of network and hardware securities, respectively.



Fig. 1 Keynote Speech



Fig. 2 Panel Discussion

5. Summary

This report has concisely explained ADSN2014. We have a plan to propose ADSN2015 to be held in Seattle, USA in June/July, 2015 in conjunction with ICDCS2015.

References

- [1] <http://adsn.net.info.hiroshima-cu.ac.jp>
- [2] Proceedings of 34th IEEE International Conference on Distributed Computing Systems Workshops, ISBN 978-0-7695-5199-9, 2014.

Report of Workshop on the Next Generation Mobile Communication Technologies and Applications 2014

Hidekazu Murata
Kyoto University



1. Introduction

The 9th Workshop on the Next Generation Mobile Communication Technologies and Applications was held in Naha, Okinawa, Japan from June 19 to June 21, 2014. This workshop was sponsored by Japan-China ICT Forum, YRP R&D Promotion Committee, and FuTURE FORUM, and technically cosponsored by IEICE-CS Technical Committee on Radio Communication Systems (RCS). This year, it is also backed by Okinawa Prefecture and supported by IIOT Foundation.

The workshop venue was the Okinawa-ken Seinen Kaikan. And also, at the Okinawa NaHaNa Hotel & Spa, we had fantastic lunch and reception arranged by YRP R&D Promotion Committee. Both are located in the heart of Naha city, and easily accessible by Yui Rail from Naha Airport.

2. Themes of this year

- Next Generation Mobile System: 5G, 2020 and beyond, IMT-2020
- Millimeter wave and Terahertz wave
- M2M, IoT (Internet of Things and M2M Communications)
- Space Communication

3. Technical sessions and discussions

On the first day, we had a special session, Japan-China Workshop and RCS Special Session on 5G, as a joint event of Japan-China Workshop and RCS Technical Committee. In this session, three welcome speeches, three guest greetings, and four keynote speeches were delivered. The list of the speakers is as follows.

Welcome speeches:

1. Mr. MOTAI Akio, President of YRP R&D Promotion Committee
2. Prof. YOU Xiaohu, Secretary General of FuTURE Mobile Communication FORUM
3. Prof. TAROMARU Makoto, Chairman of RCS

Guest greetings:

1. Mr. UEHARA Hiroshi, Director-General, Okinawa Office of Telecommunications, Ministry of Internal Affairs and Communications, Japan
2. Mr. RUAN Xianping, Minister-Counsellor, Embassy of the People's Republic of China in Japan
3. Mr. SHIMOJI Akikazu, Director General, Department of Commerce, Industry and Labor, Okinawa Prefectural Government.

Keynote speeches:

1. Mr. FUSEDA Hideo, Director, Land Mobile Communications Division, Radio Department, Telecommunications Bureau, Ministry of Internal Affairs and Communications, Japan
2. Prof. YOU Xiaohu, Southeast University
3. Mr. NAKAMURA Takehiro, Director, Radio Access System Group, Radio Access Network, Development Department, NTT DOCOMO, INC. and Mr. NAKAMURA Takaharu, Principal Engineer, Network Products Business Unit, Fujitsu Limited
4. Prof. WANG Jing, Tsinghua University

In the Japan-China Workshop, we had five regular sessions of 15 presentations in total from both Japan and China. This year, thanks to RCS co-sponsorship, RCS participants were able to join the regular sessions. We had friendly and fruitful discussions on future wireless communication technologies and systems. Also, RCS committee introduced its activities for participants with the panels during a break.



Fig. 1 All participants of Japan-China Workshop and RCS Special Session on 5G

4. Statistics

Japan-China Workshop and RCS Special Session on 5G attracts 94 participants, and Japan-China Workshop was attended by 68 participants including 25 participants from China. The room of the workshop was almost full.

5. Conclusion

Since 2006, this workshop has been the forum for researchers and engineers in Japan and China to present and discuss hot topics related to next generation mobile communication technologies and applications. This workshop will be held next year in China.

Report on WTC 2014

Noriaki Kamiyama, Kohei Shiomoto
NTT Network Technology Laboratories



1. Introduction

The World Telecommunications Congress (WTC) brings together leading experts from industry, academia and government to map out the future requirements for telecommunications technologies, applications and policy. The WTC builds on the traditions of quality, timeliness and open interaction from its origins in the ISS (International Switching Symposium) and ISSLS (International Symposium on Services and Local Access). The first ISS was held in 1957, and the first ISSLS was held in 1974, so the WTC has long history more than 50 years. The WTC 2014 was organized by VDE, technically sponsored by Communications Society, IEICE, and held in Berlin, Germany, for June 1 to 3, 2014.

2. Statistics

After the review process, 39 papers were accepted and categorized into 10 technical sessions, and the sessions were held in two parallel tracks. The tracks covered a wide variety of topics including wireless networks, QoS & traffic control, content distribution, and optical networks. The presenters were from various countries including Germany, Italy, Japan, USA, and China. About 100 participants registered the congress.

3. Technical sessions

The various papers were presented in technical sessions. For example, Ahmad et al., evaluated the effect of aggregating multiple M2M devices into the identical physical resource block (PRB) for improving the throughput in LTE-Advanced Wireless networks using the OPNET simulation tool [1]. Thomas et al. experimentally evaluated the effect of reducing the file transfer time by delivering content from multiple source nodes on multiple routes simultaneously in Publish Subscribe Internetworking (PSI) [2]. Moreover, Priscoli et al. proposed to maximize the QoE of flows by optimizing the selection of service class of each flow so that the difference between the estimated QoE and the target QoE was minimized [3]. Hermanns et al. proposed a method of dynamically adjusting the encode rate at senders based on the measured and estimated network load and sustaining high throughput in video phone over LTE [4].

4. Other sessions

Five keynote speeches were presented. The followings are the speakers and titles of these keynote speeches: (i)B. Jacobfeuerborn, CTO of Deutsche Telecom AG, “Technology-driven innovations”, (ii)R.



Fig. 1 Keynote speech

Henkel, Senior policy officer in the European Commission, “Broadband policy of the European Union”, (iii)M. Hofmann, Bell Labs/Alcatel-Lucent, “The User-Centric Network”, (iv)K. Hashimoto, Senior Vice President NEC Europe, and (v)H. Woesner, Co-founder and CEO of BISDN GmbH, “How Software Defined Networks (SDN) are lowering the entrance barrier into the telecommunications market. In the closing session, six panelists, M. Hofmann, H. Kolbe (NEC), D. Soldani (Huawei), K Shiomoto (NTT), I. Yahia (Orange), and H. Woesner, discussed on the topic of SDN/NFV.

5. Awards

The Best Paper Award which was given to the paper with the highest technical quality was given to N. Kamiyama et al., “Loss Recovery Method for Content Pre-distribution in VoD Service. Moreover, the Best Presentation Award which was given to the presenter with the highest presentation quality was given to N. Hermanns, A Framework and Evaluation of Rate Adaptive Video Telephony in 4G LTE.

6. Reference

- [1] F. Ahmad, et al., Tailoring LTE-Advanced for M2M Communication using Wireless Inband Relay Node, WTC 2014.
- [2] Y. Thomas, et al., Accelerating File Downloads in Publish Subscribe Internetworking with Multisource and Multipath Transfers, WTC 2014.
- [3] F. Priscoli, et al., Dynamic Class of Service mapping for Quality of Experience control in future networks, WTC 2014.
- [4] N. Hermanns, A Framework and Evaluation of Rate Adaptive Video Telephony in 4G LTE, WTC 2014.

IEICE-CS Related Conferences Calendar

Date	Conference Name	Location	Note
25 Mar - 27 Mar 2015	The Twelfth International Symposium on Autonomous Decentralized Systems (ISADS2015)	Taichung, Taiwan	Submission deadline: 24 Sep. 2014
2 Dec - 5 Dec 2014	2014 International Symposium on Antennas and Propagation (ISAP2014)	Kaohsiung, Taiwan	Submission deadline: Closed
4 Nov. - 6 Nov. 2014	2014 IEEE International Conference on Communication, Networks and Satellite (COMNETSAT 2014)	Jakarta, Indonesia	To be held soon
22 Oct. - 24 Oct. 2014	International Conference on Information and Communication Technology Convergence 2014 (ICTC 2014)	Busan, Korea	To be held soon
20 Oct. - 23 Oct. 2014	International Topical Meeting on Microwave Photonics /The 9 th Asia-Pacific Microwave Photonics Conference (MWP/APMP2014)	Sapporo, Japan	To be held soon
1 Oct. - 3 Oct. 2014	The 20 th Asia-Pacific Conference on Communications (APCC 2014)	Pattaya, Thailand	To be held Soon
17 Sep. - 19 Sep. 2014	Asia-Pacific Network Operations and Management Symposium (APNOMS 2014)	Hsinchu, Taiwan	To be held soon
2 Sept. 2014	The 7 th International WDN Workshop on Cooperative and Heterogeneous Cellular Networks (WDN-CN2014)	Washington DC, USA	To be held soon
28 Aug. - 30 Aug. 2014	Asia Pacific Conference on Wireless and Mobile (APWiMob)	Bali, Indonesia	Done
27 Aug. - 29 Aug. 2014	The 12 th International Conference on Optical Internet (COIN 2014)	Seogwipo, Koreaa	Done
30 Jul. - 1 Aug. 2014	The Fifth International Conference on Communications and Electronics (ICCE2014)	Da Nang, Vietnam	Done
6 Jul. - 10 Jul. 2014	OptoElectronics and Communications Conference and the Australian Conference on Optical Fibre Technology 2014 (OECC/ACOFT 2014)	Melbourne, Australia	Done
30 Jun. - 3 Jul. 2014	The 13 th International Workshop on Assurance in Distributed Systems and Networks (ADSN 2014)	Madrid, Spain	Reported on this issue
19 Jun. - 21 Jun. 2014	Workshop on the Next Generation Mobile Communication Technologies and Applications (CJMC)	Naha, Japan	Reported on this issue
1 Jun. - 3 Jun. 2014	World Telecommunications Congress 2014 (WTC 2014)	Berlin, Germany	Reported on this issue
28 May - 30 May 2014	2014 IEICE Information and Communication Technology Forum (IEICE ICTF 2014)	Poznan, Poland	Reported on this issue
13 May - 16 May 2014	2014 International Symposium on Electromagnetic Compatibility (EMC'14/Tokyo)	Tokyo, Japan	Reported on this issue

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

Special Section Calendar of IEICE Transactions on Communications

Issue	Special Section	Note
Jan. 2016	Recent Progress in Antennas, Propagation and Wireless Systems Related to Topics in ISAP2014	Submission due: 6 April 2015
Dec. 2015	No special section in this issue	
Nov. 2015	No special section in this issue	
Oct. 2015	5G Radio Access Networks [Part II] Multi-RAT Heterogeneous Networks and Smart Radio Technologies	Submission due: 19 January 2015 See page 39
Sep. 2015	Emerging Technologies on Ambient Sensor Networks toward Future Generation	Submission due: 9 January 2015 See page 38
Aug. 2015	5G Radio Access Networks [Part I] Radio Access Technologies and System Design	Submission due: 8 December 2014 See page 37
Jul. 2015	Electromagnetic Compatibility Technology in Conjunction with Main Topics of EMC'14/Tokyo	Submission due: 14 October 2014 See page 36
May 2015	Recent Progress in Radio Propagation	To be issued
Apr. 2015	No special section in this issue	
Mar. 2015	Position Papers Exploring Innovative Intelligence and Technologies in Communications	To be issued
Feb. 2015	Quality of Diversifying Communication Networks and Services	To be issued
Jan. 2015	Position Papers Exploring Innovative Intelligence and Technologies in Communications	To be issued
Dec. 2014	Technologies and Architectures for Improving Scalability, Reliability, and Robustness for Future Information Networks	To be issued
Nov. 2014	Network Virtualization, and Fusion Platform of Computing and Networking	To be issued
Oct. 2014	Recent Progress in Measurement and Design Techniques on Antennas, Propagation and Wireless Systems	To be issued soon
Sep. 2014	Ambient Intelligence and Sensor Networks	To be issued soon

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 Electromagnetic Compatibility Technology in Conjunction with Main Topics of EMC'14/Tokyo

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Electromagnetic Compatibility Technology in Conjunction with Main Topics of EMC'14/Tokyo" in the **July 2015** issue.

Combining and utilizing both the wideband communication technology and the power electronics technology, such as the wireless power transfer systems and the smart meters, often cause the Electromagnetic Compatibility (EMC) problems to the function of several electronic devices. In addition, the effects on the electromagnetic environment by a natural phenomenon, which have been researched for a long time, are also problems to be solved. Therefore, the importance of the EMC technology increases not only for the functional safety of the electronic devices and systems but also for the safety between the equipment/systems and the human. Such related problems had been discussed in the 2014 International Symposium on Electromagnetic Compatibility (EMC'14/Tokyo), which had been held in Tokyo in May 2014. A special section to be issued in July 2015 is being planned in order to further promote the development of new EMC technologies. The special section solicits paper submissions from anyone associated with the EMC field and especially from people who presents paper(s) in EMC'14/Tokyo. The authors working in this field are strongly encouraged to submit original research papers on the field which include, but are not limited to, the following topics:

1. Topics

- 1) **EMC Measurements:** *Measurement & Instrumentation, Measurement Techniques, EMC Test Facilities, Antennas*
- 2) **High Power & High Voltage EMC:** *Lightning & Overvoltage Protection, Intentional EMI / EMP*
- 3) **EMC Management and Standards:** *Standards & Regulations, Electromagnetic, Product Safety, System-Level EMC, EMC Management*
- 4) **Chip, Package, PCB & Cables:** *IC EMC, Electronic Packaging, PCB, Transmission Lines & Cables, Power & Signal Integrity*
- 5) **Immunity/Susceptibility, ESD and Transients:** *EMC Tests, EM Radiation, Gap Discharge, Contact, Surge Protection*
- 6) **Shielding, Grounding & Materials:** *Shielding & Grounding, EM Absorber, Material in EMC Applications, Meta-materials*
- 7) **Numerical Modeling:** *Computational Electromagnetics, Large-scale Numerical Simulation, GPU Simulation*
- 8) **EMF Safety & Biomedical Issues:** *Human exposure to ELF/RF EM fields, Biological Effects, Medical Application*
- 9) **Power System EMC:** *Smart Grids, EMC in Power Plants & Substations, Solar Power Systems, Wireless Power Transmission*
- 10) **Power Electronics & Vehicles:** *Automotive EMC, Electric Vehicle, Railway & Naval EMC, EMC in Space*
- 11) **Communication System EMC:** *Wired & Wireless Communications, Power Line Communications, Information System Security*

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 14th, 2014 (JST)**. Authors should choose the Electromagnetic Compatibility Technology in Conjunction with Main Topics of EMC'14/Tokyo as a "Journal/Section" on the online screen. Do NOT choose [Regular EB].

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3. Special Section Editorial Committee

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— Special Section on 5G Radio Access Networks – Part I: Radio Access Technologies and System Design —

IEICE Transactions on Communications announces that it will publish a special section entitled “Special Section on 5G Radio Access Networks – Part I: Radio Access Technologies and System Design” in the **August 2015 issue**.

As the fourth generation mobile communications system (4G), the Long Term Evolution (LTE) is being rolled out worldwide and preparations for LTE-Advanced deployment are being underway. Meanwhile, the fifth generation mobile communications system (5G) has been attracting more and more attention, with many organizations being established toward the identification of system requirements, novel system concepts and potential technologies for 2020 and beyond. Examples of 5G related activities include the establishment of “Future IMT Vision” study group by ITU-R WP5D, METIS project in Europe, IMT-2020 in China, 5G Forum in Korea and “2020 and Beyond Adhoc (20B AH)” by ARIB Japan. From radio access perspective, 5G is generally perceived as the combination of LTE-Advanced evolution in addition to novel radio access technology (RAT) as an enabler of more advanced capabilities such as the support of new scenarios and frequency bands. In order to further promote 5G related research and development activities, a special section on technologies for further LTE-Advanced evolution and novel radio access technologies, radio interface and system concept designs for 5G is being planned (scheduled to appear in the August 2015 issue).

1. Scope

Special section aims at timely dissemination of research in the following areas. Possible topics include, but are not limited to:

- 5G system concept
- Radio interface design
- New waveform design
- Massive MIMO techniques
- Small cell technologies
- Advanced modulation and coding schemes
- Advanced multiple access technologies
- Advanced interference coordination and mitigation techniques
- Advanced MIMO technologies
- Capacity/coverage split system design
- Energy-efficient radio access technologies
- Technologies for higher frequency bands
- Technologies for massive connectivity
- Technologies for small packet transmission
- Technologies for ultra-low latency
- Device to Device (D2D) communications
- Wireless backhauling and advanced relay

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 guidelines 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 **8th December 2014 (JST)**. Authors should choose the “5G Radio Access Networks – Part I: Radio Access Technologies and System Design” as a “Journal/Section” on the online screen. Do not choose [Regular EB].

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* For membership applications, please visit <http://www.ieice.org/eng/member/OM-appli.html>

Call for Papers

--- Special Section on Emerging Technologies on Ambient Sensor Networks toward Future Generation ---

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on Emerging Technologies on Ambient Sensor Networks toward Future Generation" in **September 2015**.

Sensor networks enable gathering ambient information from peoples, products, and sensing devices for real space. Sensing data should be processed, analyzed, and applied for enhancement or assistance for human activities, which is called ambient intelligence. Ambient sensor networks (ASNs) are the sensor networks interactively cooperating with ambient intelligence. It is expected that gentle social environments such as efficient electric power usage in smart grids and effective transportation systems will be established through the ambient sensor networks. Applied researches have been promoted in the field of technologies supporting the ambient sensor networks. Toward future generation, it is important to support such progressing technologies and promote further collaboration with other fields. From the above points of view, the special section is planned (scheduled to appear in the September 2015 issue) to publish papers on the related fields.

1. Scope

The scope of this special section includes not only information and communication research fields but also its multidisciplinary research with agriculture, forestry and fisheries industry fields, industry fields including incineration and power-generator plants, and service fields such as health-care, medical-care, and circulations because they are important and major applications for the ASNs. Possible topics include, but are not limited to:

a. Ubiquitous sensing and Actuation technologies

Space sensing, vital sensing, mobile sensing, ambient interface, device and appliance technologies, embedded software, sensing and control theory.

b. Ad-hoc, mesh, and sensor networks

MAC/routing protocols, QoS control, multi-hop and cooperative communication, security, cross layer design, energy harvesting, green wireless, communication and network theory.

c. Ambient intelligence

Sensor database, context extraction, mining, location-information technology, stream processing, privacy and security, big data, learning signal processing.

d. System basement

Large scale widening, dependability, IoT, M2M, cyber physical, operation management, autonomous distributed control.

e. Interdisciplinary system applications

Agriculture, forestry and fishery support systems, disaster prevention and mitigation system, smart space, medical and health systems, industrial support system, social infrastructure system, wide area sensing system

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 (TeX/Word files, figures, authors' photos and biographies) via the IEICE Web site https://review.ieice.org/regist/regist_baseinfo_e.aspx **by January 9, 2015 (JST)**. Authors should choose the Emerging Technologies on Ambient Sensor Networks toward Future Generation as a "Type of Section (Issue)" on the online screen. Do not choose [Regular-EB].

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----- Special Section on 5G Radio Access Networks – Part II: Multi-RAT Heterogeneous Networks and Smart Radio Technologies -----

The IEICE Transactions on Communications announces that it will publish a special section entitled "Special Section on 5G Radio Access Networks – Part II: Multi-RAT Heterogeneous Networks and Smart Radio Technologies " in the October 2015 issue.

As the fourth generation mobile communications system (4G), the Long Term Evolution (LTE) is being rolled out worldwide and preparations for LTE-Advanced deployment are being underway. Meanwhile, the fifth generation mobile communications system (5G) has been attracting more and more attention, with many organizations being established including "Future IMT Vision" study group by ITU-R WP5D, towards the identification of system requirements, novel system concepts and potential technologies for 2020 and beyond. Key issues for the 5G system is the support of the rapidly growing mobile traffic by exploration of higher frequency bands, high density cell deployment, and low-cost network operation. Integration of heterogeneous multiple radio access technologies (multi-RAT), e.g., cellular, WLAN, and short range communications in millimetre-wave bands, is expected as a practical solution to overcome these issues. Moreover, Smart Radio technologies are expected as promising enablers for the 5G system. In order to further promote 5G related research and development activities, particularly on multi-RAT heterogeneous networks and Smart Radio technologies, a special section is being planned (scheduled to appear in the October 2015 issue).

1. Scope

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

- Smart radio
- Heterogeneous radio access networks
- Cellular and WLAN interworking
- Multi-band/multi-mode radio systems
- Aggregation of fragmented spectrum bands
- Cognitive radio/cognitive networks
- Common control channel and cloud operation
- Dynamic spectrum access and spectrum management
- Shared use of spectrum/optimising unlicensed spectrum usage
- Radio resource and traffic management
- Network-oriented interference coordination
- Cross-layer optimisation
- Software defined radio and networking technologies
- Radio policy and regulatory issues.

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 **19th January 2015 (JST)**. Authors should choose the "5G Radio Access Networks – Part II: Multi-RAT Heterogeneous Networks and Smart Radio Technologies" as a "Journal/Section" on the online screen. Do not choose [Regular EB].

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Guest Editors: Masayuki Ariyoshi (ATR), Osamu Takyu (Shinshu Univ), Shigeru Tomisato (Okayama Univ)

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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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Africa; South America	11,000 yen	5,600 yen

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IEICE Communications Society - GLOBAL NEWSLETTER

Submission Guideline

First version in only Japanese: May 30, 2008
Second version in only Japanese: Feb. 13, 2009
Third version in only Japanese: Jul. 22, 2010
Fourth version in English and Japanese: Mar. 8, 2011
Ver 5.0 : August 10 2013

1. About GLOBAL NEWSLETTER

The Institute of Electronics, Information and Communication Engineers Communications Society (IEICE-CS) GLOBAL NEWSLETTER has been established since 2002. We quarterly publish an English newsletter every March, June, September, and December.

1.1. Goal

Our goal is to share information between overseas/foreign members and other members in IEICE-CS as a global activity, and to show IEICE presence internationally.

1.2 Category of Articles

- 1) Messages from President/Vice President
 - An inaugural message from CS President is published once per year in June. Message from CS Vice President is published properly.
 - 2) IEICE-CS Activities Now
 - IEICE General/Society Conference information/reports
 - Activities of Technical Committees
 - International activities of the society
 - 3) IEICE-CS Related Conferences Reports
 - Information/reports on IEICE-CS related conferences
 - IEICE-CS Conferences Calendar (*)
 - 4) Others
 - Essays, Laboratory activity reports, Technology reports, Messages from overseas/foreign members, etc.
 - Information from Sister Societies
 - Special topics (*)
 - 5) IEICE-CS Information
 - Call for papers
 - From editor's desk (*)
- *: planned / written by IEICE-CS Directors, Planning and Members Activities

2. Major notes for Contribution

Basically, IEICE-CS members and readers can contribute articles. IEICE-CS Directors, Planning and Members Activities may ask non-IEICE-CS members to contribute articles. The articles should be fruitful and profitable for IEICE-CS members, **NOT** for particular organization. IEICE-CS Directors, Planning and Members Activities may not accept an article for publication if it does not follow this guideline.

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Please use English for all articles.

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<http://www.ieice.org/eng/about/copyright.html>

4. Publication fee / Manuscript fee

No publication fee and no manuscript fee for all articles.

5. Schedule

Standard editing schedule is as follows. Please note that the schedule may vary due to public holidays or other circumstances. The exact deadlines are indicated in call for newsletters.

Publication date	1 st , Mar.	1 st , Jun.	1 st , Sept.	1 st , Dec.
Call for newsletters	1 st Mon., Dec.	1 st Mon., Mar.	1 st Mon., Jun.	1 st Mon., Sept.
Contribution entry	4 th Fri., Dec.	4 th Fri., Mar.	4 th Fri., Jun.	4 th Fri., Sept.
Submission of Manuscript/Copyright	3 rd Fri., Jan.	3 rd Fri., Apr.	3 rd Fri., Jul.	3 rd Fri., Oct.

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5.3 Submission of Manuscript

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6 Contact Point

IEICE-CS Directors, Planning and Members Activities in charge of IEICE-CS GLOBAL NEWSLETTER, cs-gnl@mail.ieice.org

From Editor's Desk

● A New Member of Editorial Staff Joined

A new member joined the editorial staff in May this year and has been engaged in publication operations from this issue. Through the publication of GLOBAL NEWSLETTER (GNL), we, three of editorial staff, are continuously trying to aim at the goal to share information between overseas/foreign members and other members in IEICE-CS as a global activity, and also to show IEICE presence internationally. For such goal, we welcome your contribution of article submissions to GNL. Category of the articles in GNL includes also Essays, Laboratory activity reports, Technology reports, Messages from overseas/foreign members, etc. For article submission, please refer to the Submission Guideline of IEICE-CS GLOBAL NEWSLETTER shown in page 42.

● IEICE Society Conference 2014 Held in September

Complete English Sessions will be scheduled in IEICE Society Conference 2014 for the globalization of IEICE's academic activities. The conference is to be held in the University of Tokushima, Tokushima, for September 23-26, 2014. We would like to remind readers to consider joining in the conference. Please check out the latest information on the IEICE web site at:

http://www.toyoag.co.jp/ieice/E_S_top/e_s_top.html

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Scope

Opportunities and challenges for implementing highly complex, efficient, and dependable business and control systems have been steadily increasing, driven by the continuous growth in the power, intelligence, adaptiveness and openness of technologies and standards applied in computing, communication and control systems. Dynamically changing social and economic situations demand the next-generation of systems to be based on adaptive, reusable, and internet and Web-enabled technologies and applications. Such systems are expected to have the characteristics of living systems composed of largely autonomous and decentralized components. Such systems are called Autonomous Decentralized Systems (ADS). The International Symposium on Autonomous Decentralized System (ISADS) has been the premier events in the past twenty-four years to have successfully addressed these challenges. The 12th ISADS 2015 will continue to focus on the advancements and innovations in ADS concepts, technologies, applications strategic issues, and other related topics. The special topic for ISADS 2015 is the evolving systems for next generation social infrastructures. We invite research papers, workshop proposals, and panel proposals on, but not limited to, the following topics:

- Ad-hoc networks and sensor networks
- Advanced network infrastructures and internetworking
- Assurance, fault tolerance, on-line expansion, on-line-maintenance, and resilience
- Autonomous and decentralized services, including service architecture, protocols, and collaboration
- Cloud computing and big data analysis
- Distributed and collaborative development, test and maintenance, and development infrastructure of high-quality software systems, cloud computing, and service-oriented architecture
- Heterogeneous distributed information / control systems
- Mobile agent / computer-supported cooperative works
- Model driven development
- Modeling and simulation of autonomous services and service-oriented application composition
- Network and system security and safety
- Novel applications, including e-business, e-commerce and e-government; telecommunications; information service systems; manufacturing systems; real-time event management; office automation; traffic and transportation control; supply chains; environmental/emergency protection; networked health and medical systems; intelligent home control; embedded systems for automotive and avionics applications
- Service-oriented architecture, design patterns, and application frameworks
- Technologies and applications to promote transformation of social infrastructures, including the smart grid, environment management, resilience of system, Internet of Things, autonomous car and train, communication among the mobiles
- Web services and Web-based application composition

Information for Authors

Research papers should describe original work and be up to 20 double-spaced pages (5,000 words) or 8 pages in IEEE double-column conference paper format. Papers should include: title, authors, affiliations, 150-word abstract and list of keywords. Please identify the contact author clearly, including name, position, mailing address, telephone number, and email address. At least one of the authors of each accepted paper must register and present the paper at ISADS 2015. Authors must submit their manuscripts electronically following the instructions at the ISADS 2015 web site at: <http://isads2015.asia.edu.tw>

Information for Workshop and Panel Organizers

Workshop and panel proposals should include: title, organizer affiliation, position, mailing address, telephone number, email address, and a draft call-for-papers, including Chairs, committees, and submission deadline. Workshop and panel proposals must be e-mailed to the program chair, Dr. Chen (yinong@asu.edu).

General Information

For general information, visit the ISADS 2015 web site at: <http://isads2015.asia.edu.tw> or email local arrangement chair Dr. Liao (liao@aim.asia.edu.tw).

Important Dates

June 15, 2014: Workshop and panel proposals due.
July 31, 2014: Acceptance notification for workshop proposals.
September 24, 2014: All papers due.
November 15, 2014: Acceptance notification for paper authors and panel organizers.
December 31, 2014: Camera-ready copies of accepted papers and panelist position papers due.