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Activities of the IEEE ComSoc Nanjing Chapter

By Nan Liu, Yueming Cai, and Guangguo Bi, ComSoc Nanjing Chapter, China

The IEEE ComSoc Nanjing Chapter was founded on April 13, 2008. The opening ceremony was held in Nanjing, China. Over 35 Chapter members and over 40 guests attended the ceremony. After the inauguration, two keynote addresses, "Development of IEEE in China" and "New Rising Wireless Communications and Wireless Networks," were given. In the afternoon the Executive Committee of the Chapter was founded and discussed activities in 2008. The Chapter Officers are Prof. Guangguo Bi of Southeast University as Chapter Chair; Profs. Jinlong Wang, Baoyu Zheng, Jinkang Zhu, and Aiping Huang from various universities serve as Chapter Vice-Chairs; Prof. Yueming Cai is Secretary; and Prof. Nan Liu serves as Secretary and Treasurer.

Since coming into existence, the ComSoc Nanjing Chapter has been very active in hosting and sponsoring various activities to serve its members. In 2008 we technically sponsored/co-sponsored three conferences/workshops: the International Conference on Communications and Networking in China (CHINACOM 2008, co-sponsored) was held in Hangzhou in August, accepting 270 papers for an acceptance rate of 32.8 percent, with 121 IEEE members attending the conference; the Workshop on Cognitive Wireless Networks (sponsored), held in Nanjing in September, with around 140 attendees, more than 30 being Chapter members; and the Conference on Communications and Signal Processing in China (CCSPC 2008, co-sponsored) held in October in Zhengzhou with around 150 attendees.

In 2009 the ComSoc Nanjing Chapter was even more active. In June 2009 the (technically co-sponsored) Conference on Green Wireless Technology and Systems was held in Huangshan, China, with 115 attendees from many Chinese universities and industrial companies. The main topics included power-efficient and energy-saving wireless communications system design and engineering techniques, wireless access protocols, services, software design, and wireless resource saving.

In August 2009 the (co-sponsored) 9th Asian Conference on Quantum Information Science (AQIS '09) was held in Nanjing with around 180 attendees. AQIS '09 focused on quantum information science and technology, bridging quantum physics, computer science, mathematics, and information technologies.

In September 2009 we hosted three excellent talks by IEEE ComSoc Distinguished Lecturers. The first talk, "Resource Management for Multitier Wireless Networks," given by Prof. Xueming (Sherman) Shen from the University of Waterloo, Canada, discussed issues on resource and mobility management algorithms, and achieving flexible and effective utilization of network resources with guarantees for end-to-end QoS requirements of multimedia traffic. The second talk, "Resource Allocation for Cellular/WLAN Integrated Networks" by Prof. Weihua Zhuang, also from the University of Waterloo, Canada, focused on ways to enhance multiservice provisioning by taking advantage of the complementary cellular/WLAN integrated network strengths, and details of call assignment/reassignment strategies, admission control policies, and the impact of user mobility and data traffic variability. Both lectures drew a great deal of interest, and more than 170 faculty members and students with more than 30 IEEE members in attendance. The third talk, given by Prof. Jacob Gavan, titled "Concepts, Applications and Design of High Altitude Platform Radio Relays," expounded the feasibility, recent status, technical issues, and advantages of different categories of HAPS for several applications. The talk concluded with recent trends in HAPS design and developments. Around 50 faculty members and students, among whom over 10 were IEEE members, attended the lecture and benefited from learning about HAPS.

The opening ceremony of WCSP 2009 in Nanjing, China.

The highlight of the activities of the ComSoc Nanjing Chapter in 2009 was technically sponsoring the 2009 International Conference on Wireless Communications and Signal Processing (WCSP 2009) held in Nanjing, China, on November 13–15, which attracted much attention from both the academic and industrial fields. It received a total of 1023 submissions from 32 countries and regions. All papers were rigorously and independently peer reviewed by the 104 TPC members and a large number of reviewers. The conference finally accepted 366 high-quality papers from 23 countries and regions, representing an acceptance ratio of 36 percent. Accepted papers were grouped into 24 sessions with two tracks, Wireless Communications and Signal Processing. A highlight of the conference was the seven keynote speeches delivered by distinguished scientific experts from all around the world. About 300 researchers, scientists, engineers, and

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White Spaces: Unused TV Band Channels for Rural Broadband in the United States

By Ana Vazquez Alejos, Felipe Gil Castiñeira, Manuel Garcia Sanchez, and Iñigo Cuiñas
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During the next few years there are three technologies called to change together the traditional rigid policy for spectrum allocation: software defined radio (SDR), cognitive radio (CR), and white space devices (WDs). The CR paradigm proposes the creation of intelligent devices (usually developed with SDR platforms so that they can modify the radio parameters by software) which automatically change their conditions of operation in response to user demands or changes in the surrounding network. The application of these technologies in the channels reserved as guard bands, known as white spaces, is derived in WDs, which have made possible not only the use of the unused bands, but also the use of licensed bands by unlicensed users without causing interference to the legitimate owners.

However, in some cases spectrum-sensing technology may not be completely effective in preventing co- or adjacent-channel interference with the licensed user. In order to solve this problem, WDs have been coupled with geolocation technology (e.g., GPS positioning along with a database of services and operation times). In November 2009 the U.S. Federal Communications Commission (FCC) launched a call for proposals to manage a database network that registers and controls the use of an important amount of liberated spectrum allocated in the 50–3000 MHz band to prevent the emerging new WDs from interfering with TV stations and other wireless services operating in this frequency region.

But is there available space in so large and attractive a region of the extremely scarce frequency spectrum? The reality is that a non-negligible number of gaps exist between 50–3000 MHz since the analog TV switchoff process started, and this opportunity did not pass unappreciated by many eyes (Fig. 1). The Wireless Innovation Alliance [1], formed by companies such as Google, Dell, Hewlett-Packard, Motorola, and Microsoft, became the impelling motor for the free use of this accessible spectrum to develop a new generation of wireless devices that could be the answer to the need for providing broadband access to U.S. rural areas in a cost-effective manner. The first pilot was run in October 2009 in Claudville, Virginia [2].

There are several standardization organizations working on white space technology. The IEEE [3] formed a work group that is closing the P1900 standard, which will try to provide guarantees for compatibility and interference avoidance. Even the WiMAX Forum has announced a modification to accommodate its technology to the white spaces in an attempt to avoid losing the train of a business estimated in hundreds of billions of dollars.

The unused TV broadcast channels were liberated as a result of the evolution toward digital terrestrial television (DTT) presenting blocks of 6 MHz, although this assignment varies all over the territory. The origin of the changes in the spectrum scene began with the abandonment of channels 52 to 69, or 698–806 MHz, by broadcasters as a response to the analog switchoff. This portion constitutes the 700 MHz spectrum publically auctioned in 2008 to 100 bidders that obtained about 1100 licenses for $20 million. These licensed spaces will provide mainly cellular expansion, including fourth-generation Long Term Evolution (4G LTE), commercial mobile TV, and wireless broadband.

The assignment of frequencies to DTT stations was done in the space 54–698 MHz, channels 2–51, and due to the local feature of these new assigned frequencies many gaps can be found in this region of the spectrum, mainly due to channel guards. Since the FCC announced the free use of part of the unused broadcast channels in 2008, the technological community has put forth a giant effort to satisfy all the parts involved. The main opposition derived from the TV broadcasters that predicted important malfunctions and interference in their licensed frequencies due to the WDs. A pilot developed in 2008 demystified the prognosticated problems of co- and adjacent-channel interference, showing that cognitive technologies are the answer for future services and gadgets operating in white space gaps [2].

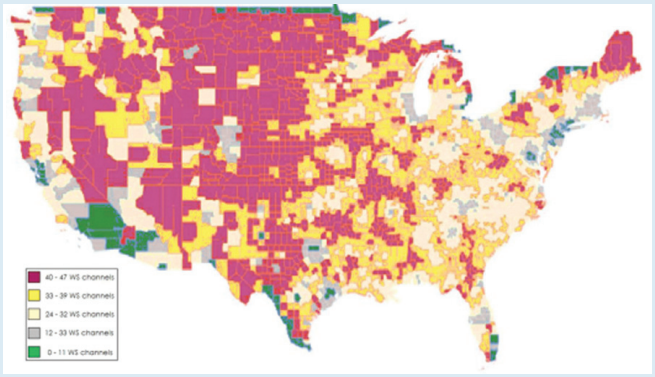

Figure 1. White space channels available in December 2009 [4].

Among the technical advantages offered by these gaps allocated under 900 MHz, despite their unlicensed status, we can mention the longer coverage areas that can be achieved (up to one mile), the reduced loss by penetration into buildings and vegetation (a detail especially relevant in rural areas), and the reduced impact of multipath, at least compared to frequencies of the 2.4 and 3.5 GHz bands. The availability of low-cost hardware is not less important, due to the facilities for the semiconductor technology at ultra high frequency (UHF).

Nevertheless, not all the news is good. We cannot forget that longer antennas are required, and this fact can represent a business opportunity for antenna manufacturers. Another downside could be the need for incorporating geolocation in the WDs, increasing power consumption and size.

In the future, the WDs and unlicensed services operating in the unused broadcast frequencies will operate under the guidelines given by CFR 47 Part 15 and amendments, retaining the 6 MHz channel. More spectrum space is available in the upper 700 MHz segment, which is expected to be assigned to deploy a nationwide communication network for public safety forces. This space contains 10 MHz blocks.

The creation of the database proposed by the FCC will prevent licensed services, such as wireless microphone users or TV broadcasters, suffering interference during their operation. The standards under development will ensure that the new devices have dynamic access control, taking into account the local spectrum conditions to modify transmission/reception. The database to be implemented plays an important role.

2010 can present the definitive and successful launch of WhiteFi (a Wi-Fi style system operating in white spaces), thus providing full access to the information society for rural areas.

References

[1] The Wireless Innovation Alliance
[2] Bridge Wave Inc
[3] www.ieee802.org/22
[4] http://www.showmywhitespace.com

Hightlights of the IEEE 9th TELSIKS Conference

By Prof. Bratislav Milovanovic, University of Nis, Serbia

On October 7–9, 2009 the Faculty of Electronic Engineering in Nis, Serbia, hosted fir the ninth time the biennial International Conference on Telecommunications in Modern Satellite, Cable and Broadcasting Services (TELSIKS 2009). Like the previous conference, TELSIKS 2007, this year's event was organized jointly by the Faculty of Electronic Engineering Nis and the National Society for Microwave Technique and Technologies. TELSIKS 2009 was organized under the technical co-sponsorship of the IEEE MTT Society, IEEE AP Society, and IEEE Region 8, and in cooperation with the IEEE Section of Serbia and Montenegro, IEEE MTT-S Chapter, and IEEE Communications Society Chapter of Serbia and Montenegro, as well as the National Society for Telecommunications and Society for ETRAN. The conference was also supported by the Serbian Academy of Science and Art, Academy of Engineering Science of Serbia and Montenegro, Ministry of Science and Technological Development, and Ministry of Telecommunications and Information Society.

The main part of the conference program included presentations of scientific papers from a range of topics in the field of telecommunications. The review of submitted papers was done by an international board of conference reviewers, and the final selection was made by the Conference Program Committee. The total number of papers selected for presentation was 124, 19 of which were invited. Authors of the papers are scientists from the following countries: Bosnia and Herzegovina, Bulgaria, Canada, Czech Republic, Croatia, Germany, Greece, Italy, Libya, Macedonia, the Netherlands, Romania, Slovenia, Serbia, Ukraine, Spain, the United Kingdom, and the United States. There were 11 regular sessions and five poster sessions. All papers scheduled for presentation were published prior to the conference. The two-volume proceedings, accompanied by a CD-ROM, were distributed to all registered participants. It is important to note that the *Conference Proceedings*, as an official IEEE publication, will be distributed by the IEEE Conference Publications Program (IEEE CPP). All of the conference papers will be indexed in the IET INSPEC database.

Prof. A. Marincic opening the TELSIKS 2009 Conference. From left: Chairmen Prof. K. Rao, Prof. B. Milovanovic, Prof. S. Tomacic, Prof. G. Stoyanov, and Prof. O. Fratu.

Like previous TELSIKS conferences, this year's conference was not just a conference with presentations of scientific papers and exchange of experience, but also an event including many activities and meetings covering different important issues related to the field of telecommunications. The first of the additional activities was the Workshop "Trends in Multimedia Communications." The lecturers were Prof. Kamisetty R. Rao, University of Texas at Arlington, who gave a plenary talk at the beginning of the Conference as well, and Prof. Zoran Bojkovic, University of Belgrade, Serbia. Then there were two roundtables organized during the conference: "Strategy of Scientific and Technological Development in tbe Republic of Serbia 2009–2014" and "Accreditation in Higher Education — Results and Forthcoming Activities." Since actual Serbian topics were considered, both roundtables were held

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The Spanish ICT Hyper-Sector Reduces Its Activity by Seven Percent

By Juan Pedro Muñoz-Gea and Josemaría Malgosa-Sanahuja
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The Spanish Association of Electronics, Information Technologies and Telecommunications (AETIC) has presented the data of the ICT hyper-sector (telecommunications industries, telecommunications services, information technologies, consumer electronics, electronic components, and professional electronics) relating to the period between July 2008 and June 2009, which shows a reduction of 7 percent in activity. This figure shows an abrupt change of trend in the ICT sector, which has always starred in annual increments upward, except in 2008, when zero growth was recorded.

All sectors that make up the hyper-sector have recorded losses for the first time, highlighting the addition to this negative trend of the telecommunications services and information technologies sectors (–4 and –2 percent, respectively). In addition, the second quarter of 2009 showed a rapid decline of 13 percent in the hyper-sector (compared to the same period in 2008) with rates ranging from –8 percent in telecommunications services to –38 percent in electronic components.

The telecommunication industries sector registered the biggest fall of the hyper-sector from July 2008 to June 2009 (–25 percent), which accelerated in the second quarter of 2009 with a decline of 31 percent. Among other factors, this sharp fall is associated with a decline (for the first time in Spain) in the turnover of operators, a reduction in demand for fixed networks, and stagnation of the fixed broadband market. In the second quarter computers and networks fell by 40 percent, while mobile terminals fell 17 percent in the first six months of 2009.

The consumer electronics sector underwent the second biggest decline, with a reduction in turnover of 22 percent (–27 percent, second quarter). The main causes are focused on the falling prices of TVs — around 25 percent — and a reduction of close to 10 percent of sold units in the market. The electronic components sector reduced its activity by 17 percent due to negative performance in other sectors. During the second quarter, the trend worsened to –38 percent. The professional electronics sector fell 8 percent, while from April to June 2009 the decline was more pronounced (–15%) because companies had exhausted the sector's backlog, and replacement was very limited.

The telecommunications services sector decreased (for the first time in history) 4 percent in billing. The second quarter figures went down four more points(–8%). All components

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in Serbian. Both of them gained the attention of the Serbian academic community.

Since TELSIKS is dedicated to the introduction of new telecommunications technologies and services, experimental broadcasting of digital television programs in Nis was set up during the Conference, in cooperation with the national telecommunication company Telekom Srbija, as well as three television companies, one of which has national coverage.

In addition to the activities related to the presentation of scientific and professional results and activities, there were several commercial presentations. Some of the leading information and communications technology (ICT) companies presented their latest solutions and products. Furthermore, there was a one-day exhibition of IET journals. As a special attraction, the presentation of the project "Computer Simulation and 3-D Modeling of the Original Patents of Nikola Tesla" was held. It was organized by the Faculty of Electronic Engineering of Nis and the Nikola Tesla Museum in Belgrade.

Among the other activities, there were meetings of the Executive Committee of the IEEE Section of Serbia and Montenegro, and the IEEE Women in Engineering Chapter of Serbia and Montenegro. Furthermore, a meeting of the Serbian Society of Cable Operators' representatives was held as well.

The conference program was rich in social events as well. There was a reception for invited authors organized by the Mayor of the City of Nis, followed by a nice musical performance for all conference participants. A sightseeing tour for all interested participants was organized. The conference gala dinner was organized at the end of the second day. Serbian national cuisine, an orchestra performing Serbian and international music, and, most important, cheerful guests made the evening memorable.

After the successful series of previous TELSIKS conferences, TELSIKS 2009 again offered a forum for promoting, discussing, and spreading ideas in the field of telecommunications.

I would like to thank to all of the authors, members of the TPC and organizing committee, reviewers, sponsors, exhibitors, and all the others who participated in organization and in the conference itself.

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showed negative trends in income (fixed, mobile, pay TV, wholesale services), except for Internet access, which had a positive but declining rate. This situation is a direct result of the combined effect of the fall in traffic and average revenue per line and per minute, in both fixed and mobile telephony. Despite all of this, mobile line and Internet penetration grew moderately, and fixed access penetration was steady.

The information technologies sector has decreased by 2 percent in turnovers during the past 12 months (–15 percent second quarter). The negative behavior of the software and computer services has added to the behavior registered by hardware equipment for a long time. This is due primarily to decreased investment in professional systems, both public and private.

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scholarship students from all over the world, about half of them IEEE members, participated in the conference. WCSP 2009 was very successful, and conference attendees felt that the conference provided them with a platform where they could learn about new advances in the wireless communications and signal processing fields, and meet and discuss issues in research with peers working in the same area. They also expressed that they look forward to participating in WCSP next year.