

# AP Newsletter No. 23, May 2003

<http://www.comsoc.org/~apb/>

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## 1. APB Director's Message by Prof. Kwang-Cheng Chen

Dear Colleagues at IEEE ComSoc APB:

With the gradual recovering of telecommunication and Internet industry, we have been expecting a more exciting 2003 in AP region. Suddenly, SARS seems taking the focus in many international activities in this region. Its impact on travel and thus one of our major focus issues, conferences in AP region, might be significant this year. Let us wish a more healthy time from now on.

There are a few international conferences in AP region later this year. We do expect organizers having a well-prepared plan to deal with possible impacts from SARS such as paper submissions, conference attendees, finance/budget plan, etc. We may also expect a lower than usual distinguished lecture tours and likely no APRCC meeting in 2003.

On the other hand, I would encourage to see a bright side: SARS might introduce more important role for communications and networks, including video conferences and wireless communications, etc. We may also think about new communication technology brought to AP activities, which we had initially tried at IEEE Globecom 2002 in Taipei.

Please aspire our creation for new applications, to promote APB and to promote communication technology.

K.C. Chen

## 2. Messages from the 1<sup>st</sup> APB Young Researcher Award Winners

### (a) Best Young Researcher, by Byoung-Hoon Kim

In the last November, a ComSoc flagship conference, GLOBECOM 2002, was held in Taipei, Taiwan. During the award luncheon ceremony, five young researchers in the AP region received Asia-Pacific Young Researcher Awards, which were given by APB of ComSoc to recognize the young researchers who had accomplished remarkable research achievements for the last several years. As one of the awardees, I was complimented and congratulated by many participants and I myself admit that it was an exceptionally honorable experience in my life. However, the award also imposed an uneasy burden on me, reminding me of

### Editorial Message

*Welcome to the 23<sup>rd</sup> edition of the Comsoc AP Newsletter. I hope you will enjoy reading this latest update of IEEE Comsoc events in the Asia Pacific Region. In this issue, we include messages from the recipients of the first APB Young Researcher Award and provide updates on wireless developments in Japan. We report on the conference activities of IEEE Globecom 2002, successfully held in Taipei, Taiwan, and include greetings from the General Chairs of two prestigious conferences including IEEE INFOCOM 2004 in Hong Kong, and IEEE ICME 2004 in Taiwan.*

*I would like to take this opportunity to thank the authors for contributing to the newsletter. To make our newsletter a truly AP newsletter, we invite you to contribute articles and news on your respective regions. We would also appreciate any comments you may have to improve the newsletter. Thanks in advance and enjoy reading!*

Wanjiun Liao, Editor

engineering researcher's struggling life.

Personally, I agree that the engineering researcher's life should be like that of chameleon. The engineering world ceaselessly requests its researchers to adapt themselves to a new field and create a new technology that can overcome and replace the state-of-the-art technology. At the moment when people recognize you as a good researcher on a promising topic, they also whisper that most critical works on the topic have already been completed and you should move to another demanding topic rather than live in your past. Pioneering engineering researchers cannot live on their past achievements but they must innovate themselves to search for a new technology that improves the present. But they cannot always be recognized for their new trials. In fact most researchers have few chances to be recognized in their lives. Therefore, successful and happy researchers will be those who do not pursue a vanity to receive recognition but have an ambition to change the world into a better place. I see many old researchers who have left great achievements in their lives and are still yielding invaluable works. I am not sure whether the world has really turned into a better place through those engineering researchers' efforts, but I bet they are successful and happy researchers who have persistently tried to improve the world. If an engineering researcher stops innovating himself at some time in his life and starts to see that the present cannot be better as it is, he will cease to be a successful and happy pioneering researcher at the very moment.

In this context the award gave me a special meaning: It is time that I should innovate myself if I want to remain as a pioneering researcher. I think the value of Young Researcher Awards lies in that it stimulates promising young researchers to continue their innovations rather than to be satisfied with their past achievements, leading them to remain as successful and happy researchers who will cut the future world.

## **(b) Outstanding Young Researcher**

### **1) Tomoaki Ohtsuki, Associate Professor, Tokyo University of Science, Japan**

First I really appreciate the 1st APB Young Researcher Award. I was really lucky, because it was the first and last chance for me to apply for the award due to the age limit. I was awarded because of the contribution to the optical CDMA and wireless communications. I want to explain my research fields briefly. I am doing research particularly on the physical layers. One of my research fields is photonic networks using optical CDM and CDMA as a code label. Not so many researchers are doing research in this field, but optical CDM/CDMA has a possibility to make a virtual networks over WDM and/or TDM networks and increase the capacity of the network. But now, more than half of my time is devoted to the researches on wireless communications. One topic is a multicarrier modulations, such as OFDM and multicarrier CDMA (MC-CDMA). This is mainly for high-speed wireless communications such as fourth generation (4G) wireless communications. I am doing researches on channel estimation techniques, space-time signal processing, error correction coding for the multicarrier systems. The other research field is Ultra WideBand (UWB). UWB has a possibility to realize the very high-speed for short-range wireless communications. I am trying to develop a very high-speed WUB communication system with coexisting with other communication systems, such as wireless LAN. Now I have my own LAB. I have 15 graduate students and 12 undergraduate students. We are doing researches on the above fields. I hope we can contribute future communications. This award encourages me to make good researches.

### **2) Shiann-Tsong Sheu, Professor, Tamkang Univ., Taiwan**

First, I would like to appreciate the IEEE Asia Pacific Board Committee for giving me this award. Secondly, the science of communication is the future of the world. In this field, there are millions of outstanding experts contributing their knowledge day and night with all their hearts, especially in Taiwan. Owing to the hardworking and teamwork, our country now stands a great chance in this field to compete with many other advanced countries. I believe that what we have devoted to our work, we will harvest in the future. Third, I have been acquired the IEEE membership for over ten years since I was a graduate student. Thanks to IEEE, I acquire thorough and professional information from the society. I realize that joining the society is very helpful to our works; therefore, I introduce all my students to become the members just like what I have been through. They all benefit a great deal on their studies from IEEE as well. I also appreciate IEEE for sponsoring me to attend the conference when I was still a student. I always believe that the society plays an important role on distributing and sharing the knowledge and I wish I could acquire the senior membership soon and contribute myself to the society.

### **3) Eiji Oki, NTT Network Innovation Laboratories, Japan**

It is a great honor for me to receive this Outstanding Young Researcher Award. I thank the ComSoc Asia-Pacific Board for encouraging everyone joining this field. Since I joined NTT in 1993, it has always been big challenge for me to contribute to IEEE conferences and journals. These opportunities have stimulated and strengthened my research activities. Given the

strong competition, I am happy that my research activities were recognized by IEEE. I would like to become much more active as one of the many Asia-Pacific researchers and help make Asia-Pacific research activities renowned throughout the world. Thank you very much.

### **3. APB Office Report -- Distinguished Lecture Tours in 2003 by Fanny Su**

The year 2003 has not been conducive for Distinguished Lecture Tours for our Region to take place. Firstly, IEEE and its Societies are operating on a tight 2003 budget making it difficult for our Distinguished Lecturers from Europe and the U.S to find airfares within the budget constraints to visit our Region. In the midst of locating additional funds for our DL's airfares, the War in Iraq commenced followed immediately by the outbreak of Severe Acute Respiratory Syndrome (SARs) in our Region. IEEE has also advised following WHO (World Health Organization) recommendations to issue Travel Advisories to affected SARs countries. We have now placed on-hold any planning for DLTs to this Region until the SARs situation improves, as it is difficult for our DLs and our Chapters to commit to dates.

We will re-start our planning for the Distinguished Lecture Tours as soon as Travel Advisories are lifted.

On a sad note, Salah Aidarous (ComSoc Distinguished Lecturer) passed away on the 21 Jan 2003. Many of us in the Asia Pacific will remember him as an ardent Distinguished Lecturer to our Region. In 2001, he conducted 2 DLTs in the Asia Pacific. His DLTs were hosted by Chapters in Bangkok (Thailand), Kuala Lumpur (Malaysia), Singapore, Hong Kong, Melbourne and Adelaide (Australia). He will be sorely missed by his friends and colleagues, and those of us who were touched by his enthusiasm for his profession and work.

A Tribute to our Friend and Colleague, Salah Aidarous

<http://www.comsoc.org/headlines/salah.html>

Salah Aidarous Memorial

<http://www.comsoc.org/socstr/org/operation/techcom/CNOMWWW/index.html>

### **4. Software Defined Radio Development in Japan, By Ryuji Kohno**

Software radio or software defined radio (SDR) has emerged, by virtue of its very potential, as a group of technologies of global interest. Given Japan's major role in recent years in the development of mobile technology - *i-mode* and 3G (FOMA) - it is thus only natural that Japan has also played an early and active part in the development of concepts and technologies for SDR. This article provides an overview of these activities, describing the role of the players on the Japanese national scene, as well as summarizing the technical contributions of some of the major companies and organizations.

#### **(a) Research Cooperation between Industry, Government and Academia**

The third generation (3G) of mobile communication systems, i.e. IMT-2000 or UMTS, has been started servicing in Japan October 2001 aiming for higher quality and variable transmission speed for multimedia information. Thus research interest has now moved beyond the 3G, to explore topics such as MMAC in Japan, U-NII in USA and BRAN in Europe. Today, and in the future, various systems coexist with different standards in the fields of mobile communications and wireless LAN. In the transition between 2G and 3G mobile cellular systems, there exist many different standards such as PDC, GSM, IS-95, PHS, DECT, EDGE, GPRS, IMT-2000, cdma2000 etc. However, their interoperability has not yet completely been ensured between handset and base station. Although IMT-2000 was conceived as enabling a single global standard, differences still remain. In wireless LANs, there are such standards as IEEE802.11b (ARIB-STD33), IEEE802.11a (ARIB STD-T71) and HBRAN (ARIB STD-T70), but various wireless LANs using DS, FH, OFDM etc coexist, including some 'de facto' standards, such as Bluetooth. Their different specifications result in a lack of interoperability among them.

Japanese customers are used to mobile wireless access to the Internet with a handset such as *i-mode* of NTT DoCoMo and to wireless connections in ITS (Intelligent Transport Systems) such as GPS car navigation, DSRC (Dedicated Short Range Communications) including ETC (Electric Toll Collection), and IVC (Inter-Vehicle Communications). To satisfy such demands, many manufacturers in Japan have been developing various wireless systems with different specifications. However, radio frequency resource is limited in practice, co-located systems tend to interfere with each other, and sometimes too many wireless equipments need to be installed in a vehicle. This, in Japan, is another urgent driver for an SDR system with multi-mode and multi-functional capability.

In order to respond to such needs, the IEICE Software Radio Technical Group (SR-TG : <http://www.ieice.or.jp/cs/sr/jpn/index-e.html>) was formed in December 1998 in Japan in order to promote research and

development in the field of software defined or reconfigurable radio systems. The IEICE SR-TG covers the following subjects, amongst others:

- Theory of software radio
- Software and hardware technology for use in software radio
- Applications to communications, broadcasting, ITS etc.
- Research into APIs (Application Programming Interfaces)
- Standardization of software radio
- Information exchange and cooperation with active organizations in other countries

The SR-TG has held technical conferences/workshops three times an year and panel sessions in IEICE annual symposia and at IEEE sponsored international conferences, e.g. PIMRC'99, VTC2000-spring in Japan, over the past three years, and occasionally also in conjunction with the SDR Forum. The IEICE SR-TG published a special issue on SDR in the English volumes of the IEICE Transactions on Communications in June 2000 and a special issue in the Japanese volumes of IEICE Transactions on Communications in July 2001.

### **(b) Research Trends in SDR Technology**

SDR is a broad concept encompassing all-digital transceivers and software-based adaptability for multi-purposes and multi-applications in multi-environments. An SDR transceiver is generally defined as a transmitter and a receiver implemented by SDR techniques which can adaptively process and control RF analog hardware with software in digital circuits. It should be a multi-purpose transceiver which is applicable to all, or multiple, purposes and should be an adaptive transceiver which can learn and adapt to all, or a wide variety of, transmission and channel environments with software. Such a concept of SDR is attractive but its implementation is not easy because there are still many problems that need to be overcome. Moreover, SDR is an enabling technology for designing and implementing devices that are capable of downloading or programming their hardware architecture and functionality remotely.

IEICE SR-TG has been covering various subjects in the field of SDR such as architectures, devices, algorithms, description languages and application programming interface (API), for achieving reconfigurability and downloadability in SDR. R&D for SDR in Japan tends to focus on wireless hardware, rather than software architecture; this is because most of the researchers in SDR originate from wireless, electrical or electronics engineering. A wireless communication system typically consists of several hardware modules such as an antenna, a multi-band RF converter, IF band filter, an ADC, a DAC, a baseband processor, e.g. DSP, FPGA, ASIC and so on. In order to improve feasibility of an SDR system, such a structure has still several problems. Several major themes have been discussed at IEICE TG-SR technical conferences and related workshops.

In order to prove the feasibility of SDR, several organizations have developed prototype software radios as the first step in SDR application studies in Japan. The targets of those studies are to verify the feasibility of SDR functions. For instance, Sony Computer Science Laboratories (CSL) has proposed an SDR platform called SOPRANO (Software Programmable and Hardware Reconfigurable Architecture for Network). It is capable of handling multi-band and multimode radio standards for such applications as wireless LAN and cellular phone systems, whose carrier frequency ranges from 800MHz to 5GHz. The proposed platform consists of a reconfigurable digital circuit, A/D converters, D/A converters and a novel low power wide-band analog component called a "multi-port junction MMIC" which can directly convert radio frequency carrier signals to baseband. The configuration of SOPRANO is shown in Figure 1 and its parameters are shown in Table 1.

### **(c) Regulation Change for SDR**

Japan has been active in SDR since the late-1990's, is today actively engaged with the wider global SDR community and has already fielded some important and innovative contributions. The focus of SDR research and development in Japan is primarily in a hardware area. On the other hands, SDR Forum is originated from USA and active in standardization and regulation for SDR. FCC in USA is initiating the inquiry to obtain comments from the public on a variety of issues related to software defined radios. This notice of inquiry (NOI) included four broad areas of inquiry such as state of technology, interoperability between radio services, spectrum efficiency and sharing, equipment approval process.

Then SDR Forum surveyed various problems and their solutions before SDR products start in commercial in March 2000. Through this NOI, FCC sought input to help it evaluate the current state of SDR technology, and to determine whether changes to the Commission's rules are necessary to facilitate the deployment of this technology. Upon review of the responses to this inquiry, FCC determines whether to propose any changes to the rules. FCC released report & order adopted in September 13, 2001, concerning

- Regulatory definition of SDR
- Streamlined SW modification process
- Third party development of software
- Who/What/How for equipment tests
- Security measures to ensure compliance

In order to announce and discuss on the new regulation for SDR, IEICE SR-TG held SDR workshop at the conference hall in Ministry of Public management, Home affairs, Posts and Telecommunications (MPHPT), Tokyo in cooperation with MPHPT, SDR Forum, Telecom Engineering Center (TELEC) and ITU-Japan in October 17, 2001. The key points in discussion were as follows.

- World's first general authorization for SDR – FCC recognizes need to refine policy further as technology develops
- Defines SDR for the purposes of the new regulation
- Creates an authorization concept for both SDR hardware and subsequent software changes
- Establishes accountability for preventing unauthorized software from being used in SDR hardware

IEICE SR-TG and TELEC have studied investigation on appropriate technologies for these FCC demands under supervision of MPHPT in order to establish a global transparent regulation. IEICE SR-TG held a joint workshop with SDR Forum to discuss their solutions in Tokyo, April 15-19, 2002.

## **5. IEEE Globecom 2002 in Taipei by Prof. Yumin Lee, National Taiwan University**

American comedian Fred Allen (1894 – 1956) once said, “A conference is a gathering of important people who singly can do nothing, but together can decide that nothing can be done.”

Well, not quite true for Globecom 2002.

Globecom 2002 was held from November 17 to 21, 2002, at Taipei International Convention Center. In addition to being one of the flagship conferences of IEEE Communication Society (ComSoc), Globecom 2002 was of special importance because it coincides with the 50<sup>th</sup> anniversary of ComSoc. The conference began on November 17 with a big BANG of drum matrix performers in Welcome Reception, which also featured performances by local martial art experts, Chinese lantern and pottery exhibits, Chinese calligraphy, and live handicraft making. The food, needless to say, was impeccable.

The three-day technical program held from November 18 to 20 echoes the conference theme, “The World Converges,” with special arrangements to celebrate ComSoc's 50<sup>th</sup> birthday. The opening plenary session on November 18 began with a live welcome address from President of Taiwan transmitted via digital transmission links using state-of-the-art technologies (the inventors for some of these technologies were actually present in the conference). The opening keynote speaker was Mr. Kurt Hellstrom, President of Ericsson. The opening plenary session was followed by one of the highlights of the conference – the 50<sup>th</sup> Anniversary Special Session. The theme of the Special Session was “Over the Horizon – What's Ahead and What's Challenging?” Six “gurus” of telecommunications, including Norman Abramson, Charles Kao, Gottfried Ungerboeck, William Lindsey, David Messerschmitt, and Vincent Poor, offered enlightening views and visions on the futures of networking, optical communications, coding, transmission, signal processing, and wireless communications. The technical programs on November 19 and 20 respectively featured keynote speeches by Mr. Mario Rivas, Executive Vice President of Philips Semiconductor and Dr. Keiji Tachikawa, President and CEO of NTT DoCoMo. The technical program also included three 50<sup>th</sup> Anniversary Workshops on Forward-Looking Technologies and two Business and Applications Sessions.

For the technical sessions, the technical program committee (TPC) received a record number of 1980 technical submissions, from which a total of 593 papers were selected to be presented in 12 parallel symposia organized into 79 technical sessions.

Those that attended Grand Reunion Banquet, held on November 19, also found a special treat in addition to live music and dance performances – a panel discussion between past, present and future ComSoc presidents, including Drs. Maurizio Decina (President, 1994-95), Steve Weinstein (President, 1996-97), Roberto de Marca (President, 2000-01), Celia Desmond (President 2002-03), and Curtis Siller (President-Elect). The panelists discussed various issues facing the telecommunication industry, and also took questions from the floor.

Globecom 2002 attracted nearly 1,300 attendees, in which more than 700 traveled to Taiwan from all over the world to attend the conference. It was the feeling of many attendees that Globecom 2002 was one of the best conferences they have

attended. The technical program was very attractive, diverse, and well organized. Social events – especially Welcome Reception and Conference Banquet – were very impressive and offered a great view of the Taiwanese culture. Many innovative services unparalleled by other conferences were also offered in Globecom 2002, such as wireless projectors in some rooms and video recordings of some parallel sessions that were made available to attendees on the following day via the Web.

The Asia Pacific (AP) region in many ways played a key role in the success of Globecom 2002. The conference owed its success largely to the TPC chair, Professor Lin-shan Lee (past APB Director), and TPC co-chair, Professor Kwang-Chen Chen (current APB Director). Members from AP also held key positions in the TPC and organizing committee. The keynote speech of Dr. Tachikawa added a special touch to the conference. Of the 12 technical symposia, 5 were chaired and/or co-chaired by members from the AP region. Many technical sessions were organized and/or chaired by members from AP. The AP region also contributed almost 34% of the published technical papers in Globecom 2002. Finally, the leadership of the Conference General Chair, Dr. Chih-Kuo Mao, and the support provided by Chung Hwa Telecom and other patrons in the region were crucial factors without which the conference would never have materialized.

Looking back, Globecom 2002 was indeed a gathering of important people as Fred Allen said. However, contrary to what he said, this group of important people converged to celebrate the achievements of the many pioneers that shaped the telecommunication industry, and offered their visions and contributions on what can be done and will very likely happen in the many more 50 years to come.

## **6. Call For Paper – Greetings from the General Chairs of the Conferences**

### **(a) IEEE INFOCOM 2004**

#### **Invitation to IEEE INFOCOM 2004 in Hong Kong by Prof. Victor O. K. Li, the University of Hong**

On behalf of the INFOCOM 2004 Executive Committee, I would like to extend the warmest invitation for you to visit Hong Kong to attend INFOCOM next March. This will be the first time this premier conference in telecommunications and networking is held in China, and only the second time in Asia. We have been planning for this for over a year now, and in the next year, we will continue to work very hard to ensure you will enjoy a great technical program. But INFOCOM in Hong Kong is more than just a technical program. It will be an experience which you will treasure for years to come, for Hong Kong is a very special place.

Hong Kong is where East meets West. It is a cosmopolitan city with the most advanced telecommunications and transportation infrastructure, while at the same time we celebrate ancient Chinese festivals and traditions dating back thousands of years. It is a city of diversity. There is a large expatriate population and Hong Kong has the largest number of international schools. Chinese and English are the official languages so you should be able to get around fine with English. It also has the lowest crime rates of any big city. It boasts the best Chinese food, but also has excellent French, Italian, Indian, Middle Eastern, Japanese, and Korean restaurants.

It is a shopper's paradise, not only because prices are affordable, but also because of the varieties of products available. A friend who visited recently remarked, "Hong Kong is like a gigantic shopping mall." He bought so much clothing, electronic products, Chinese handicrafts, etc., that he has to buy another suitcase to take them home.

It is the gateway to China. Shenzhen is just across the border, and cities like Beijing, Shanghai, and Xian are a two-hour plane ride.

It is beautiful. When you take the cable car to the top of Victoria Peak, you will get the most spectacular view. I have traveled widely, and I believe it is the most spectacular view I have experienced. No wonder Hong Kong is sometimes called "The Pearl of the Orient."

So, be sure to mark your calendar (March 7 – 11 2004)! By the way, I urge you to spend at least one week here. There is just so much to do in Hong Kong! As the Hong Kong Tourist Association says "Hong Kong – City of Life." See you in March!

For more information, visit <http://www.ieee-infocom.org/2004/>.

### **(b) IEEE International Conferences on Multimedia and Expo (ICME) 2004**

## **Greetings from IEEE ICME 2004 in Taipei by Dr. D. T. Lee, Academia Sinica, Taiwan**

The 2004 International Conference on Multimedia and Expo (ICME'2004) will be held at the Grand Hotel, Taipei, Taiwan, from June 27 (Sunday) to June 30 (Wednesday). On behalf of the organization committee, I would like to invite you to attend this annual joint event of four IEEE societies, the Circuits and Systems Society, the Communications Society, the Computer Society, and the Signal Processing Society. The past conferences were held in New York City, NY, USA (2000), Tokyo, Japan (2001), Lausanne, Switzerland (2002), and Baltimore, MA, USA (2003). This annual event brings together researchers, engineers, and students of more than 500 people each year, to discuss state-of-the-art technologies in multimedia and communication. ICME'04 covers a wide spectrum of research topics including audio, video and image processing, computer graphics and virtual/augmented reality, signal processing of multimedia, multimedia communication and security/protection, human-machine interaction, hardware and software systems of multimedia and networks, standards, applications, and more. In addition to paper presentations, the ICME'2004 features distinguished keynote speeches, cutting-edge tutorials, and poster presentations. Following the spirit of the conference series, the ICME'2004 will also host industrial exhibitions and academia project demonstrations.

We expect a large number of participants from academia and industry to join the event at the Grand Hotel, Taipei, which is famous for its Chinese palace style architecture. Based on our past experience we are confident that the participants will be pleased with the facilities at the Grand Hotel and with the transportation to and from the international airport and other interesting places in the city of Taipei. In addition to sightseeing, the conference organization committee will arrange tours to the National Palace Museum, which keeps fabulous Chinese art treasures and historical collections, as well as hiking in the famous Yangmingshan National Park.

Together we are looking forward to this great opportunity of interesting technical presentations and social activities. Please join us for this excellent event and enjoy warm hospitality from Taiwan.