



Commission C

2011-2014 Triennial Report

Marco Luise, Commission Chair
Sana Salous, Commission Vice Chair

1. Scope of Activities

[Commission C](#) promoted research and development in:

- Information Theory, Coding, Modulation and Detection;
- Spectrum and Medium Utilization, including cognitive and cooperative techniques;
- Wireless networking;
- Radar, radio localization and navigation systems;
- Green, energy-efficient radio communications.

The design of effective radio-communication and signal processing systems also included scientific, engineering, and economic considerations. This Commission emphasized the scientific aspects of radio communications, but also provided enabling technologies to other areas of radio science.

2. International Events Sponsored or Cosponsored by Commission C

2.1 9th edition of the International Symposium on Signal System and Electronics [ISSSE 2012](#)

Sponsors: Commissions C and D

Venue: Potsdam, Germany

Date: October 03-05, 2012

General Chair: Prof. Rolf Kraemer, BTU Cottbus and IHP, Germany, General Co-Chair: Dr. Thomas Haustein, Fraunhofer HHI/Heinrich-Hertz Institut, Germany

The ISSSE (International Symposium on Signals, Systems and Electronics) is held every three years, exceptionally in 2012 after two years, and is organized under the guidance and with sponsorship of the international steering committee of the URSI Commissions C (Radiocommunication Systems and Signal Processing) and D (Electronics and Photonics). Moreover each radio system depends on its antenna that couples the electromagnetic waves into the medium. Thus we included aspects of URSI Commission B (Fields and Waves) into the technical scope of the symposium. The 9th edition of the ISSSE was held in Potsdam, Germany October 03-05, 2012. The reason why ISSSE was anticipated from 2013 to 2012 is the following: in so doing, Commission C will sponsor one main URSI event every year in the three-year cycle of each chairmanship, namely ISSSE in 2012 (2015,-18 etc), AP-RASC (see below) in 2013 (-16, -19 etc.), and the GASS in 2014 (-17,-20 etc.).

2.2 *Asia-Pacific Radio Science Conference* [AP-RASC 2013](#)

Sponsors: URSI (main sponsor) in cooperation with National Taiwan University, National Central University, Chunghwa Telecom Co., Institute for Information Industry, Academia Sinica Institute of Astronomy and Astrophysics

Venue: Howard International House, Taipei, Taiwan

Date: Sept. 03-07, 2013

Honorary Chair: Phil Wilkinson, President of URSI; General Chair: L.-C. Lee President, China (SRS) National Committee of URSI; General Co-Chairs: S.-C. Lu ex-Chairman & CEO, Chunghwa Telecom Co. Ltd., R.-B. Wu President, Institute for Information Industry; Professor, National Taiwan Univ.

The AP-RASC is the Asia-Pacific regional URSI conference held between the URSI General Assemblies and Scientific Symposia. The objective of the AP-RASC is to review current research trends, present new discoveries, and make plans for future research and special projects in all areas of radio science, especially where international cooperation is desirable, and a particular emphasis is placed on promoting various research activities in the Asia-Pacific area. Scientific sessions composed of oral and poster papers were organized at this conference in order to cover all scientific activities by URSI Commissions A-K. Commission C organized 6 specific sessions on different aspects of radio communications, plus 5 more joint sessions with other URSI Commissions.

2.3 *URSI XXXI General Assembly and Scientific Symposium* [URSI GASS 2014](#)

Sponsor: Union of Radio Science International

Venue: Beijing Conference Center, Beijing, China

Date: Aug. 16-23, 2014

Honorary Chair: Han Qide, the Chairman of China Association for Science and Technology; Chair: Lou Qinjian, the Chairman of the Chinese Institute of Electronics

The XXXI General Assembly of the International Union of Radio Science will be held at the Beijing Conference Center (BCC) in downtown Beijing, China on August 16-23, 2014. The General Assemblies of URSI are held at intervals of three years to review current research trends, present new discoveries and make plans for future research and special projects in all areas of radio science, especially where international cooperation is desirable. The first Assembly was held in Brussels, Belgium in 1922 and it is the first time the Assembly be held in Beijing, China. The XXXI edition of the GASS will have a scientific program consisting of plenary lectures, public lectures, tutorials, posters, invited and contributed papers organized around the ten Commissions of URSI. In addition, there will be workshops, short courses, special programs for young scientists, student paper competition, programs for accompanying persons, and industrial exhibits. Over 1,000 scientists from more than fifty countries will participate in the Assembly. The activities by Commission C are summarized in the table below:

Com C		7:50	08:00	08:20	08:40	09:00	09:20	09:40	10:00	10:20	10:40	11:00	11:20	11:40	12:00	12:20	12:40	13:00	13:20	13:40	14:00	14:20	14:40	15:00	15:20	15:40	16:00	16:20	16:40	17:00	17:20	17:40	18:00	18:20	18:40	19:00		
Saturday	16 August	Short courses / Workshops										Lunch					Short courses / Workshops																					
		Preparation of the Secretariat										Board					Coordinating Committee																					
Sunday	17 August	Short courses / Workshops										Lunch					Council 1					Opening Ceremony																
		Council 2																																				
Monday	18 August	Overview by each Commission Chair/WC	CD1: Advances in signal processing for cognitive radio (1)	CD2: Advances in signal processing for cognitive radio (2)	General Lecture 1	Lunch	CA01: Radio Localization Techniques: satellite, indoor, in tunnels, autonomous	CD01: Circuit Technologies for Mobile Communications	Commission Business Meetings 1																													
Tuesday	19 August		CD3: Advances in Channel Coding for Reliable Communications (1)	CD4: Emerging technologies for 5G cellular communications (2)		Lunch	CB01: Radio Channel modeling: MIMO, indoor, outdoor	Poster Session 1																														
								Council 2																														
Wednesday	20 August		CD5: Cooperative Communications and Network Coding (1)	CD6: Cooperative Communications and Network Coding (2)	General Lecture 2	Lunch	CT: Tutorial C	CF02: URSI-SPRS Session on Communications and Remote Sensing in Disaster Scenarios (2)	Commission Business Meetings 2																													
Thursday	21 August		CD0K1: Body-Area Networks	CD7: Wireless Physical Layer Security		Lunch	CD8: Urban scenarios: small cells, indoor to outdoor, vegetation	Poster Session 2 + 3																														
Friday	22 August		CD0K2: Ultra-high bit rate radio communications (Terahertz and 60 GHz) (1)	CD0K3: Signal Processing for Radar Systems	General Lecture 3	Lunch	CD9: Resource allocation in wireless networks	C10: Advanced Technologies for WLANs and WSNs	Commission Business Meetings 3																													
Saturday	23 August		C11: Communications Technologies for (high-speed) transportation systems (1)	C12: Communications Technologies for (high-speed) transportation systems (2)	Public Lecture	Closing Ceremony	Lunch																															

Table of Commission C events @ URSI GASS 2014

The GASS witnessed an unprecedented number of submissions fitting within the research themes of Commission C, that mark the relevance of such themes as well as the success of the event.

3. Activity Reports from Member Nations

3.1 Brazil, by Marcelo S. Alencar

Introduction

The Brazilian telecommunication market continues to grow strong. In 2010, 37.642 municipalities were served by the basic telephone service, and 97,1% of the population had access to mobile telecommunication services, which represented 86,7% of the municipalities [1]. In 2012, 43.2 million are served by the basic telephone service, an increase of 2.8% over the previous year, 250.8 million use mobile cellular communication services, which represents an increase of 19.2%, there are 13,7 million users of cable television services, an increase of 31.2%, wideband fixed access Internet services comprise 17.3 million users, which indicates an increase of 20.7%, and the trunking companies attend 4.3 million users, an increment of 17.2%, considering the 2011 figure [2]. The total investment by the companies, in 2013, was US\$ 13,2 billion. The gross revenue was US\$ 102.3 billion, representing an increase of 6.2% in relation to 2012. [3].

Telecommunication Market

Regarding the composition of the telecom market, in terms of gross operational revenue, in 2010, four or five telecommunication operators served 78,6% of the population, three operators served 6,2%, two operators served 4,8% and only one operator served 7,3% of the population. The gross operational revenue for the telecommunications sector, in the first quarter of 2010, was US\$ 26 billion [1]. The number of telecommunication access, in the first quarter of 2011, was 277.4 million, which included fixed and mobile telephony, wired and wireless broadband, and cable television. This was an increase of 15.5% compared to the same period of 2010. Wireless broadband increased 77%, from 13.8 to 24.4 million Internet accesses. Telephony grew from 179.1 to 210.5 million devices – a 17.5% increase. Fixed broadband evolved

20.5% in the period, from 11.7 to 14 million. Overall, the number of wideband connections, wired and wireless, reached 40.9 million in April, 2011. The growth in television subscribers was 31.6%, in 12 months. The total number of clients increased from 7.9 to 10.4 million [4].

According to the Brazilian census for 2010, 87.9% of the houses had access to telephone services, fixed or mobile. In 2012, 39,121 localities were served by the fixed telephone system, and 17,059 have individual access, and increase from the number of 38,452 localities in 2011. Also, 100.0% of the population have access to cellular services, divided into 83.1% served by four or five companies, 2.8% served by three companies, 4.9% served by two companies, and 9.2% served by one company. In 2012, 100.0% of the municipalities count on mobile communication services, 85.3% of the population have access to wideband mobile services, 60,512 public schools are connected by the government wideband program. The gross operational revenue for the telecommunication sector, from January to March, 2012, was US\$ 26.6 billion, which represented an increase of 10.8%, as compared to the same period in 2011. This figure projects a gross operational revenue of US\$ 106.4 billion for the whole year.

The composition of the revenue, in 2012, was as follows: industry: US\$ 3.3 billion (35.0% increase in relation to 2011); fixed operators: US\$ 6.2 billion (a decrease of 8.1% in relation to 2011); fixed wideband providers: US\$ 3.0 billion (6.0% increase); mobile personal communication service operators: US\$ 11.6 billion (14.3% increase); cable television providers: US\$ 2.3 billion (33.0% increase); trunking operators: US\$ 1.1 billion (12.8% increase). The gross operational revenue for the telecommunication sector, in 2011, was US\$ 100.6 billion, the highest in the history of Brazil, and equivalent to 4.9% of the country's gross national product (GNP). The telecommunications service providers collected US\$ 7.4 billion in government taxes in the period January to March of 2012, which is equivalent to 46.2% of their net operational revenue US\$ 15.9 billion. There were 489.3 thousand employees in the telecom market, in 2012, an increase of 5.1% from 2011, of which 25.8 thousand work in the industry, 50,6 thousand are in deployment services, 165.5 thousand are in telecommunication services, and 244.7 thousand work for call centers. The number of access points increased, in 2012, to a total of 344,5 million (+7%), of which: fixed telephony, 44 million (+2%); mobile, 263 million (+8%); fixed wideband, 20.8 million (+14%); television subscribers, 16.7 (+25%). The fixed telephony in Brazil, in 2012, accounted for: 64.7 million deployed accesses; 44 million (+2,4%) in service; market share of incumbents, 32%; 22.3 access points per 100 inhabitants (teledensity); one million public telephones; 39.6 thousand municipalities attended; more than 240,000 km of optical multifibers deployed.

The telecommunication companies had positive figures in most services, in 2013. The gross revenue per sector was: fixed telephony, US\$ 20.6 billion, a decrease of 5%; wideband fixed transmission, US\$ 12.3 billion, an increase of 9%; mobile telephony, US\$ 43.3 billion, an increase of 7%; cable television, US\$ 11.1 billion, an increase of 22%; trunking, US\$ 3.1 billion, a decrease of 16%. The number of employees in the telecommunication sector, in 2013, was 504.7 thousand, an increase of only 1% in relation to 2012. Most of the them are employed in call centers. The total number of accesses, in 2013, was 362.8 million, a growth of 4% in relation to 2012. Fixed telephony accounted for 45.3 million accesses, and increase of 2%. Fixed wideband transmission accounted for 23.2 accesses, an increase of 9%, and cable television had 18.8 million accesses, a growth of 11%. Mobile telephony accounted for 275.5 million accesses, and increase of 4% in relation to 2012. The number of mobile accesses per 100 inhabitants (teledensity) is 135. The number of radiobase stations deployed is 67,749, which represents an increase of 11% in relation to 2012 figures [3].

Activities of the Scientific Societies and Institutions

Events

The Brazilian Telecommunications Society (SBrT) sponsored the XXIX Brazilian Telecommunications Symposium (SBrT'11), which was held in Curitiba, between 2 and 5 of October, 2011, at the conventions center of the Pestana Hotel. The general chair was Alexandre Pohl. There were four short courses, and three invited talks given by Javier Garcia-Frias, Paulo S. R. Diniz and Dan Sadot. A total of 177 technical articles and 18 scientific initiation communications were presented, selected from 316 submitted papers. The number of participants was 269.

The Brazilian Telecommunications Society (SBrT) sponsors the XXX Brazilian Telecommunications Symposium (SBrT'12), which will be held in Brasilia between 13 and 16 of September, 2012, at Centro de Convenções Ulysses Guimarães. The general chair is Ricardo Queiroz (UnB). There will be four invited talks given by Amin Shokrollahi, Gaurav Sharma, Joseph Kahn and Max H. M. Costa. Six tutorials will be presented at the symposium. The technical articles and scientific initiation communications are selected from 320 submitted papers.

The Brazilian Telecommunications Society (SBrT) sponsored the XXIX Brazilian Telecommunications Symposium (SBrT'13). In its 31th edition, the symposium was held in Fortaleza, between 1 and 4 of September, 2013, at the Vila Galé Hotel. The general chair was Charles Casimiro Cavalcante, the honorary chair was João Cesar Moura Mota and the technical program chairs were Marcello Luiz Rodrigues de Campos and Rubens Viana Ramos.

The 2011 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference (IMOC 2011) is an international forum of telecommunication technologies organized by the Brazilian Microwave and Optoelectronics Society (SBMO) and co-sponsored by IEEE Microwave Theory and Techniques Society of the Institute of Electrical and Electronic Engineers (IEEE MTT-S). In its fourteenth edition, this conference was held in the city of Natal, Brazil. The conference venue was the Imir'á Plaza Hotel, a beach hotel with 166 apartments, located at Via Costeira. IMOC 2011 provided a major international forum for exchanging information on research and development in the theoretical and experimental fields of Microwaves and Optoelectronics including Millimeter and Nanometer Waves, Antennas, Propagation, Wireless Communication, Fiber Optics, and Photonic Networks. The general chair was Adaildo G. D'Assunção (UFRN, Brazil), and the technical program chairs were Gervásio P. S. Cavalcante (UFPA, Brazil) and Evandro Conforti (Unicamp, Brazil). The 15th Brazilian Symposium on Microwaves and Optoelectronics and the 10th Brazilian Congress on Electromagnetism (MOMAG 2012) occurred in João Pessoa, Paraíba, in 2012. The event was organized by the Grupo de Telecomunicações e Eletromagnetismo Aplicado (GTEMA) of the Instituto Federal de Educação, Ciência e Tecnologia da Paraíba (IFPB) and by the Departamento de Engenharia de Comunicações (DCO) of the Universidade Federal do Rio Grande do Norte (UFRN). The event was supported by the Brazilian Microwave and Optoelectronics Society (SBMO) and by the Brazilian Electromagnetics Society (SBMag). The general chairs were Alfredo Gomes Neto (GTEMA, IFPB) and Adaildo Gomes D'Assunção (DCO, UFRN). The venue was the Tambaú Hotel, a five star beach hotel, and the conference presented six special sessions and nine tutorials.

The SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference is a biennial forum on telecommunication science, technology and innovation, sponsored by the Brazilian Microwave and Optoelectronics Society (SBMO) and the IEEE Microwave Theory and Techniques Society (IEEE MTT-S). In its fifteenth edition, the conference was held in the city of Rio de Janeiro, Brazil, from 4 to 7 August 2013. The general chair was José Ricardo Bergmann and the technical program chairs were Maria Thereza Rocco Giraldo and Luiz da Silva Mello.

The third Annual Meeting of the Iecom on Communications, Networks and Cryptography (ENCOM 2013) was held in Recife, from October 4 to 5, 2013, under the sponsorship of the Institute for Advanced Studies in Communications (Iecom) IFPE, UPE, UFPE and UFCG. It received support from Datashop and Rohde & Schwarz. The general chairs were Marcelo Sampaio de Alencar and Geraldo Andrade de Oliveira, and the technical program chairs were Wamberto José Lira de Queiroz, José Ewerton Pombo de Farias, Carmelo José Albanez Bastos Filho and Evio da Rocha Araújo [5].

Journals Published

The Journal of the Brazilian Telecommunications Society (JBTS) was created in 1986 by the SBrT as a way to document and disseminate the results produced by Brazilian researchers. Effective December, 2005, the Board of the SBrT approved a new title for its publication, which became known as Journal of Communication and Information Systems (JCIS). The Editors-in-Chief, for the first five years, were Marcelo S. Alencar (UFCG), Celia Desmond (IEEE ComSoc) and Elvino S. Sousa (UofT). The Journal of Communication and Information Systems (JCIS) features high-quality, peer-reviewed technical papers in

several areas of communications and information systems. The JCIS is jointly sponsored by the Brazilian Telecommunications Society (SBrT) and the IEEE Communications Society (ComSoc). The JCIS aims at a larger international audience. The Steering Committee includes renowned scholars from the international and the Brazilian communities. Also, distinguished researchers in several fields of Communication and Information Science act as area editors. Since 2012, Jo~ao Marcos Romano (Unicamp) and Merouane Debbah from (SUPELEC) are the new Editors-in-Chief [6]. The Journal of Microwaves, Optoelectronics and Electromagnetic Applications (JMoe) is published by the Brazilian Microwave and Optoelectronics Society (SBMO) and Brazilian Society of Electromagnetism (SBMag). It is a refereed publication devoted to disseminating technical information in the areas of Microwaves, Optoelectronics, Photonics, and Electro-magnetic Applications. The journal is published in electronic format since 1997. The editors are Maria Thereza Miranda Rocco Giraldo (IME) and Renato Cardoso Mesquita (UFMG). [7].

The JMoe is indexed in the following bibliographic databases: SciELO, SCOPUS, SIMAGO, EM-BASE, Engineering Village, Reaxys, Sumarios.org and Directory of Open Access Journals (DOAJ). It is also part of the Scientific Electronic Library Online-SciELO's collection. The Journal of Information and Communications Technology (RTIC) is published by the Institute for Advanced Studies in Communications (Iecom). The journal is published in electronic and printed formats since 2011. The RTIC is registered by DOI and was awarded a Capes Qualis B5 classification. The editor-in-chief is Wamberto Jos'e Lira de Queiroz.

Concluding Remarks and Recommendation

According to a report from the International Telecommunication Union (ITU), the telephone services in Brazil present the highest cost in the World. The blocking probability is very high, which led the Brazilian National Telecommunication Agency (Anatel) to punish the several telecom operators by blocking the sales of new services. As a recommendation, it is important that the International Union of Radio Science (URSI), Commission C, begin to sponsor the conferences organized by the Brazilian Telecommunications Society (SBrT) and by the Brazilian Microwave and Optoelectronics Society (SBMO).

References

- [1] Telebrasil. "O Desempenho do Setor de Telecomunica~oes no Brasil S'eries Temporais – 1T10". Technical report, Telebrasil, March 2010.
- [2] Telebrasil. "O Desempenho do Setor de Telecomunica~oes no Brasil S'eries Temporais – 1T12". Technical report, Telebrasil, March 2012.
- [3] Telebrasil. "O Desempenho do Setor de Telecomunica~oes no Brasil S'eries Temporais – 1T14". Technical report, Telebrasil, March 2014.
- [4] Telebrasil. "O Desempenho do Setor de Telecomunica~oes no Brasil S'eries Temporais – 1T11". Technical report, Telebrasil, March 2011.
- [5] Institute for Advanced Studies in Communications. "Report of the Institute for Advanced Studies in Communications (Iecom). Technical report, Iecom, July 2014.
- [6] Brazilian Telecommunications Society. "Portal of the Brazilian Telecommunications Society. Technical report, SBrT, July 2014.
- [7] Brazilian Microwave and Optoelectronics Society. "Portal of the Brazilian Microwave and Optoelectronics Society. Technical report, SBMO, July 2014.

3.2 Egypt, by Said E. El-Khamy

Egyptian scientists have published 101 papers in the area Wireless Communications and Signal Processing in the past three years. These papers have been presented in 4 URSI conferences as follows:

1. **GA 2011 Istanbul – August 2011**, 6 papers, namely: C05.4 , AC.2, C13.2, C13.7, CP.1 and CP.11.

2. **NRSC 2012, Cairo, Egypt, April 2012** - 41 papers distributed over 7 sessions as follows:

Session C-1	CDMA and CELLULAR SYSTEMS 0 – 6 papers
Session C-2	ENCRYPTION and WATERMARKING – 5 papers
Session C-3	IMAGE PROCESSING I – 6 papers
Session C-4	IMAGE PROCESSING II – 6 papers
Session C-5	MODULATION CLASSIFICATION, CODING AND SPEECH – 6 papers
Session C-6	OFDM SYSTEMS – 6 papers
Session C-7	CONTROL and COMPUTER APPLICATIONS – 6 papers

3. **NRSC 2013, April 2013** – 32 Papers distributed over 6 sessions as follows:

Session C-1	MC, OFDM, OFDMA and OWDMA- 5 papers
Session C-2	Cognitive Radio and Compressive Sensing- 5 papers
Session C-3	Watermarking and Security – 5 papers
Session C-4	Image Processing- 6 papers
Session C-5	Satellite, Localization and Networks- 6 papers
Session C-6	Signal Processing, Speech and Receivers – 5 papers

4. **NRSC 2014, Cairo, Egypt, April 2014** – 22 Papers distributed over 6 sessions as follows:

Session C-1:	Encryption/Security – 3 papers
Session C-2:	Cognitive Radio - 5 papers
Session C-3:	Signal/Image/Video Processing – 3 papers
Session C-4:	LTE/WiMAX Networks – 4 papers
Session C-5:	OFDM/MIMO/STC – 4 papers
Session C-6:	Wireless Sensor Networks – 4 papers

3.3 Russia, by Alexander B. Shmelev

Members of Russian Commission C took part in organization and execution of XVIII, XIX and XX annual sci-tech conferences “Radiolocation, Navigation, Communication” (RLNC-2012, RLNC-2013, RLNC-2014) held in Voronez (Russia), April, 2012-2014. Every conference gathered nearly 200-300 participants mainly from Community of Independent States (former USSR). Proceedings of these conferences were published in Russian. The Honorary Chairman of these conferences is Academician Yu.V.Gulyaev - Chairman of Russian Committee URSI.

Russian Commission C representatives took part as a members of Program Committees and invited speakers in the First and Second International Conferences on Telecommunications and Remote Sensing (ICTRS 2012, ICTRS 2013) held in Sofia (Bulgaria), August 29-30, 2012 and in Noordwijkerhout (The Netherlands), July 11-12, 2013 as well as in the Third International Symposium on Radio Systems and Space Plasma (ISRSSP'13) held in Sofia (Bulgaria), August 28-29, 2013.

Commission C, together with Russian Committee URSI, took part in activities related to XXXI General Assembly URSI in Beijing.

3.4 Switzerland, by Marcos Rubinstein

Commission E has been active in the analysis and processing of measured wideband lightning electromagnetic fields and currents. As part of the work lightning data from the Sántis tower in northeastern Switzerland has been analyzed. The tower has been instrumented to measure lightning currents and its update to measure remote fields is being implemented. This work has been carried out in cooperation with Commission C (Prof. Farhad Rachidi of the EPFL)

Journal and conference articles prepared in collaboration with Commission C on processing of measured field waveforms, measurements on the Sántis Tower and on the Time-Reversal technique.

1. M. Rubinstein, J.-L. Bermudez, V. Rakov, F. Rachidi and A. Hussein. Compensation of the Instrumental Decay in Measured Lightning Electric Field Waveforms, in IEEE Transactions on Electromagnetic Compatibility, vol. 54, p. 685-688, 2012.
2. C. Romero, F. Rachidi, M. Paolone and M. Rubinstein. Statistical Distributions of Lightning Currents Associated With Upward Negative Flashes Based on the Data Collected at the Sántis Tower in 2010 and 2011, in IEEE Transactions on Power Delivery, vol. 28, num. 3, p. 1804-1812, 2013.
3. R. Romero, C. Alberto, M. Paolone, M. Rubinstein and F. Rachidi-Haeri et al. A system for the measurements of lightning currents at the Sántis Tower, in Electric Power Systems Research, vol. 82, num. 1, p. 34-43, 2012.
4. G. Lugrin, N. M. Parra, F. Rachidi, M. Rubinstein and G. Diendorfer. On the Location of Lightning Discharges Using Time Reversal of Electromagnetic Fields, in IEEE Transactions on Electromagnetic Compatibility, vol. 56, num. 1, p. 149-158, 2014.
5. M. Azadifar, M. Rubinstein, F. Rachidi, M. Paolone, D. Pavanello, On the Influence of Measuring Instruments Bandwidth Limitations on the Inferred Statistical Parameters for Lightning Currents, to be presented at the GASS in Beijing in 2014.
6. C. Romero, F. Rachidi, M. Rubinstein, V. A. Rakov and M. Paolone et al. Bursts of Fast Pulses in Positive Lightning Current Waveforms Recorded on the Sántis Tower. 12th International Symposium on Lightning Protection SIPDA, Belo Horizonte, Brazil, 2013.

3.5 USNC, by Amir I. Zaghoul

The officers of the United States National Committee of URSI (USNC-URSI) for the triennium 2012-2014 are:

Chair: Dr. Amir I. Zaghoul, Sensors and Electron Devices Directorate, US Army Research Laboratory and Electrical and Computer Engineering Department, Virginia Tech University, amirz@vt.edu

Vice Chair: Dr. Gregory H. Huff, Electrical and Computer Engineering Department, Texas A & M University, ghuff@ece.tamu.edu

Secretary: Dr. Eric L. Mokole, Radar Division, US Naval Research Laboratory, eric.mokole@nrl.navy.mil

USNC-URSI Meetings:

The US National Committee of URSI holds two regular meetings every year. One meeting is held in January in Boulder, Colorado, and includes all Commissions of URSI. The second meeting is held in conjunction with the IEEE Antennas and Propagation Society International Symposium, which is held in summer of every year. Its location is determined by the IEEE AP-S/URSI Joint Meeting Committee and has been traditionally held in the North American countries of the US and Canada. Not all URSI Commissions are represented in the summer meeting. Occasionally, when the summer meeting is held in Canada, it is declared as a North American USNC/CNC meeting, in which years the January meeting in Boulder, CO is skipped. Commission C of USNC-URSI participates in all winter and summer meetings.

Over the triennium of 2012-2014, Commission C of USNC-URSI participated in the following meetings: 2012 USNC-URSI National Radio Science Meeting: 4-7 January in Boulder, CO

- (a) 2012 AP-S Symposium/USNC-URSI Meeting: 8-14 July in Chicago, IL
- (b) 2013 USNC/URSI National Radio Science Meeting: 9-12 January in Boulder, CO
- (c) 2013 AP-S Symposium/USNC-URSI Meeting: 7-13 July in Orlando, FL
- (d) 2014 USNC-URSI National Radio Science Meeting: 8-11 January in Boulder, CO
- (e) 2014 AP-S Symposium/USNC-URSI Meeting: 6-11 July in Memphis, TN

Next meeting will be an AP-S Symposium/North American USNC-CNC URSI Meeting to be held in Vancouver, BC, Canada, on 19-25 July, 2015. No January meeting will be held in 2015.

Regular Sessions:

The USNC-URSI Calls for Papers for the meetings list the following topics for regular sessions for Commission C.

- Cognitive radio
- Computational imaging and inverse methods
- Distributed sensor networks
- Physics-based signal processing
- Radar target detection, localization, and tracking
- Sensor array processing and calibration
- Signal processing for radar remote sensing
- Statistical signal processing of waves in random media
- Synthetic aperture and space-time processing

Special Sessions:

In addition to the regular session, Special Sessions are organized, sometimes jointly with other Commissions. A list of Special Sessions organized over this triennium is given below.

- Antenna, System, and Spectrum Sharing Issues in Cognitive Radio and Cognitive Radar
- Computational Modeling of Stochastic Uncertainty in Electromagnetic Components and Systems: Methods and Applications
- Deformable, tunable, and other advanced material systems in communication and sensing platforms
- Recent advances in cognitive radio and signal processing techniques
- Innovative applications of smart phones, tablets, and other mobile platforms
- Wireless Power Transfer and energy harvesting systems
- Spectral management, engineering, and theory
- Spectrum-Awareness for Circuits and Systems
- Spectrum Challenges and Changes

Keynote Speeches:

One of the main features of the January USNC-URSI meeting is presentations by well recognized Keynote Speakers on subjects related to URSI Commissions. Two Commissions are selected at every meeting to host the Keynote Speakers. In 2013, Commissions C and F were selected as the host commissions. The topic chosen for this event was: “Remote Sensing and Communication Systems in Disaster Mitigation and Response.” The contribution from Commission C was given by Professor Charles W. Bostian from Virginia Tech University. The title of his presentation was: “The Promise of Cognitive radio for Communications and Remote Sensing for Critical Infrastructure, Disaster, Safety, and Risk Management.”

Radio Science Bulletin:

Radio Science Bulletin is one of the primary publications of URSI. The contributions to the Bulletin come from all commissions of URSI. Commission C of USNC-URSI contributed two papers in the present triennium, with a third paper in preparation. The three papers cover the topics of Cognitive Radio, Cognitive Radar, and Quantum Communications and Networks.

Membership:

The membership in Commission C of USNC-URSI reached numbers close to 200 in the early part of the new millennium, around 2002. This number contracted in years prior to the present triennium. A turn around and renewed interest occurred during the triennium of 2012-2014. An increase by around 4-5 members per year has taken place during this time.

4. Contributions to the Radio Science Bulletin (RSB)

The RSB is the most widespread periodical publication by URSI and collects contributions from all commissions. Emphasis lies on non-specialized contributions that are oriented towards the radio-scientist community. During the triennium covered by this report, Commission C contributed directly (through the proactive invitation by commission officers) or indirectly (from national committees, or in URSI conferences) the following papers:

- Issue 340, “Spectrum Management Overview” by Tjelsta-Struzak
- Issue 340, “Opportunistic Secondary Spectrum Access: Opportunities and Limitations” by Zander and Sung
- Issue 341: “Satellite Navigation. Present and Future” by Enge
- Issue 342: “Cognitive Radio: A practical Review for the Radio Science Community” by Bostian-Young
- Issue 345: “Two-Tier Femto-Macro Wireless Networks: Technical Issues and Future Trends” by J.Zhang-Xiao-X.Zhang-Liu
- Issue 347: “Massive MIMO Systems: Signal Processing Challenges and Future Trends” by de Lamare
- Issue 347: “On the Road Towards Green Radio” by Palicot-Zhang-Moy
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