

# Broadcast Technology Society Newsletter

The technologies to deliver information and entertainment over the air, cable, satellite and Internet to audiences worldwide, at home and on the go.

## From the President



Dear BTS Members:

As another new year arrives, it's a good time to reflect on the activities of our Society during 2005 and to look forward to an exciting year ahead. Perhaps most noticeable to you, our Newsletter readers, in the past year were the addition of "aviation-orange" color and more articles to our quarterly issues – we hope you've found them interesting and informative. You also may have noticed the new color on the thicker bindings of the Transactions, which will be even thicker in the coming

year, with more pages in each issue. But beyond skin deep, the content of our Transactions was ranked in the Top 20 in citations among Telecommunications journals.

Our 2005 conferences were also well received – the technology tutorials at NAB and IBC, and our annual Broadcast Symposium in the Fall, with its special session on Mobile & Multimedia Broadcasting. In 2006, we'll be expanding on this topic with a new Symposium on Broadband Multimedia Systems and Broadcasting, being launched at the CTIA show in April. We hope this will provide additional value to our current members and enlarge our potential membership base in the growing multimedia technology segment.

The focus groups we conducted at NAB and IBC have given us insight into the needs of multimedia professionals and  
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## From the Editor



As you read from the President's message, we had an active and successful year for the IEEE Broadcast Technology Society. We expect that 2006 will be an even better year for the BTS. As Editor of the BTS Newsletter, my goal is to bring you interesting news and useful technical articles. You will be kept informed of IEEE developments and worldwide activities. In particular,

we will give you articles reporting on BTS events and activities planned and accomplished.

This is your BTS Newsletter. All BTS members are always welcome to submit articles to the Newsletter. Typical articles can provide information about members' activities and meeting events. We are especially interested in receiving technical how to or hands on articles related to broadcast operations or equipment which could be useful to other BTS members working in industry. In  
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## From the President continued

potential opportunities for IEEE and BTS to serve them better. We look forward to continuing this market research in the coming year, and to developing new products and services through our Mobile & Multimedia Broadcasting Initiative. I'm pleased to report that a number of you have already stepped up to help us with this Initiative and with our new Symposium, based on the articles in the Fall Newsletter – but more volunteers are always welcome!

Thanks to the efforts of our Strategic Planning team, with the professional guidance of long-time IEEE volunteer and BTS member Irv Engelson, we completed a SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis of our Society. An action plan is being developed, and you'll start to see the fruits of this effort in the coming months as we adapt BTS to our evolving "broadcast" industry – the multimedia initiatives are just the beginning.

After a decade of steady decline, total membership in BTS began to level off in 2005. We hope this presages an upturn in 2006. But, while our higher-grade and affiliate memberships grew, the number of student members declined. This is one of the issues to be addressed by our Education Initiative in the coming year.

BTS continues to be in excellent financial condition, thanks to our partnership in the IBC, which continues to grow each year. It provides a solid foundation that allows us to develop new products and services,

## Newsletter Deadlines

The BTS Newsletter welcomes contributions from every member. Please forward materials you would like included to the editor at [wmeintel@computer.org](mailto:wmeintel@computer.org). Here are our deadlines for upcoming issues:

Issue	Due Date
Spring, 2006	January 20, 2006
Summer, 2006	April 20, 2006
Fall, 2006	July 20, 2006
Winter, 2006	October 20, 2006

and to keep the costs of our publications and conferences affordable for our members.

One perk that we are pleased to offer in early 2006 – with a value that more than offsets the cost of BTS membership – is a complimentary copy of the IEEE Proceedings Special Issue on Global Digital Television, to which several of our members contributed. You'll find it bundled with

the March issue of the Transactions on Broadcasting, in appreciation for your membership in BTS. So, tell your non-member colleagues to join now.

My best wishes to each of you for a happy and prosperous 2006!

Tom Gurley  
President  
IEEE Broadcast Technology Society  
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## From the Editor continued

In addition we welcome articles from academic researchers reporting on new developments in broadcast engineering automation, control, and new technologies. Both the commercial applications and applied research articles are welcome. I believe such articles help new engineers and IT professionals to become aware of job and personal professional development opportunities in the dynamic state-of-the-art broadcast engineering applications of computer software, automation and new hardware in high power wide band RF technologies. These technologies enable broadcast systems and signal distribution operations to become more efficient and cost effective. I am also working with BTS colleagues in industry to obtain broadcast engineering training materials which can be published as a series of articles in future BTS Newsletters.

In 2006 this Newsletter will report on a series of BTS events which include a new BTS Symposium on Broadband Multimedia Systems and Broadcasting being co-located with the Cellular Telephony and Internet

Association (CTIA) Wireless 2006 and the IEEE Communications Society Wireless Communications and Networking Conference (WCNC) 2006 to be held on 6-7 April in Las Vegas. Our BTS Technical Program Committee and Steering Committee are preparing a broad technical program to provide the latest information to industry attendees and research attendees. I recommend that you visit the IEEE BTS web site often to view the latest program information about this event.

In addition, your BTS Newsletter will include articles about BTS 2006 participation at the NAB Convention in Las Vegas, the Broadcast Asia Conference and Exhibition in Singapore, the International Broadcast Convention in Amsterdam, and the premier BTS event which is the IEEE Broadcast Technology Symposium on 27-29 September 2006 at the Hotel Washington, Washington, DC. Our Newsletter and web site will keep you informed about these events.

If you happen to see an article in a trade journal or other technical publication that you think would be of

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## From the Editor continued

interest to readers of this Newsletter, please send me an email with the name of the article and publication. If the article you recommend is considered to be of interest to the Newsletter readers, I will make arrangements to contact the publisher and request permission to reprint the article in the BTS Newsletter. Another area of the Newsletter which has been a tradition-

al item is the Brain Teaser articles which BTS member Lanny Nass has been providing during the past years. Lanny is always on the lookout for new brain teasers related to broadcasting. If you see any brain teasers or challenging puzzles that would be of interest to our readers, please send them directly to Lanny Nass at [elnass@cbs.com](mailto:elnass@cbs.com).

I wish all our readers a successful and prosperous New Year. Please contact me with your ideas, comments and suggestions.

With best regards,

Bill Meintel  
Editor  
IEEE BTS Newsletter  
[wmeintel@computer.org](mailto:wmeintel@computer.org)

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## IEEE MEMBERS SELECT LEAH H. JAMIESON 2006 IEEE PRESIDENT-ELECT

From the IEEE Newsroom

Leah H. Jamieson, Ransburg Professor of Electrical and Computer Engineering, and associate dean of Engineering for Undergraduate Education at Purdue University in West Lafayette, Ind., has been selected as 2006 IEEE president-elect. Pending acceptance of the Teller's Committee report by the IEEE Board of Directors, Jamieson will begin serving as IEEE president on 1 Jan. 2007. She will succeed 2006 IEEE President Michael R. Lightner, Professor of Electrical and Computer Engineering at the College of Engineering and Applied Science at the University of Colorado at Boulder.

Jamieson, an IEEE Fellow, is only the second woman in the history of the IEEE to be chosen for the president-elect position. An IEEE member for 30 years, she presently serves on the IEEE Board of Directors and Executive Committee. She is a member of the Strategic Planning Committee, chairs the New Technologies Directions Committee and holds the position of vice president of the Publication Services and Products Board. Among her many other leadership roles, she has served as vice president of the Technical Activities Board and as president of the IEEE Signal Processing Society.

In addition to her current positions as professor and associate dean at Purdue, Jamieson is co-founder and director of the Engineering Projects in Community Service (EPICS) undergraduate engineering design program, which was initiated at Purdue and has been adopted by 17 universities. For her work with EPICS, she was co-recipient of the U.S. National Academy of Engineering's Gordon Prize for Innovation in Engineering and Technology Education. She has served on advisory committees of the National Science Foundation and on the Board of Directors of the Computing Research Association. She is a member of the U.S. National Academy of Engineering.

Edward Della Torre was selected as division delegate-elect/director-elect for 2006 for IEEE Division IV-Electromagnetics and Radiation. He will also take office as division delegate/director on 1 January 2007.

Division IV consists of the following societies: Antennas and Propagation, Broadcast Technology, Consumer Electronics, Electromagnetic Compatibility, Magnetics, Microwave Theory and Techniques, Nuclear and Plasma Sciences plus the Superconductivity Council.

Edward Della Torre, Professor at George Washington University, Washington, DC, received the B.E.E. from Brooklyn Polytechnic Institute, the M.Sc. in electrical engineering from Princeton University, the M.Sc. in physics from Rutgers University, and the D.E.Sc. degree from Columbia University. He has been a professor at George Washington University since 1982. He also taught at Rutgers, McMaster, and Wayne State Universities, and served as Chairman of the Electrical and Computer Engineering Departments at the latter two universities. He performed research at the Bell Laboratories, the University of Toronto, and the National Institute of Standards and Technology during sabbatical years.

Edward Della Torre is a Life Fellow of the IEEE and a Fellow of the American Institute for Physics. He is the author or coauthor of over 250 technical papers in refereed publications and three books. He has made over 200 conference presentations, holds 18 patents, and is a regular reviewer for many technical journals. He has chaired several IEEE Conferences.

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# ATSC Published Four New Candidate Standards

By Jerry Whitaker, VP of Standards Development,  
Advanced Television Systems Committee, Inc.

The Advanced Television Systems Committee (ATSC) has published four Candidate Standard documents relating to coding and transport stream management for the optional enhanced-VSB (E-VSB) transmission mode. E-VSB, also known as the Robust Mode, is specified in ATSC document A/53D (Annex D). E-VSB allows broadcasters to trade-off data rate for a lower carrier-to-noise threshold for certain services. Examples of potential applications for E-VSB include delivery of “fall back” audio, programming services targeted at small DTV receivers with indoor antennas, non-real time transmissions of file-based information to handheld and pedestrian receivers, and robust data broadcasting to devices such as desktop and laptop computers.

Elevation of a specification to Candidate Standard status is an explicit call to those outside of the related specialist group for implementation and technical feedback. This is the phase at which the specialist group is responsible for formally acquiring field experience or at least defining the expectations of implementation. Candidate Standards may be revised during the posting period if issues are identified by implementers.

The new Candidate Standards, available on the ATSC Web site, are:

- **CS/TSG-658**, “Amendment to ATSC Digital Television Standard, Doc. A/53D, to define Video System Characteristics of VC-1 as new Annex F”
- **CS/TSG-659**, “Amendment to ATSC Digital Television Standard, Doc. A/53D, to define Video System Characteristics of AVC as new Annex F”
- **CS/TSG-660**, “Amendment to ATSC A/53D to Define Transport of AVC Codec in Annex C”
- **CS/TSG-661**, “Amendment to ATSC A/53D to Define E-VSB Transport in Annex C”

## About the New CS Documents

The ATSC Technology and Standards Group (TSG) is considering the possibility of specifying one or two advanced video codecs for the E-VSB mode. CS/TSG-658 and CS/TSG-659, developed by the Specialist Group on Video and Audio

Coding (TSG/S6), define the video system characteristics for VC-1 and AVC, respectively. They also document how CEA-708-B closed captions are to be carried with either codec.

In the event that one or more new video codecs, in addition to MPEG-2, were to be approved for use in the E-VSB mode, transport aspects would be documented as an amendment to Annex C of A/53. CS/TSG-660, developed by the Specialist Group on Service Multiplex and Transport Systems Characteristics (TSG/S8), is the Candidate Standard Amendment to Annex C to define transport of the AVC codec for use in E-VSB transmission mode.

In the event that no new video codec is approved for use in the E-VSB transmission mode, MPEG-2 video may be transmitted in the Robust Stream. CS/TSG-661, an alternate amendment to Annex C developed by TSG/S8, defines the related transport aspects.

Both CS/TSG-660 and CS/TSG-661 also document transport of Enhanced AC-3 in the Robust Mode. E-AC-3 offers new coding tools that fundamentally improve performance, and new features that allow operation over a wider range of bit-rates and numbers of channels. It is important to note that E-AC-3 can be converted into AC-3 for playback compatibility on consumer’s existing A/V decoders.

All of the CS documents have been under development for some time within TSG/S6 and TSG/S8. Feedback is appreciated—and essential—as the work moves forward.

The CS period for CS/TSG-661 expires on December 15. The CS period for the other three documents expires on May 10, 2005. On or prior to the expiration date, the parent Technology Group (TSG) has the option of extending the CS period, advancing the document to the next level of approval (Proposed Standard), or returning the document to the specialist group for additional work.

## Further Information

All four Candidate Standards, as with all other ATSC standards, recommended practices, and informational documents, are available for download at no charge from the ATSC Web site <http://www.atsc.org>.

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## 2005 Broadcast Symposium is a Success

It was another successful year for the IEEE Broadcast Symposium. The 55th Annual event was held in the familiar Hotel Washington, in Washington, DC USA. This year brought a new Symposium Chair, Guy Bouchard, who organized and coordinated this event attended by about 130 of the top broadcast engineers worldwide. In addition to a new Chair, we also held the technical sessions in a new room in the Hotel Washington. With more space and more

privacy, this location seemed to be popular with attendees.

In addition to the presentation of 33 outstanding and very well received technical papers, 2005 featured memorable highlights: An onsite, live demo of the Crown Castle Mobile TV Service (see article in this newsletter); A rallying speech by Marsha MacBride, executive vice president of legal and regulatory affairs for the National Association of Broadcasters (see article in this newsletter); Finally a mov-

ing panel on Broadcasters' Emergency Preparedness Related to Hurricane Katrina and Other Events (Participants: Andy Bater, Raymond Carnovale, Steve Smith, Charles Cooper, Jerry Kalke).

Those fortunate enough to attend the panel session on Broadcasters' Emergency Preparedness could not help but walk away impressed by the important and indispensable public service that broadcasters provide

when areas are struck by disaster. Additionally, through first hand experience shared during the panel; attendees learned some of the lessons that have been learned by their colleagues in different emergency situations.

We gratefully extend our thanks to the Symposium corporate supporters; Axcera, Dielectric, ERI Electronics Research Inc., Jampro, Richland Towers and TV Technology. Without their support, we would be forced to raise

registration rates for our attendees dramatically.

Finally, thank you to the authors and session chairs who shared their time and expertise to make the IEEE Annual Broadcast Symposium the premier event for technical information on broadcasting.

We'll see you next year, September 27 – 29, 2006 at the Hotel Washington, in Washington DC USA for the 56th Annual IEEE Broadcast Symposium!



**Panel: Broadcasters' Emergency Preparedness Related to Hurricane Katrina and Other Events**



**Marsha MacBride accepts certificate of appreciation from Symposium Chair Guy Bouchard & Society President, Tom Gurley**



**AdCom members at the BTS Awards Banquet: From Left to right: Tom Silliman, Lanny Nass, Sid Shumate, Tom Gurley, Yiyan Wu, William Meintel, and Guy Bouchard.**



**Socializing at the Thursday evening reception**



**Sid Shumate presents the Matti Siukola Memorial Award. Awarded to Gary Sgrinoli, accepting for Gary is Dennis Wallace.**



**Sid Shumate presents the Scott Helt Award to Yiyan Wu and Xiaobin Wang**

# Symposium Keynote Speaker Marsha MacBride Rallies IEEE Members

by Deborah McAdams of TV Technology

Broadcast spectrum is under assault, Marsha MacBride told a roomful of engineers at the 55th Annual IEEE Broadcast Symposium, urging them to get off their duffs and lobby lawmakers.

"The demand for 'beachfront' broadcast spectrum is huge," said MacBride, executive vice president of legal and regulatory affairs for the National Association of Broadcasters, and former chief of staff for ex-FCC Chairman Michael Powell. "Broadband is in; broadcast is out."

She noted the Bush Administration call for universal broadband in the nation by 2007, up from a mere 38 million "connections" today. She said companies going after the spectrum were "players with a lot of swat in Washington," and that the effort to wrench spectrum away from television began years ago. Then, in 2002 the FCC Spectrum Policy Task Force "determined there was plenty of spectrum, it was just inefficiently used," and the current airwave-grab ensued.

MacBride cited three major forces threatening the broadcast space--unlicensed devices, broadband-over-powerline (BPL) and ultrawideband (UWB). With the current obsession for

unlicensed devices, the risk of broadcast interference is a low priority in the regulatory arena, she said. Interference tests assume a 30-foot separation--more than one can find in a lot of New York City apartments--between an unlicensed device and a TV receiver. She also said that while the FCC recognized that BPL would cause interference, it only approved protection for spectrum used by the federal government.

She very briefly mentioned the drive to free up spectrum for first responders, an effort for which Sen. John McCain (R-Ariz.) is bearing the colors. McCain's efforts last year to establish an analog sunset date were dismantled in the final hours of the Congressional session--his last as chairman of the Commerce Committee. The current chairman, Sen. Ted Stevens (R-Alaska) is busy crafting DTV legislation of his own, but not fast enough to satisfy the chagrined McCain, who is scheduled to appear at a D.C. think tank gathering Oct. 18 to once again blame broadcasters for the dismal state of emergency communications.

That event, sponsored by the New America Foundation, will also feature

speakers from Cisco Systems, the 9/11 Commission and municipal safety organizations, but not broadcasters. According to the NAF invite, the panelists will "describe the benefits of mobile, high-speed public safety data networks that will require access to the sort of high-penetration airwaves that currently lie fallow as unassigned TV channels and 'guard bands' in every community nationwide." It said senators are considering whether Channels 2 through 51 ought to be opened for unlicensed devices, although even the FCC hasn't written off on that yet.

MacBride told those gathered at the IEEE Symposium in Washington that "the role of the engineer is critical" in DTV deadline discussions. "Much of this falls in your lap," she said, urging the group to communicate with lawmakers. "Engineering is being debated today at the FCC like policy."

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*<http://www.tvtechnology.com/dailynews/one.php?id=3328>*

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## Crown Castle Previews New Mobile TV Service at IEEE Broadcast Symposium

by James O'Neal of TV Technology

The 55th annual IEEE Broadcast Symposium in Washington, D.C. offered its attendees a look at "the next screen" and redefined the "PID" acronym.

The opening proceedings could be best summed up in the title of the first paper, "The Emergence of Digital Video Broadcast TV in Mobile Terminals," presented by Don Shaver of Texas Instruments.

Television broadcasting continues to morph and one of the latest imple-

mentations is subscription video delivered through "PIDS." Put aside the familiar "Packet ID" acronym for the time being; the new "PID" stands for Portable Information Device--right now that would translate as a video-enabled cell phone. PIDs, however, are likely come into their own as substantially more than just a cell phone with pictures.

Michael Schueppert of Crown Castle Mobile Media described his compa-

ny's ongoing field trials of this technology in the Pittsburgh area. This is the first deployment of DVB-H (hand-held) network technology in the U.S. Additional trials are being conducted in Germany, Finland, the UK, Australia and France. The U.S. trial is a cooperative effort featuring equipment and services provided Axcera, Thales, Kathrein, Nokia and SES Americom.

One of the unique features of the Pittsburgh trial is the use of L-band

spectrum. No broadcast TV channels had to go dark. The system operates within a 5 MHz channel in the 1.670 GHz region. This was formerly a spectrum slot set aside for weather balloon telemetry, but has gone largely unused since weather satellites began to replace the balloons. It has now been cleared nation-wide for this use. The field trial uses a 200 W transmitter, and with antenna gain produces a 2 kW EIRP. It is estimated that the video service could potentially reach 750,000 people in the Pittsburgh area.

Nokia provided their model 7710 handset units or "PIDs" with a DVB-H tuner built in for evaluation of the trial service.

Another feature of the Crown Castle field test is the use of satellite linkage for delivery of content to the "cell" transmitter, instead of leased terrestrial connectivity. Satellite delivery is expected to be very cost effective when compared to the amount being spent now by cell providers for T-1 connectivity to their cell sites.

Satellite delivery made the system

easy to demonstrate to the Symposium audience. A Ku-band antenna was temporarily installed on the roof of the hotel hosting the event and delivered digitally encrypted signals to a demodulator and low powered L-band transmitter located in the conference area. The same audio and video signals seen in Pittsburgh were available for viewing by the audience on the Nokia devices.

Another implementation of this technology was described by Capitol Broadcasting's Sam Matheny.

WRAL Television in Raleigh, N.C. has partnered with Sprint and Verizon to provide a local news service to cell phone subscribers in the Raleigh-Durham area. Matheny described the service, introducing the term "the third screen." This is the cell phone's display. The other, older screens are those in television sets and computers.

"We are at the front end of witnessing a fundamental change in how people get their news," Matheny said, citing the demise of afternoon newspapers and the phenomenal growth of the cell phone industry. He said that

there are an estimated 196 million cell phones subscribers, with 16 million new subscriptions added so far this year and predicted that with the universality of the cell phone, it will become the favored mode for news dissemination.

"We're moving news to the third screen," he said.

WRAL is packaging news, weather, stock and highway information for the Raleigh-Durham area. The service is available by subscription for \$3.99 per month. He said a survey showed that people would be willing to pay even more. A popular feature of the service is access to area highway traffic cameras.

Qualcomm's MediaFLO delivery technology was described at the sessions, as was the ISDB-T technology being tested in Japan.

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*<http://www.tvtechnology.com/dailynews/one.php?id=3344>*

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## 2005 Scott Helt and Matti M. Siukola Awards Presented

by Sid Shumate, BTS AdCom Awards and Nominations Chair

The Scott Helt Award for the best paper published during the past year in the IEEE-BTS Transactions, and the Matti M. Siukola Award for the best paper presentation at the 2004 Broadcast Symposium, were presented at the BTS Awards Luncheon, held during the 55th Annual IEEE Broadcast Symposium on Oct. 14, 2005.

### Matti S. Siukola Memorial Award

The 2005 Matti S. Siukola Memorial Award was awarded to Gary Sgrignoli for his paper on "Interference Analysis of Co-Sited DTV and NTSC Translators" presented at the 54th Annual Broadcast Symposium.

This is Mr. Sgrignoli's second involvement in a Siukola award; he

was the co-author of a paper presented by Carl G. Eilers that was the recipient of the 2002 Siukola award, and he was the recipient of the 2004 Scott Helt Award.

**Gary Sgrignoli** received his Bachelor and Master of Science degrees in Electrical Engineering from the University of Illinois, Champaign-Urbana in 1975 and 1977, respectively. He joined Zenith Electronics Corporation in January 1977, where he worked as an engineer in the Research and Development department for 27 years. Currently, Gary is a DTV transmission consultant and a partner in the consulting engineering firm of Meintel, Sgrignoli and Wallace.

He has worked in the R&D design area on television "ghost" canceling,

cable TV scrambling, and cable TV two-way data systems before turning to digital television transmission systems. Since 1991, Gary has been extensively involved in the VSB transmission system design, its prototype implementation, the ATTC lab tests in Alexandria, VA, and both ACATS field tests in Charlotte, NC. He holds 35 U.S. patents.

Gary was involved with the DTV Station Project in Washington DC, helping to develop DTV RF test plans. He has also been involved with numerous television broadcast stations around the country, training them for DTV field testing and data analysis, and participated in numerous DTV over-the-air demonstrations with the Grand Alliance and the ATSC, both in the U.S. and abroad.

In addition to publishing technical papers and giving presentations at various conferences, he has held numerous digital VSB transmission system seminars around the country.

The Matti S. Siukola Memorial Award was established in 1982 "to encourage presentation at the Annual Fall Broadcasting Symposium of technical papers of excellence by authors engaged in the field of broadcast engineering." The recipient is presented with a plaque at the following year's Annual Symposium Awards Luncheon. To determine the winner, ballots are distributed at each Technical Session during the Symposium. Prior to the award, Sidney Shumate, the BTS Awards Chairman, recounted Matti Siukola's last paper presentation before the Symposium. This event, which occurred 25 years ago in the same room where the Awards Luncheon was held this year, led to the establishment, in 1982, of the Matti S. Siukola Memorial Award.

### Scott Helt Memorial Award

The 2005 Scott Helt Memorial Award plaque, and individual certificates, were awarded to Xianbin Wang, Yiyang Wu and Bernard Caron for their paper "Transmitter Identification Using Embedded Pseudo Random Sequences", published in the September, 2004 IEEE Transactions on Broadcasting.

**Xianbin Wang** is a research scientist with the Communications Research Centre, in Ottawa, Canada. He received his Ph.D. degree in 2000, from the Dept. of Electrical and Computer Engineering at the National University of Singapore. Prior to joining the CRC in 2002, he was with STMi-

croelectronics Inc. (Ottawa Design Centre) as a system designer, with principal involvement in the research and development for Gigabit Ethernet and Digital Subscriber Loop chipsets. His areas of research interest include: Channel estimation/equalization, Modulation techniques, Synchronization techniques, Orthogonal frequency division multiplexing (OFDM) systems, Multiple input multiple output (MIMO) systems, and Ultra wideband/impulse radio.

**Dr. Yiyang Wu** is a Principal Research Scientist with the Communications Research Centre in Ottawa, Canada. Dr. Wu's research interests include digital television and multimedia signal processing, and broadband wireless communications. He is an IEEE Fellow, an adjunct professor of Carleton University in Ottawa, Canada, a member of the IEEE Broadcast Technology Society Administrative Committee, and a member of the ATSC Board of Directors, representing IEEE.

**Mr. Bernard Caron** has been Acting Vice-President of the CRC's Broadcast Technology Branch since January 2, 2004, in addition to his current role as Research Manager of the Television Systems and Transmission research group, which is focusing on the introduction of terrestrial digital television and multimedia broadcasting in Canada. Mr. Caron joined the CRC in 1979 and assumed his current role in 1992.

During these years, he contributed to many technological advancements, including the development of videotext and teletext systems, the precursors of the Internet, and the creation of CRC's Advanced Television Evalua-

tion Laboratory (ATEL). This laboratory was used to subjectively evaluate five proposed systems, out of which emerged today's North American standard for High Definition Television.

Mr. Caron was involved in the joint Canada-USA-Brazil OFDM-6 project, which aimed to adapt and evaluate the Digital Television transmission technology proposed by Europe for the Americas. He has also negotiated and managed many projects under contract for private enterprises from the United States, China, Korea and Canada to evaluate the performance of various Digital Television transmission systems and technologies.

Mr. Caron received a B. Sc. in Electrical Engineering from Université Laval, Québec City, in 1978 and a M. Sc. from the University of Ottawa in 1984. He is a member of the Professional Engineers of Ontario. He has actively participated on several employee-centric committees including the Industry Canada Survey Advisory Committee and the CRC Employee Advisory Committee, of which he was a founding member. He has published more than 70 papers and reports.

The Scott Helt Memorial Award was established in 1957 by the IRE Professional Group on Broadcast Transmission Systems, the precursor of the Broadcast Technology Society. The purpose of the IEEE Scott Helt Memorial Award is to recognize exceptional publications in the field, and to stimulate interest in, and encourage contributions to, the fields of interest of the Society. Papers are nominated by reviewers and voted upon by the entire BTS Publications Committee.

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## Special Issue on Global Digital Television: Proceedings of the IEEE, January 2006

From the Guest Editors of this Special DTV Issue

Digital Television (DTV) and High Definition Television (HDTV) services via satellite, cable and terrestrial broadcasting have been with us for

some time. There have been few, if any, tutorials that comprehensively cover all the worldwide DTV systems. This Proceedings of the IEEE special

issue on DTV is produced by a team of experts in digital television from around the world who, for the first time, have jointly developed a com-

plete and systematic tutorial series of papers. The main focus is on the terrestrial DTV systems, but satellite and cable DTV are also covered, as well as emerging services such as Internet Protocol TV (IPTV), Interactive services, and multimedia service to handheld devices. This special issue consists of two invited papers and three special paper sections describing DTV systems and related standards developed in North America, Europe and Japan.

The first paper entitled "Overview of Digital Television Development Worldwide" is an introductory and overview paper by guest editors. A brief history of television development, from black and white TV to color TV, and then to more advanced enhanced TV and HDTV systems are reviewed. It also puts the current digital television systems into perspective and describes the historical background and different evolution paths that each system took. The future development and research directions of digital broadcasting and multimedia systems are also discussed. The second invited paper "Digital Television Station and Network Implementation" covers practical issues faced by broadcaster stations and networks around the world as they have transitioned from analog to digital technologies – both for transmission and for program production. It also compares broadcast service models used in various parts of the world. The intention is to share the experiences learned by North American, European and Japanese broadcasters with their colleagues in other parts of the world, hopefully, to make their DTV transition and implementation easier.

The rest of the special issue consists of three special sections of invited papers from digital television standard groups based in North America, Europe and Japan. All of the authors are leading experts or technical authorities in the respected fields.

The first special section is from North America and has eight invited

papers. The first paper is an introduction to the ATSC terrestrial DTV standards. The second paper describes the ATSC modulation and channel coding systems, DTV coverage and channel assignment criterion, as well as distributed transmission concept and transmission identification system. The third paper discusses video and audio coding in digital television systems. The next paper introduces packetized transport and multiplex, including Program and System Information Protocol (PSIP). Followed by a paper describes ATSC standards/protocols for data broadcasting and interactive services software environment. The sixth paper focused on receiver design and implementation. The seventh paper presents carriage of digital video and other emerging services by cable in North America. The last paper describes digital satellite Direct-To-Home (DTH) service in North America.

The second special section is from the DVB Project – the European based DTV standard body. It consists of six invited papers, which are mainly focused on new and emerging technologies. The first paper describes the DVB family of standards and recent developments in new technologies and emerging services. The next two papers discuss DVB terrestrial DTV standards DVB-T and DVB-H for stationary, portable and mobile services, as well as DTV and multimedia service to handheld devices. The fourth paper introduces DVB-S2 – the second-generation satellite transmission standard for satellite broadband services. The fifth paper presents the technologies for DVB services over the Internet and IPTV. The last paper is on the DVB Multimedia Home Platform (MHP) – the open middleware system for interactive services.

The last special section is from Japan on ISDB DTV standards. It covers eight topics with 14 invited papers. The first paper outlines the ISDB systems. The next six papers

describes the terrestrial DTV and digital sound broadcasting systems, i.e., ISDB-T and ISDB-TSB, MPEG-2 applications and broadcast-wave relay technology in terrestrial DTV broadcasting, as well as HDTV mobile reception and personal mobile DTV terminal for receiving digital terrestrial broadcasting with Internet services. The following two papers introduce satellite DTV transmission system, ISDB-S, and its uplink facilities. The tenth paper introduces cable television transmission system, ISDB-C, in Japan. The eleventh paper describes Japanese datacasting coding scheme, Broadcast Mark-up Language (BML) for interactive services. Followed by a paper discusses digital broadcasting conditional access system in Japan. The thirteenth paper presents ISDB digital television receiver design and implementation. The last paper focused on broadcast satellite multimedia services for mobile reception.

It should be pointed out that today's DTV systems not only deliver crystal-clear pictures and CD-quality sound, but also provide various innovative new services and programs, such as electronic program guide (EPG), personalized advertisements, parental control, conditional access, emergency alerts, software download, IP encapsulation, data broadcasting, and various multimedia interactive services. DTV also provides a seamless interface with other communication systems, computer networks and digital media, and can even be used to deliver content to handheld devices at home or on the go. The introduction of digital television will increasingly impact broadcasters, consumers and many related industries. It is a key element of the on-going digital revolution leading towards the information society.

As Guest Editors, we would like to thank the authors and the reviewers who contributed their valuable time and advice. We would also like to acknowledge the Editor-in-Chief, the Editorial Board members and staff of the Proceedings of the IEEE for their

support of this special issue. We hope the readers will find this special issue informative and useful.

**Yiyuan Wu, Guest Editor**  
**Communications research**  
**Centre Canada**  
**Ottawa Ontario Canada**

**Shuji Hirakawa, Guest Editor**  
**Toshiba Corp.**  
**Tokyo, Japan**

**Hisakazu Katoh, Guest Editor**  
**NHK (Japan Broadcasting**  
**Corporation)**  
**Tokyo, Japan**

**Ulrich Reimers, Guest Editor**  
**Chairman, DVB Technical Module**  
**Professor, Braunschweig**  
**Technical University, Germany**

**Jerry Whitaker, Guest Editor**  
**ATSC Vice President Standards**  
**Development**  
**Washington DC U.S.A.**

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## Activity Report: IEEE BTS Argentina Chapter

by Valentin Trainotti

On 12 November 2005, the IEEE BTS Argentina Chapter met and received a presentation of a paper by graduate student Luis Dorado. The presentation was based on a paper titled "Cross Field Antenna (CFA) Performance" which was co-authored by Prof. Valentin Trainotti of the University of Buenos Aires, Argentina and Luis Dorado who is working toward a PhD degree at the Science Faculty of the Buenos Aires University, Argentina. The presentation described the CFA analysis from input impedance and radiation properties using Maxwell's equations, through Transmission Line

and Moment Method approaches. This subject was also presented by Prof. Trainotti at the 2005 55th Annual Broadcast Symposium in Washington DC. The presentations at both events were well received by the attendees. If you are interested in receiving a copy of the CFA Performance paper, please contact Dr. Trainotti via email at [vtrainotti@ieee.org](mailto:vtrainotti@ieee.org).

The IEEE BTS Argentina Chapter had an active year in 2005. In addition to bi-monthly planning meetings by the Chapter Officers, the following formal technical presentations were conducted for BTS Chapter members and

guests:

**10 March** - Digital Radio Experiences (IBOC) by Pedro Macarone

**8 June** - Radio Station Digitalization by Fabian Balliro and Moises Martini

**6 July** - TV Station Digitalization by Fabian Balliro and Moises Martini

**7 Sep.** - Digital TV Update by Juan Carlos Guidobono

**10 Nov.** - Crossed Field Antenna Performance by Luis Dorado

The Argentina Chapter is planning its next technical session to be a presentation by Prof. Trainotti on Non Ionized Radiation and FM Transmitting antennas.

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## Activity Report: IEEE BTS New York Chapter

by Warner Johnston

A meeting of the IEEE BTS New York Chapter was held on 6 December 2005 at ABC Facilities, 47 West 66th Street, New York, NY. This was a joint meeting with the IEEE Women in Engineering (WIE) New York Section Affinity Group. The speaker for this meeting was Eileen Pedersen of ABC Broadcasting.

Her topic was "Evolution of Television and the Convergence of Technology." She discussed how technology advances in electronics, cameras, audio devices, processing equipment, computers, software, recording media, test equipment, distribution, etc. are constantly converging and being applied by broadcast engineers to

improve the technical performance of television studios, technical facilities, and distribution systems.

Ms. Pedersen also highlighted the technical opportunities for women engineers in the field of broadcast engineering. This field can be very rewarding professionally since it requires engineers to constantly learn the latest advances in electronics and other technologies with potential applications to broadcast systems and facility operations. A unique professional benefit provided to television broadcast engineers requires them to meet critical technical deadlines while working in a dynamic, time sensitive, multi-discipline team envi-

ronment with managers, program directors, producers, technical staff and talent.

Eileen joined ABC in the early 80's where she went on to become the first Chief Engineer of 1125 Productions -- one of the first High-Definition facilities. Later on Ms. Pedersen became the Director of Engineering and Maintenance for USA and Sci-Fi Networks. At USA, she was part of a team that built one of the first State of the Art Digital Facilities. She went on to work as a consultant on a number of High Definition builds including CNN and ESPN and currently works as a System Design Engineer for ABC.

For information about IEEE Women in Engineering (WIE) contact Darlene E. Rivera, WIE Chair at <dri-  
vera938@ieee.org>.

Future meetings of the IEEE BTS New York Chapter are scheduled for 10 January, 14 March, and 9 May 2006. For more information about the

IEEE BTS New York Chapter, contact Warner Johnston, New York BTS Chapter Chair at <Warner.W.John-  
ston@abc.com>.

## Activity Report: IEEE BTS St. Petersburg Chapter (Russia)

by Dmitry Tkachenko

On October 18, 2005, a technical meeting of the St.Petersburg BT/CE/COM Chapter was held at the MART Company in St.Petersburg. Technical meetings of the Chapter are traditionally conducted at this company facility due to the efforts of Dr. Alexander Artamonov, Deputy Director of MART Company. The MART Company is one of the pioneers in development of digital TV and radio technologies in Russia. Technical meetings of the IEEE Chapter help initiate new activities and projects relating to the introduction of digital TV and radio in Russia. Several years ago MART developed the first Russian DVB-T transmitter and since that time the company has initiated several new projects in this field.

Alexander Artamonov opened the meeting and welcomed the participants. He announced the agenda of the meeting that included reports of Chapter members regarding recent international conferences and exhibitions and a technical discussion concerning possible introduction of DTV single frequency networks (SFN) in Russia.

Then Professor Konstantin Glasman delivered a report concerning his visit to IBC2005 conference and exhibition in Amsterdam. Prof. Glasman mentioned three main areas that were of special interest to him at IBC. They are (1) Introduction of several Mobile TV standards, (2) Introduction of HDTV in Europe and (3) Increased availability of IPTV papers and products. He also discussed standardization activities in the field of digital cinema. Prof. Glasman reminded the meeting participants that the Tenth IEEE International Symposium on

Consumer Electronics would be held in St.Petersburg on June 29 – July 1, 2006.

Alexander Nepomnyashchiy, Deputy Executive Director of the Kozitsky Plant (one of the major TV set manufacturers in Russia with the brand name “Raduga”) told the participants about his visit to the Consumer Electronics Exhibition IFA2005 that was held in Berlin in September. Unfortunately Russian manufacturers are still not prominently represented at international exhibitions. In order to increase their representation, they should first try to gain a greater share of the Russian market. For example, the estimated number of TV sets sold in Russia in 2004 is about 7 million units with about 4.8 million of them manufactured in Russia. About 55 % of the latter number are foreign brands TV sets assembled in Russia, whereas less than half of this number consists of TV sets developed in Russia. Transition to digital television in Russia provides an opportunity for Russian manufacturers to start manufacturing hybrid TV sets that provide reception of both analog and digital TV programs during the transition period.

The second part of the meeting was devoted to a discussion of the possible introduction of single frequency DTV networks in Russia. A major problem is that the vast territory of Russia covers 10 time zones (i.e. the difference in time between the East and West parts of Russia is 10 hours) in which some territories do not have terrestrial TV at all due to very low density of population. Nevertheless, SFN networks may be reasonable for deployment in densely populated areas. According to

draft estimates, several thousand SFN TV transmitters are necessary to cover main regions of the country. Dr. Artamonov proposed setting up a pilot zone for a SFN TV broadcasting network that could be located, for example, in the St. Petersburg area. In order to establish the pilot zone it is necessary to solve problems related to SFN DVB-T modulators development, synchronization of transmitters and delivery of DTV streams to the transmitter sites. Meeting participants expressed their opinions on this proposal.

Sergey Travkin from the Russian Research Institute of Radio Navigation and Time reported that they have developed synchronization/positioning units that may work with both GPS and GLONASS positioning systems. GLONASS is the Russian satellite system based on 12 satellites that provides the same functionality like GPS system. These units are commercially available and ready for integration into DTV transmitters.

Dr. Vyacheslav Lukinov from “Supertel DALIS” company reported that his company developed a wide range of products for the multiplexing and distribution of MPEG-2 DTV streams including communications systems supporting any standard bit rates, modulators and set-top-boxes for cable TV networks, multi-protocol encapsulators for MPEG-2 transport streams, etc. He stated that there are no technical problems for delivery of DTV programs to the transmitters in the regional SFN network.

Dr. Alexander Brunchenko from the MART Company said that MART might develop a SFN DTV modulator in a few months so that the prototype  
*continued on page 13*

model may be available by the end of the year 2005.

Participants of the meeting agreed that introduction of SFN DTV pilot area may be a good example for further development of SFN DTV networks in Russia that may require

corresponding investments.

The meeting was followed by a Chapter sponsored dinner. During the dinner, the Chapter Chair Dmitry Tkachenko briefly described the technical program and topics presented at the recent 55th Annual IEEE Broadcast Sym-

posium held in Washington D.C. He also reminded the Chapter members about the 2006 IEEE Membership Renewal Campaign. During the dinner a friendly exchange took place among the attendees who shared opinions on various technical and professional topics.

## Activity Report: IEEE Broadcast Technology Society, Taipei

by Ying Li

A distinctive seminar on the past and future of broadcast technology was held on October 28, 2005 at Yuan Ze University (YZU), Chungli, Taoyuan, Taiwan. This seminar had over 120 attendants and was jointly hosted by the IEEE BT Society Taipei Chapter, Yuan Ze University's Communications Engineering Department, and the China Radio Association. The two speakers included Mr. Chi-Tai Chang and Professor C. C. Jay Kuo. Mr. Chang was formerly the Chief Engineer of Central Radio Broadcast Station, the founding chairman of IEEE BT Taipei Chapter, and the Chairman of China Radio Association (<http://www.cra.org.tw/BV50CRA/En/En-Main.aspx>) with 2,300 members celebrating its 50th anniversary this year. Professor Kuo is an IEEE Fellow and a Professor in the EE and Math depart-

ments of the University of Southern California (<http://viola.usc.edu/>).

Mr. Chang's talk, titled "Technical Evolution and History of Radio Broadcasting in Taiwan," described how a radio station was established during the early days of radio. From studio design (involving building acoustics) to microwave link transceiver installations (the engineers used a mirror at one site and binoculars at the other site to determine the 'line of sight'); from impedance matching (weak signals and a burned out transmitter will result from incorrect impedance matching) to antenna grounding, Mr. Chang's informative talk captivated the audience. This was a rare opportunity to learn from a real hands-on engineer whose design experiences spanned such a

wide spectrum from acoustic to microwave frequencies. Mr. Chang kindly gave two sets of his popular books "FM Broadcast Transmission and Receiving" and "Microwave Communications System Design" as gifts to YZU.

Professor C. C. Jay Kuo's talk, titled "Introduction to Digital Media Broadcasting (DMB) Technologies and Systems," gave an overview of modern digital audio/video/media broadcasting technologies, systems and standards. Compared to AM and FM broadcasting which has been in place for more than a half century, digital broadcasting enjoys improved signal quality, bandwidth and power efficiency, thanks to OFDM signaling, error control coding and data compression techniques. The Digital Audio Broadcasting (DAB) system has been standardized and services are taking place in several countries. Digital TV has been deployed in today's satellite (DVB-S) and cable (DVB-C) broadcasting systems. It will be used for terrestrial broadcasting (DVB-T or ATSC) in quite a few countries in 2007. As compared with analog TV (NTSC or PAL), digital TV offers a more flexible platform DVB-MHP to generate new diversified applications such as games, information retrieval, interactive services and advertisement. Furthermore, the convergence of digital TV and mobile IP-based communication facilitated by the new standard DVB-H allows digital TV contents to be delivered to mobile phones. This new digital TV delivery platform opens up



Attendees of the Seminar on the Past and Future of Broadcast Technology, 2005/10/28.

numerous new business opportunities for the IT-enabled service industry. In addition to the overview, Professor Kuo also presented an intuitive intro-

duction to Orthogonal Frequency Division Multiplexing (OFDM) signals displaying numerous diagrams and figures without referring to equations. Addi-

tional information about Professor Kuo's talk can be found at: <http://www.comm.yzu.edu.tw/board/941027.htm>



Speakers: Mr. C. T. Chang (left) and Professor C. C. Jay Kuo (right).



IEEE BT members and YZU students. Top row from left: C. C. Lee, Y. Li, Y. M. Chen, C. T. Chang (speaker), C. C. Jay Kuo (speaker), J. R. Yang, C. C. Hwang, J. K. Hwang, three students, S. J. Chang. Front row and second row: YZU students in graduate schools of Electrical Engineering and Communications Engineering.

## BTS Activity Report: UKRI Consumer Electronics and Broadcast Technology Joint Chapter

During 2005 the IEEE United Kingdom Republic of Ireland (UKRI) Section proposed to its Consumer Electronics Chapter that it also incorporate the UKRI Broadcast Technology members in its organization. The Consumer Electronics Chapter Committee agreed to do this and changed its name to the IEEE UKRI Consumer Electronics and Broadcast (CE/BT) Joint Chapter.

The CE/BT Joint Chapter is governed by a five member Committee chaired by Eur Ing Dr. Simon Sherratt, Senior Lecturer in Consumer Electronics, School of Systems Engineering, University of Reading. Mike Bennett, a member of the BTS AdCom who resides in the UK, met with Dr. Sherratt on behalf of the IEEE Broadcast Technology Society. As a BTS repre-

sentative, Mike Bennett will assist the Joint Chapter with its activities. He also offered to give presentations on broadcast technology developments at future Joint Chapter events.

During 2005, as a newly expanded organization, the UKRI CE/BT Joint Chapter conducted its first two events at the University of Reading. The first event was on 16 November 2005. Dr. Vassilios Chouliaras of the University of Loughbough spoke on Parallelism and Software-Hardware Interface in Consumer-Application Embedded Systems. He discussed an automatic means to extract thread level parallel software for embedded systems and how traditional rigid hardware-software interfaces can be optimized to match temporal and

spacial behaviors of embedded workloads.

The second Joint Chapter event was held on 7 December 2005. Dr. Sandra Woodley of the University of Birmingham gave a presentation on Wearable Computing. Her talk included a review of wearable/ubiquitous computing research directions, challenges and applications, and a look ahead at new potentials in personal medical devices.

The IEEE Broadcast Technology Society extends its heartiest welcome and congratulations to the new UKRI CE/BT Joint Chapter. We wish the Joint Chapter success in all its activities as it brings together members from both the Consumer Electronics and Broadcast Technology Societies.

# Digital Television Developments in East Tennessee--- An Update

by David Bower, IEEE Region 3 Public Information Officer  
and IEEE East Tennessee Section PACE Chair

The IEEE East Tennessee Section hosted a meeting on November 22 titled "Digital television Developments in East Tennessee--An Update," with support from the IEEE Broadcast Technology Society (BTS) and IEEE USA. The program was given by Bob Williams, Chief Engineer of WATE-TV, Knoxville, Tennessee. Bob's presentation started with an overview of early television technology and its impact on history. As part of this overview, he showed the attendees some early television camera pickup tubes; including an image orthicon and iconoscope.

Bob told the audience that the FCC does not mention high definition (HD) in the rules and regulations, nor does it set any standard for digital television except for the transmission bandwidth of 19.4 megabits. He covered the many different scan and compression schemes that are now in existence. As a result, the various television receiver manufacturers have to design and construct TV sets to decode any number of scan line and compression schemes. Further, Bob said: "The last time I counted, which was a few years



**Bob Williams, Chief Engineer of WATE-TV, speaks to the IEEE East Tennessee Section**

ago, there were a total of 39." And on the other side of the equation, manufacturers of television production and distribution equipment also face some difficult challenges regarding the different scan line and compression schemes that need to be supported (i.e. cameras, switchers, etc.).

Bob Williams covered some of the issues regarding antennas for HD

reception over the air and, as he relates, "We really don't yet have a good pulse on digital reception in the area" (i.e. East Tennessee).

The talk continued with what is happening regarding digital television in East Tennessee. Bob covered the 720P and 1080i formats chosen by the major networks and showed a graphic of what the various local stations are planning regarding the transition from analog to digital.

Another technical aspect discussed by Bob concerned the Program and System Information Protocol (PSIP) data stream distributed with the video and audio, which among other things, provides a method for DTV receivers to identify a particular digital television station and receive the information properly. In addition, PSIP identifies the specific digital television channel and the associated analog channel.

The IEEE East Tennessee Section appreciates the support of Tom Gurlley, IEEE BTS President, and Scott Grayson, IEEE USA; for supplying handouts and other materials for the meeting.

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## BTS Members Included in Class of 2006 Fellow Grade

The IEEE Grade of Fellow is conferred by the Board of Directors upon a person with an extraordinary record of accomplishments in any of the IEEE fields of interest. A brief citation is issued to new Fellows

describing their accomplishments and the total number selected in any one year does not exceed one-tenth percent of the total voting Institute membership.

The Fellow Committee has named

271 IEEE Senior Members to Fellow Grade effective 1 January 2006. The new Fellows, who are members of the IEEE Broadcast Technology Society in addition to other Societies, are listed below.

---

### Dr. Steven Best

Air Force Research Laboratory  
Townsend, MA 01469 USA

For contributions to the theory, design, and understanding of electrically small antennas.

### Prof. John Sahalos

Aristotle University of Thessaloniki  
Thessaloniki, 54124 Greece

For contributions to antenna analysis and design.

**Prof. Sitthichai Pookaiyaudom**

Mahanakorn University of Technology  
Bangkok, 10530 Thailand

For contributions to circuits and systems and engineering education.

**Prof. Ulrich Reimers**

Braunschweig Technical University  
Braunschweig, D-38106 Germany

For contributions to the development of Digital Video Broadcasting (DVB)

**Prof. Luc Vandendorpe**

Université Catholique de Louvain  
Louvain la Neuve, B-1348 Belgium

For contributions to digital communications.

**Prof. Masao Nakagawa**

Keio University

Yokohama, Kanagawa 223-8522 Japan

For contributions to the advancement of code division multiple access (CDMA) and mobile communications.

**Prof. Johannes Huber**

University Erlangen-Nuremberg

Erlangen, Bavaria D-91058 Germany

For contributions to coded modulation and digital subscriber line design.

**Dr. Frederick Raab**

Green Mountain Radio Research Co.

Colchester, VT 5446 USA

For contributions to modeling and design of high-efficiency power amplifiers and radio transmitters.

The IEEE Broadcast Technology Society extends its heartiest congratulations to the Fellows of the Class of 2006

## Congratulations to Three BTS Members Recently Elevated to Senior Member Level!

The new BTS Senior Members are:

**Larry Hull**

IEEE Western North Carolina Section

**I. Rabowsky**

IEEE Buenaventura Section

**Marc Walker**

IEEE Utah Section

IEEE Senior Members are honored members of the IEEE organization. We

hope you'll consider joining the ranks of Senior Members. IEEE Bylaw I-105.3 sets forth the criteria for elevation to Senior Member Grade, as follows:

"... a candidate shall be an engineer, scientist, educator, technical executive or originator in IEEE-designated fields. The candidate shall have been in professional practice for at least ten years and shall have shown significant performance over a period of at least five of those years."

When you become a Senior Member, you will receive a bronze and wood plaque, a letter to your employer (upon request), \$25 towards a new Society Membership, the recognition of your peers, and the opportunity to become an executive IEEE volunteer. Visit <http://www.ieee.org/seniormember> for more information. If you would like to become a Senior Member and need some help, please contact your Section Chair, or [a.monroe@ieee.org](mailto:a.monroe@ieee.org)

## BRAIN TEASER - REWARD OFFERED

*"A reward of 500 microfarads is offered for information leading to the arrest of the desperate criminal Hop-A-Long Capacity.*

*This unrectified criminal escaped from a primary cell where he had been clamped in ions, awaiting the gauss chamber.*

*He is charged with the induction of an 18 turn coil named Millibhenry, who was found choked and robbed of valuable joules. He is armed with a carbon rod and is a potential killer. Capacity is also charged with driving a dc motor over a Wheatstone bridge and refusing to let the band pass. If encountered, he may offer resistance. The electro-motive force spent the night searching for him in a magnetic field, where he went to ground. They had no success and*

*believe he returned ohm via a short circuit.*

*He was last seen riding a megacycle with his friend Eddy Current, who was playing a harmonic.*

*In your search for the criminal, please use caution and don't get Hertz. The emitter will gladly pay the collector an appropriate base amount of the reward."*

The above play on words was provided by Tom Wiener, President of the IEEE Sensors Council and Chair of the Society Review Committee. The last sentence was added by Lanny Nass of the BTS.

We welcome you inputs for the brain teaser or other interesting items for the the BTS Newsletter. Please email your input to Lanny E. Nass at [elnass@cbs.com](mailto:elnass@cbs.com).



## IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2006

*"Mobile and handheld systems for entertainment on the go"*

**April 6-7, 2006**

**Las Vegas, NV USA**

**Co-located with CTIA Wireless 2006  
& IEEE WCNC 2006**

Broadcasting, consumer electronics, telecommunications and networking technologies are rapidly converging to create new ways to broadcast rich media content to consumers on the go, via portable devices such as cell phones, PDAs, and video players. This new industry-oriented Symposium will bring together content originators and distributors, wireless service providers, and technology developers and suppliers of equipment, systems, and consumer platforms – focusing on research and development, applications, and implementation of mobile and portable multimedia systems.

### **Potential Topics:**

- Streaming, IPTV, VoIP, VoD, Mobile TV, Wireless Multimedia
- Channel Coding and Error Correction, Modulation, Signal Processing
- Transmission, Propagation, Coverage, and RF Spectrum Considerations
- Advanced Audio and Video Coding, Processing, and Quality Assessment
- Content Re-purposing Technology: Transcoding, Protocols, Formats, Resolution
- Head-end Architectures, Routing/Switching, Server & Storage Devices, IP Encapsulation
- Design Considerations for Mobile & Handheld Devices
- RF, Antenna, Receiver, & Hardware Technologies
- Microsystem Design, System-on-a-Chip, and Memory Technologies
- Advanced Display, Power Management & Battery Technologies
- User Interface & Human Vision and Hearing Factors
- Security & Digital Rights Management, Watermarking
- Automotive Entertainment & Information Systems
- Algorithms, Software, Test Equipment, Standards
- Networks, Services, QoS, Billing
- Field Trials and Service Deployments

**Registration, Program & Hotel Information will be posted at:**  
**[www.ieee.org/bts](http://www.ieee.org/bts)**



**Broadcast Technology Society**  
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## IBC 2005 Report

IBC 2005 took place September 9 – 14, 2005 in Amsterdam, Netherlands. It was a year marked by continued growth, with visitor numbers increasing by 5% to about 43,000. It is also reported that conference registrations rose significantly this year.

The IEEE Broadcast Technology Society presented a joint tutorial with SMPTE entitled “A Review of the Technologies and Standards of High

Definition Television - Both Current and Future” and featuring presentations by: Ken McCann, Zetacast; Matthew Goldman, Tandberg; Ray Baldock, GVG; Glenn Reitmeier, NBC; and Masayuki Sugawara from NHK.

This successful tutorial took place thanks to the efforts of BTS volunteers William Hayes, Yiyan Wu and SMPTE representative Peter Symes. This tutorial was not only well received; the staff

of the BTS membership booth received comments such that this was the best tutorial ever, and that it was not only a great tutorial with important information, that it avoided repetition and was well presented throughout.

We hope you'll join us next year in Amsterdam. Visit the IBC website at: [www.ibc.org](http://www.ibc.org) IBC 2006 dates: Conference: September 7 – 11, 2006 Exhibition: September 8 – 12, 2006



BTS Tutorial at IBC2005



Tom Gurley at IBC2005 BTS Membership booth



Demin Wang & Yiyan Wu at the IBC2005 BTS membership Booth

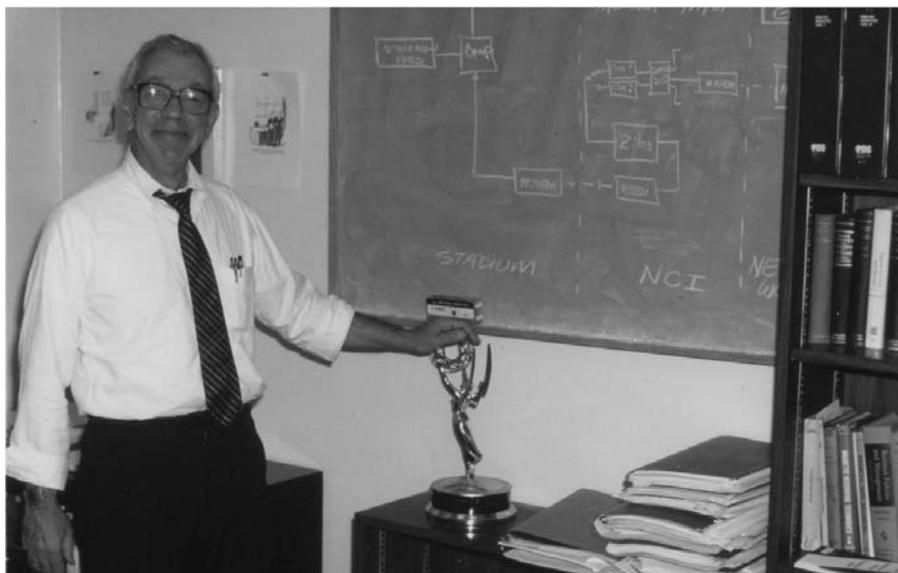
## Obituary – David Sillman

Mr. David Sillman died December 4, 2005 in Washington, DC. He was 83 years old.

Mr. Sillman, a native of New York City, received a Bachelors degree in Electrical Engineering from the School of Technology of the City College of New York in 1944.

Upon graduation he joined the Hazeltine Corporation in Little Neck, NY where he was engaged in research and development of IFF aparati for the U.S. Navy. Following World War II he did research and development in the fields of frequency modulation and television home entertainment receivers. He was a participant in the efforts of the National Television System Committee which resulted in the present color television system and standards.

In 1953, Mr. Sillman, joined the Television-Radio Division of Westinghouse Electric Corporation in Metuchen, NJ as Section Manager of



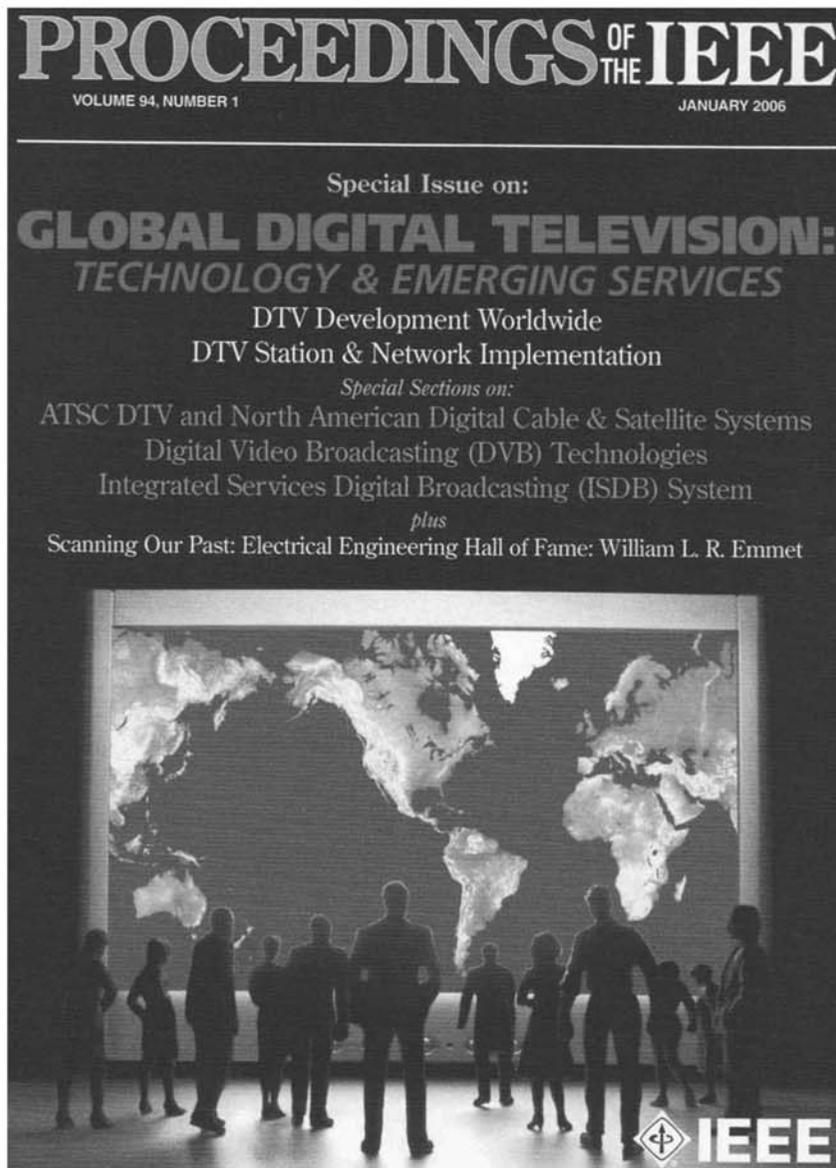
Television Engineering and where from 1964 to 1968 he was Division Engineering Manager.

In 1968, Mr. Sillman returned to Hazeltine Research, Inc. (a subsidiary of Hazeltine Corporation) in Chicago, IL as Vice President and Director of

Research, a position he held until 1976. Among other projects developed at Hazeltine in this period was a system for Closed Captioning of television programs.

*continued on page 20*

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Active 2006 Members of the **IEEE Broadcast Technology Society** will receive a *free* copy of the January 2006 Proceedings of the IEEE bundled with the March issue of the *IEEE Transactions on Broadcasting Technology*.

\*membership must be active on 1 February 2006

# IEEE Broadcast Technology Society Organization

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## Obituary continued

In 1977, Mr. Sillman joined Public Broadcasting Service as Manager of Engineering Planning with prime responsibility for the development of the Closed Captioning System. For this work, PBS was awarded with two emmys (see photo) and the technology is incorporated in virtually every television sold in the United States. Commenting on the benefits of closed captioning for television, David wrote "Let us hope that this will signal the end of exclusion of the hearing impaired from this significant part of our social and cultural life".

Mr. Sillman was also the key engineer on the team responsible for designing, acquiring and installing the PBS Satellite Replacement Project in 1988. He retired from PBS in 1992.

Mr. Sillman was a past member of the Television Allocations Study Organization, and past chairman of the Receiver Panel of the Cable Television Advisory Committee, Broadcast and Television Receivers Group of the Institute of Electrical and Electronic Engineers, and Field Test Task Force (EIA Sub-Committee on Teletext Standards). Mr. Sillman was a Registered

Professional Engineer in the State of Illinois and a Senior Member of the Institute of Electrical and Electronic Engineers and member of the Society of Motion Picture and Television Engineers.

Mr. Sillman was preceded in death by his parents, his sister Doris Bushwick and his first wife, Mildred Morris Sillman. He is survived by his wife of 32 years, Gladys Levitan Sillman, his two children, Deborah Sillman and Sanford Sillman, and two grandchildren, Marian and Joseph Hamilton.

## Mark Your Calendar

for the **BTS Tutorial at NAB2006**

**"IEEE BTS Delivering Television to Handheld Devices: A Technology Tutorial"**

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