

Report on Commission C Activities in the Triennium 2002-2005

by Masami Akaike

1. New Terms of Reference “Radio Communication Systems and Signal Processing”

We discussed about the responsibility of Commission C in the General Assembly in Maastricht. We understand that we are now experiencing a rapidly moving Radio Science environment. Our technology is now expanding even to the outer side of the classical sense of Radio Science, that is, the mobile radio communications, ultra-wideband systems (UWB), and multiple-input multiple-output systems (MIMO) based upon signal processing and internet are playing a more and more important role in the field of Radio Science and URSI.

Surround by such a varying environment, we know that we, while actively questing a new frontier, should still always be aware of the dual aspects, i.e., the universality and the modern trend. Considering these situations, we have reached a new conclusion. The scientific sessions convened for this General Assembly in New Delhi well reflect the modern radio trend and our discussions to date.

2. 2004 International Symposium on Signals, Systems and Electronics (2004 ISSSE)

The ISSSE is an international symposium held once in every three years, one year prior to the URSI General Assembly, organized and sponsored by URSI Commissions C and D. Historically, Commission C represented signal-, system-, and software-oriented technology, while Commission D represented device- and hardware-oriented technology. In recent years, however, the importance of cooperation between systems and devices, and in other words, software and hardware, has been more and more strongly recognized. In modern radio equipment, even a tiny single device can have a complex system function, and on the other hand, software gradually takes over the role of hardware. The cooperation of Commissions C and D, therefore, is quite timely and meaningful. We believe that the international and interdisciplinary characteristics of ISSSE will surely make a desirable paradigm of the present and future URSI activities.

The sixth International Symposium on Signals, Systems and Electronics was held on August 10-13 in 2004 in Johannes Kepler University Linz, Linz, Austria. Linz, a beautiful city covered with rich green, is the capital of Upper Austria, located right in-between Vienna and Salzburg. The conference was co-chaired by two Chairs, Professor Dr. Kurt Schlacher, University of Linz, Austria, and Professor Dr. Robert Weigel, University of Erlangen-Nuremberg, Germany, from Commissions C and D.

The special feature of this time is that the symposium was cosponsored or technically cosponsored by the IEEE Microwave Theory and Techniques Society (MTT-S), the IEEE COM/MTT Joint Chapter Austria, the Austrian Electrotechnical Association (ÖVE), the German Association for Electrical, Electronic & Information Technologies (VDE), the government of Upper Austria, the city of Linz, the Linz Center of Mechatronics (LCM), the University of Applied Sciences of Upper Austria, and the University of Linz.

After a workshop on smart antennas and MIMO held on August 10, the symposium was inaugurated in the morning, August 11, by a plenary keynote address, “Cross Layer Design – A Equivalence Class Approach,” by Michel T. Ivrlack and Josef A. Nossek, Institute for Circuit Theory and Signal Processing, Munich University of Technology. Among nearly 130 papers submitted, 89 papers were selected for oral sessions and poster sessions. The authors came from more than 20 countries in the world, about 60 % from European countries, 30 % from Asia, and 10 % North America.

As another special feature, two papers of Commissions C and D were selected and awarded the Best Paper Award:

“Enhanced Detection Through Signal Space Diversity for a Coded MC-CDMA System” (Commission C), Ronald Raulefs, German Aerospace Center in Oberpfaffenhofen, Germany, and

“An Alexander Half-Rate Phase Detector for 80 Gb/s” (Commission D), by Jan-Louis Sundermeyer, Fraunhofer Institute for Integrated Circuits IIS in Erlangen, Germany.

The welcome social event and the subsequent banquet, another excitement for symposium attendees, were held in the monastery of St. Florian, where the folks enjoyed their cultural exchange through the evening with some unforgettable memories.

The next ISSSE will be held in Montreal, Canada, in 2007.

3. Reports from National Committees

The activity reports from some National Committees have been sent to Commission Chair.

3.1 Activities of URSI-Commission C/ France section in 2002-2004

The section has organized the following events:

- 1) Third international conference on « Turbo-codes », 01-05 September 2003, Brest, France
- 2) One day seminar on « Ultra Wide Band-UWB », 18 June 2003, Paris

For the General Assembly of URSI, next October, two sessions have been proposed :

- C05 : « Advances in signal processing towards fully reconfigurable radio systems »
- CJ : « Radio resource management and spectrum efficiency »

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3.2 Activities of URSI-Commission C/ Japan section in 2002-2004

URSI Commission C the nineteenth Japan Branch started with its empowered administrative committee. The committee consists of Chair, Dr. Takashi Ohira, and his seven executives elected from universities and industries in Japan. They are Dr. Makoto Taromaru (ATR), Dr. Toru Maniwa (Fujitsu), Prof. Yukihiro Kamiya (Tokyo Agri-Tech Univ), Prof. Atsushi Sanada (Yamaguchi Univ.), Dr. Kenji Itoh (Mitsubishi Electric), Dr. Noriharu Suematsu (Mitsubishi Electric), and Prof. Hiroyoshi Yamada (Niigata Univ.).

The committee is also advised by its distinguished cardinals: Prof. Masami Akaike (Science Univ. of Tokyo) and Prof. Kohji Mizuno (Tohoku Univ.). The Japan Branch holds an AdCom meeting every month to discuss and plan the future activities and events related to Commission C. The Japan Branch also holds technical meetings four times a year, which are open to public, and therefore, everyone can take part with. The meetings offer three or four invited speakers

presenting the state-of-the-art science and technologies on radio systems and signals. The meetings cover the technical areas including radio communication systems, cellular base stations, mobile handsets, signal processing, microwave circuits, adaptive array antennas, and high-frequency materials.

The typical topics of the meetings are as follows:

- (1) "Towards Future Radio Systems", January 30, 2004,
- (2) "Attempts to discover new electro-magnetic technology by studying the past through scrutiny of the old", May 28, 2004,
- (3) "Radio Waves from the Northern Country", July 20, 2004,
- (4) "Radio Waves and Challenge to the Shannon Limit", October 22, 2004,
- (5) "Radio Waves for Space Science and Systems", January 28, 2005,
- (6) "Radio Waves and Biology", July 20, 2005

Based upon the presentations/posing-problems made by invited key speakers, a thorough discussion was made by several tens of participants.

In addition to these events, Japan Branch cooperatively sponsors Asia-Pacific Microwave Conference 2005 held in Yokohama, and Korea-Japan Microwave Conference 2005 held in Busan, Korea.

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3.3 Activities of URSI-Commission C/ Poland section in 2002-2004

The section has co-organized the following events:

1. International Conference on Signals and Electronic Systems (ICSES'2002), Wroclaw-Swieradow Zdroj, Poland, 24-27 September 2002.

The Conference was organized by Institute of Telecommunication and Acoustics, Wroclaw University of Technology in co-operation with Signals, Network and Electronic Systems Section of Electronics and Telecommunication Committee of Polish Academy of Sciences, Circuits and Systems Chapter of IEEE Polish Section and URSI Commission C of Poland.

2. International Conference on Signals and Electronic Systems (ICSES'2004), Poznan, Poland, 13-15 September 2004.

The Conference was organized by Institute of Electronics and Telecommunications, Poznan University of Technology in co-operation with IEEE Circuits and Systems Society, Signals, Network and Electronic Systems Section of Electronics and Telecommunication Committee of Polish Academy of Sciences and URSI Commission C of Poland.

3. 11th International Workshop on Systems, Signals and Image Processing (IWSSIP'04), Poznan, Poland, 13-15 September 2004.

The Conference was organized by Institute of Electronics and Telecommunications, Poznan University of Technology in co-operation with IEEE Circuits and Systems Society, Signals, Network and Electronic Systems Section of Electronics and Telecommunication Committee of Polish Academy of Sciences and URSI Commission C of Poland.

4. **XI National Symposium of Radio Science (URSI 2005)**, Poznan, Poland, 7-8 April 2005.

The Conference was organized by Institute of Electronics and Telecommunications, Poznan University of Technology in co-operation with National Committee of URSI and Polish Academy of Sciences.

(Marian S. Piekarski, Institute of Telecommunication and Acoustics, Wrocław University of Technology)

Reports from other National Committees will be added in the website.

4. Conferences Supported by Commission C

The following conferences were supported by Commission C.

- 1) APMC'02 : Asia-Pacific Microwave Conference, Kyoto, Japan, 19-22 November 2002
- 2) The 11th MICROCOL, Budapest, Hungary, 10-11 September 2003
- 3) Workshop on Applications of Radio Science 2004(WARS04), Hobart, Tasmania, Australia, February 18-20, 2004
- 4) Euro Electromagnetics 2004 (EUROEM 2004), Magdeburg, Germany, July 12-16, 2004
- 5) ISSSE 2004, International Symposium on Signals, Systems and Electronics, Linz, Austria, 10-13 August 2004
- 6) AP-RASC 04 - The 2nd Asia-Pacific Science Conference, Beijing, China, August 20-23, 2004.
- 7) Radar 2004, Toulouse, France, 19 - 21 October 2004
- 8) First International Workshop on Wireless Communications in Underground and Confined Areas, Val d'Or, Quebec, Canada, 6-7 June 2005
- 9) International Symposium on Antenna and Propagation (ISAP 2005), Seoul, Korea, August 3-5, 2005.
- 10) Microwaves, Radar and Remote Sensing, Kiev, Ukraine, September 19-21, 2005.

Next triennium :

- 11) EUSAR 2006, Dresden, Germany, 16-18 May 2006
- 12) Asia-Pacific Microwave Conference (APMC 2006), Yokohama, Japan, December 12-25, 2006