

Broadcast Technology Society Newsletter

The technologies to deliver information and entertainment to audiences worldwide, at home and on the go.

From the President



Greetings everyone!

Welcome to my second message as the president of the IEEE Broadcast Technology Society. As I began writing this, I was still sitting in a hotel room in Las Vegas on the 8th day of a 10 day business trip that included attending the PBS Technical Conference and the National Association of Broadcaster convention. It is an extremely busy time for me since I am here at NAB and PBS TechCon as the director of engineering for Iowa Public Broadcasting, the vice chairman of the PBS Enterprise Technology Advisory Committee and President of BTS. Trying to juggle all of the meetings, appoint-

ments, sessions and technology demonstrations is quite a challenge, but I enjoy what I do, so being tired and worn out at the end of the day is a reminder of what I was able to see and accomplish.

As this message began, the BTS AdCom has just completed a quarterly meeting that was held at NAB. I won't go into all the details of what was discussed and decided at the meeting. I would however like to share a couple of observations regarding the BTS' participation at NAB.

Throughout the week, traffic at the BTS booth on the second floor by the South Hall was brisk. The booth was manned by Kathy Colabaugh and various members of the AdCom and BTS officers. I hope that many of you had a chance to stop by and meet with the

BTS representatives that were there. A number of new members signed up at the booth which is always rewarding for the people working there.

On Saturday the 14th of April, IEEE
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From the Editor



This newsletter comes to you with some good news and some sad news. As we were putting the final touches on this edition we learned of the death of Florence Berman. For those of you who did not know Florence she was the wife of longtime BTS member and past President Jerry Berman. I will not go into the many contributions that Florence made to the BTS since they are better covered in a separate piece in this newsletter.

However, on behalf of the BTS, I would like to offer out deepest sympathy to Jerry and his family and to let them know that Florence will be deeply missed by the BTS family.

On a happier note we would like to congratulate Kathy Colabaugh on her promotion to BTS administrator. Kathy has become a familiar face as she filled in for April Monroe prior to April's decision to leave us permanently and become a full time mom. During that period Kathy has done a great job so this is a well deserved promotion. Congratulations Kathy!

The other good news is that BTS
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From the Editor continued

recently concluded two very successful events. The first being our second annual **International Symposium on Broadband Multimedia Systems and Broadcasting** in Orlando, FL and the second being the **BTS Tutorial on Display Technology** at NAB 2007. Both events were well attended and from what I hear well received by those attending. These are both great examples of how the BTS is remaking itself into a society that will much better serve the entire broadcast industry as the lines between traditional broadcasting and other media continue to blur. Although the content of the broadband symposium is out of my area of expertise I did attend in my capacity as society Vice President. Beyond the content of the symposium, the two things that give me great hope for our society were the age of both the attendees and the presenters (many were young enough to be my kids) and the large number of countries represented. Both of these bode well for the society's future.

These were great events for our society but we are not stopping there. The IBC is fast approaching and the BTS will be presenting another tutorial there, plus having our usual booth presence and a likely large contingent of AdCom members since that will be the venue for the next meeting of the AdCom. It was decided at the AdCom meeting held in April, at NAB 2007, since the BTS is a major partner in IBC and receives a substantial amount of rev-

Newsletter Deadlines

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

Issue	Due Date
Fall, 2007	July 20, 2007
Winter, 2007	October 20, 2007
Spring, 2008	January 20, 2008
Summer, 2008	April 20, 2008

enue from that event, holding our meeting there would be educational for the AdCom members who have never attended IBC and also to demonstrate our interest and commitment to our other IBC partners.

Then to conclude the year will be the **57th Annual IEEE BTS Broadcast Symposium**. This symposium seems to get better every year and our symposium committee is hard at work to make this one the best ever. It will take place over three days beginning on October 31, 2007 and be held once again at our old home the Hotel Washington in Washington, DC. This could be the last time to attend at the Hotel Washington since the hotel has been sold and the new owners are reported to be planning a major renovation that will also mean a huge increase in cost to use the hotel. The expected cost increase may make it

economically infeasible to hold future symposiums there so take this opportunity to say Goodbye to our old friend. Please check out the announcement inside this issue and plan to attend.

Things seem to be really looking up for the BTS and that is also evidenced by the size and content of both our transactions and the newsletter. This issue of the newsletter will be the largest since I became editor and the thanks goes to all of you who have volunteered your time and knowledge to provide the content and to Ted Kuligowski who keeps everyone's feet to fire to get it all done. Many thanks to all for the great effort and keep it coming. It sure makes my job easy.

Bill Meintel
wmeintel@computer.org

From the President continued

BTS presented a half day tutorial on Video Display Technology which I was able to attend. AdCom member David Bancroft of Thomson pulled together and chaired an excellent program with the aid of Fox's Richard Friedel among other very active AdCom members. The tutorial was well attended, I estimate more than 200 people attended and based on the feedback we received at the booth, the session was very well received. I was fortunate enough to be able to attend the entire session and since I was not on the program, I was actually able to enjoy the presentations without worrying about the logistics of the event. From my experience I want to offer my con-

gratulations to David, the team that pulled together the session and presenters on one of the most useful and informative tutorials I have attended.

Some post NAB news that may be of interest to BTS members in general is the promotion of Kathy Colabaugh to the BTS administrator position. Kathy had been the interim administrator for the society while April Monroe was on maternity leave and has decided to focus on being a full-time mom. This is one of those classic good news bad news situations for BTS in that we are all extremely happy for April and support her decision but we are also saddened that she will not be with us any longer. Fortunately we also have a

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good news more good news situation with Kathy in that she has been doing an excellent job for the interim and will now continue as the permanent administrator. Of course since Kathy was the support person for the BTS Transactions, she leaves a gap there.

We will be working diligently with the IEEE offices to fill that vacancy.

I figured I'd keep this update brief since I'd like to have you read it all. Remember that BTS will be in Amsterdam at the IBC in September and conducting our annual Symposium in

Washington, DC in October. If you plan on attending these events, I would welcome the opportunity to meet you in person, say hello and find out what BTS can do to become a more valuable asset to you. Take care.

Bill

In Memory of Florence Berman

Florence Berman, wife of Gerald Berman, past president and long time activist of the Society, passed away May 18th after a heroic battle with acute leukemia.

Florence's smiling face was a regular at our membership booths at NAB and IBC, and at our Society events. Before we had a Society Administrator, volunteers always ran the booth. Florence could always be counted on for support. Often, Jerry and other Society members, would be busy with conference and IEEE business, and there would be Florence running things in the booth and signing up new members. She was frequently accompanied by Sally Kuligowski, Ted's wife, and Kareen Hunter, past president Bruce Hunter's wife.

Florence's involvement began a number of years ago the first time we had a membership booth in Amsterdam at an IBC convention. Jerry was busy setting up the booth and discovered



that all of the materials he had ordered from IEEE for the booth had not arrived. Desperately, he called Florence at the hotel, who was in the middle of a good bubble bath, and asked her to hurry over to "man" the booth while he tried to jury rig signs. Florence ran over and sat in the booth, empty except for two chairs and a table. As Florence used to tell it, people would come by and

ask what the booth was about. She'd say the "IEEE Broadcast Technology Society." When pressed about what the Society was all about she'd say, "you have to wait for my husband, I'm a marriage and family counselor." Well, news got around the convention floor and pretty soon she was busy listening to family problems, gratis of course!

Florence quickly learned about the Society and turned out to be one of the best recruiters we ever had. Her technique was simple. Guilt! When someone came by she'd ask if he or she was a member. Invariably, when the answer was no, she'd retort, "how can you be a serious broadcast engineer and not be a member of the Society." With her personality and smile it worked almost every time!

Florence will be missed by all who knew her, and especially by Jerry who often referred to her as his best friend, partner and companion.

BTS Events Featured at CTIA WIRELESS 2007

by Tom Gurley, BTS Junior Past President, and Co-chair, IEEE Broadband Multimedia 2007 & Portable 2007
Photos by Kathy Colabaugh, BTS Society Administrator

BTS sponsored two of the three conferences comprising "IEEE @ CTIA WIRELESS 2007", held March 25-29 at the Orange County Convention Center in Orlando, Florida. Co-located with the second edition of our IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (Broadband Multimedia 2007) were the IEEE International Conference on Portable Information Devices (Portable 2007) – an interdisciplinary, intersociety event co-sponsored by

BTS – and the IEEE Mobile WiMAX Symposium, sponsored by the Communications Society under its WCNC (Wireless Communications and Networking Conference) flag.

This year's Broadband Multimedia Symposium was even more successful and diverse than last year's inaugural event in Las Vegas – with more participants, representing some twenty-two countries. It also had a good balance between academic papers and those from industry and research labs, and the

attendees' evaluations gave this year's program very high marks. Admission to the CTIA WIRELESS exhibits and keynotes was included with registration again this year, and registrants could also attend the other co-located IEEE events at reduced rates. About a third of our attendees also registered for one or both of the other events.

Next year, Broadband Multimedia returns to Las Vegas, co-located with IEEE WCNC 2008 and CTIA WIRELESS 2008 during the week of March 30.



Dr. Claire Gu of the University of California, Santa Cruz, speaks on "Nanotechnologies and PIDS" at the Monday Luncheon of Portable 2007. Portable was sponsored by the IEEE Technical Activities Board (TAB) New Technology Directions Committee (NTDC) and four societies: BTS; Communications (ComSoc); Components, Packaging, and Manufacturing Technology (CPMT); and Electron Devices (EDS). Technical co-sponsors were the Engineering in Medicine and Biology Society (EMBS), the Vehicular Technology Society (VTS), and the University of California at Santa Cruz (UCSC).



Nash Parker of Alcatel-Lucent leads off the Opening Plenary Session of Broadband Multimedia 2007 with a talk entitled, "From IPTV to IP Multimedia...the Next Generation of Communications and Entertainment."



Jean Macher, Thomson Grass Valley, addresses the Opening Plenary on "Experience in the Deployment of Mobile TV & IPTV Technologies."



Symposium Co-Chair Tom Gurley welcomes attendees to the Wednesday Keynote Luncheon.



Kay Johansson, Chief Technology Officer of MobiTV, keynotes the Wednesday Luncheon.



BTS Administrator Kathy Colabaugh pauses for a photo at the Poster Session.



Wednesday afternoon's Poster Session provided an opportunity for authors and attendees to interact with each other.



Coffee breaks were good networking opportunities for attendees. Financial support was provided by Corporate Patrons Mitsubishi Electric and Grass Valley.



Technical Program Co-chair, Yiyun Wu of the Communications Research Centre Canada (left) with Jonathan Loo of Brunel University, UK, who chaired the Technical Session on Content Protection & Watermarking.



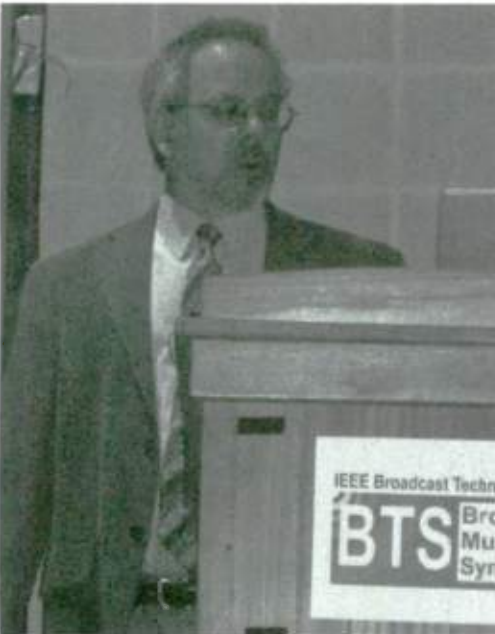
Old friendships were renewed and new ones were made at the Wednesday Evening Welcome Reception, which featured a light buffet dinner. The carving station can be seen in the background. At the table, left-to-right, are Peter Unger, Technical University of Braunschweig, Germany, Transmission Technology Session Chair; Prof. Stephane Coulombe, University of Quebec, Canada; Philipp Steckel, Technical University of Braunschweig, DTV Systems Session Chair; Pascal Marcoux from the Canadian Broadcasting Corp., and Sabri Gurbuz, NICT Cognitive Information Science Labs, Kyoto, Japan.



The Orlando Jazz Trio provided entertainment for the Welcome Reception.



Seated are Jinyun Zhang of Mitsubishi Electric, USA, Co-chair of the IPTV 2 Session, and Demin Wang of the Communications Research Centre Canada (CRC), Technical Program Co-chair. Standing, left-to-right, are Yuwei Zhang, Genesis Microchips, USA; Wei Li of CRC; Jian Song of Tsinghua University in Shanghai; Yongheng Liu, University College Dublin, Ireland; and Guoping Tan of Saarland University, Germany.



Michael Needham of Motorola Labs speaks at the Thursday morning Plenary Session on "Networking Support for Immersive Collaborative Applications."



Seated, left-to-right, are Luca Superiori, Vienna University of Technology, Austria; Raffaele Di Bari, Brunel University, UK; Pablo Angueira, University of the Basque Country, Spain; Ravin Sachdeva, STMicroelectronics, India; and Unai Gil, University of the Basque Country. Standing, from the left, are Jukka-Pekka Laulajainen, VTT Technical Research Center of Finland; Tero Jokela, University of Turku, Finland; Heidi Himmanen, University of Turku; and Ivan Pena, University of the Basque Country.



Roland Schaller of UDCast, France (left), stands with Keynote Speaker Kari Lehtinen of Modeo LLC and Symposium Co-chairs Brett Jenkins and Tom Gurley, following the Thursday Luncheon.



Three IEEE conferences – Portable 2007, Mobile WiMAX '07, and Broadband Multimedia 2007 – were co-located with CTIA WIRELESS 2007 at the Orange County Convention Center in Orlando, Florida USA. Some 275 people registered for one or more of the IEEE events.

IEEE BTS Contributes to Successful NAB2007

NAB2007 held April 14-19, 2007 in Las Vegas, garnered near-record attendance with 108,232 registered attendees including an unprecedented 26,824 international attendees from 141 countries. The show also featured national and international news, policy announcements, vendor news and keynotes from industry leaders and regulators. Visit the NAB Show Week section of the NAB2007 Web site (www.nabshow.com) for details of key sessions and webcasts of selected sessions.

IEEE BTS Information Booth

The IEEE BTS Information Booth was highly successful this year with a constant stream of visitors asking about the services and benefits IEEE BTS provides to its members through technical publications, conferences and symposiums. The booth was located at the NAB site "L27" on the upper level near the escalator in the LVCC South Hall Lobby.

IEEE BTS representatives also answered general questions about IEEE global organization and services. Through its global membership, IEEE is a leading authority on areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics, among others. The

BTS offers its thanks to Kathy Colabaugh, BTS Administrator, for coordinating, planning and staffing the BTS Information Booth. The BTS also extends its thanks and appreciation to several BTS members who generously volunteered their time to staff the IEEE BTS Information Booth including Mike Bennett, Valentino Trainotti, Yiyan Wu, James Fang and Dmitry Tkachenko for their kind assistance and time.

NAB2007 Broadcast Engineering Conference and IEEE BTS Tutorial

Covering broadcast and broadcast-related technologies in-depth, the 61st annual Broadcast Engineering Conference focused on issues relevant to practicing broadcast engineers and others concerned with future technology trends for the broadcast industry. The IEEE BTS presented a four-hour Tutorial on Video Display Technology at NAB2007, on April 14, 2007, starting at 1:00PM and ending 5:00PM at the Las Vegas Convention Center in Room S226/227.

IEEE BTS Tutorial Summary

Video display technology has undergone a sea change over the last decade, as LCD, plasma, and DLP devices have all but supplanted the venerable CRT in consumer applica-

tions. Recent developments have improved such parameters as dynamic resolution, viewing angle, contrast, and color gamut – long-held advantages of the CRT – challenging its continued dominance even for critical professional viewing. However, challenges remain in achieving standardization of color gamut, contrast range and other parameters across these new replacement technologies, for content creators to continue to achieve consistent quality control.

This half-day tutorial was presented by the IEEE BTS, a co-sponsor of the IEEE/OSA Journal of Display Technology. The tutorial was presented by leading technical experts representing user groups, manufacturers, researchers and standards organizations. They explained recent video display developments within the context of both consumer and professional applications.

Program

This IEEE BTS program was planned and organized by David Bancroft and Richard Friedel, BTS AdCom members, and Tom Gurley, who served as President of the IEEE Broadcast Technology Society during the past five years.

David Bancroft, Manager of Advanced Technology, Thomson



"Hans Hoffmann - Senior Engineer of the EBU explaining a new HDTV subjective testing method with Flat Panel Displays"

Grass Valley, United Kingdom, served as Moderator of the NAB2007 - IEEE BTS Tutorial. He opened the tutorial by presenting an overview of the topics, introduced the presenters and then moderated a panel discussion following their presentations.

The topics and presenters were:

1. "Impact of Today's HDTV and Future Formats on Perceived Quality with Flat Panel Displays" by Hans Hoffman, Senior Engineer, European Broadcasting Union, Grand Saconnex, Switzerland.
2. "Displays in the Production Environment - The Broadcasters' Requirements" by Richard Salmon, Senior R & D Engineer, Digital Media Group BBC Research, Tadsworth, United Kingdom.
3. "The Challenge to Measuring Display Performance: Whom Do You Trust?" by Paul Boynton, Electronics Engineer, National Institute of Standards and Technology (NIST), Gaithersburg, MD.
4. "An Overview of Current Display Technologies and Performance Benchmarks" by Peter Putman, Publisher, HDTVexpert.com, Doylestown, PA.
5. "A Display Manufacturer's Perspec-

...tive and Description of Latest Flat Panel Proposal for Professional Monitoring Use" by Gary Mandle, Senior Product Manager, Sony Electronics Inc, Culver City, CA.

More than 200 people attended the tutorial and received CD's with copies of the presenters' PowerPoint presentations.

As reported by Hans Hoffman, the presentation triggered a number of questions and comments from the participating audience. Hans Hoffmann presented a new subjective testing method for HDTV using three large flat panel displays. Comments from the audience agreed with Hoffmann's test results that the use of flat panel displays for viewing HDTV in homes is best served by progressive HDTV signal standards. An interesting discussion, however, occurred about the topic of how consumer flat panel displays can be built and specified, so that they provide HDTV images in the quality that was intended by the creative choice of the producers.

Overall the event and the high interest of the audience have proven that IEEE is addressing a topic of relevance for the professional audiovisual community.

BroadcastAsia2007 IEEE BTS Representation

BroadcastAsia2007

Asia's leading digital multimedia and entertainment technology event, BroadcastAsia, will return to the Singapore Expo Center from 19-22 June to showcase the latest digital technology, professional equipment and services. Over 800 exhibiting companies including Harris, Sennheiser, Miranda, Vizrt, Magna, Innocus, Conax and Qualcomm will demonstrate a full spectrum of products and applications from media content creation to delivery including new technologies birthed as a result of digital convergence. Strong group participation is also expected at BroadcastAsia2007

with pavilions from Singapore, China, France, Germany, Italy, Korea, USA and UK.

IEEE BTS Information Booth

Dr. Yiyan Wu and members of the IEEE BTS Taipei Chapter will be staffing an Information Booth in Singapore Expo Hall location 8/8G2-05. Dr. Yiyan Wu, BTS Transnational Chair and Editor-in-Chief of the IEEE Transactions on Broadcasting, and the BTS Taipei representatives will be available to provide information and answer questions about the goals, benefits, services and technical publications provided by the IEEE and, in particu-

lar, the IEEE Broadcast Technology Society.

The IEEE BTS extends its thanks and appreciation to Dr. Wu for his hard work in leading this activity, to the BTS Taipei Chapter representatives for volunteering their time staffing the booth, to Kathy Colabaugh, BTS Administrator for assisting with this effort and the IEEE Singapore Office for its support with the logistics of receiving materials and publications to be displayed at the IEEE Information Booth.

For the latest information about BroadcastAsia2007, please visit www.broadcast-asia.com

IEEE BTS Representation at IBC2007

The IEEE BTS will staff an information booth at the 2007 International Broadcasting Convention (IBC) from 6 through 11 September 2007 at the RAI Convention Center in Amsterdam, Netherlands.

The IEEE BTS booth will be located at IBC Exhibition Stand Number 8.750b in the RAI Convention Center. We will be in the same familiar location as last year in the lobby of exhibit hall 8.

You are invited to stop by and meet with the BTS representatives Bill Hayes, BTS President, Mike Bennett, BTS AdCom, Yiyang Wu, BTS Transnational Chair and Editor-in-Chief IEEE Transactions on Broadcasting, and Kathy Colabaugh, BTS Administrator. They look forward to meeting you and will be glad to help you with any questions you may have about the IEEE and the BTS.

IEEE BTS Tutorial at IBC2007

IEEE BTS will be hosting a tutorial session during IBC2007. The details are:

Conference Theme: Broadcasting by Broadband

BTS Tutorial Title: IPTV Tutorial – The technology behind broadband broadcasting

Session Moderator: Dr. Yiyang Wu
Communications Research Centre
Canada

Presenters:

1. Introduction to IPTV
Dr. Wei Li
Research Scientist, Communications Research Centre Canada
IPTV Networks and QoE (Quality of Experience)
2. Mr. Nick Fielibert
CTO & Chief Architect
Europe&Asia, Scientific Atlanta / Cisco
3. IPTV End Systems (middleware, home network, terminal devices)
Dr. Shuji Hirakawa, Secretary, IEC
TC 100 / Toshiba Corporation

Date: Thursday, 06 September 2007

Time: 11:30 -1300 hours

Location: Forum Room (can accommodate up to 750 people)
Located in the Conference Center
RAI Convention Center

Synopsis:

Internet protocol television (IPTV) has been a hot topic in recent years. IPTV can deliver broadcast television and other multimedia services over secure, managed, IP-based broadband networks with the required level of quality of service. It can also provide bundled service offerings that encompass internet access, audio/video/data and interactive services, as well as mobile delivery.

IPTV is being regarded as a great business opportunity - a multi-billion dollar market - for content providers, service providers and equipment manufacturers. With ever-increasing investment in broadband networks, and fibre to the home, the door is open to a seemingly endless array of services and a fully converged network experience for consumers.

This tutorial provides a high level overview of IPTV network architectures and underlying technologies. As far as possible, the issues will be illustrated with field trial and deployment case studies. IPTV issues to be discussed include:

- * architecture overview
- * underlying technologies
- * end systems
- * quality of service and performance management
- * network control
- * middleware, application and content platforms

Speaker bios

Dr. Wei Li is a Research Scientist with the Communications Research Centre Canada (CRC). Dr. Li received his Ph.D. degree in Electrical Engineering from INSA of Rennes, France in 1996. Before joining CRC, he was a Research Fellow with the CARTEL of the University of Sherbrooke, Quebec, Canada in 1997 and 1998. From 1999 to 2001, he was a software engineer at Motorola Canada Software Centre (MCSC) in Montreal. His current research interests include broadband wireless system, IPTV and DTV system engineering, broadband multimedia processing, digital signal and image processing.

Mr. Nick Fielibert is the chief technical officer and chief architect for Scientific Atlanta's (a Cisco company) European and Asian operations. He is responsible for developing and directing the technical roadmap and the systems architectures for Scientific Atlanta products for the European and Asian markets. His areas of focus include the development of cutting-edge technologies to provide innovative ways of delivering increasing amounts of content, such as new IP-based digital distribution systems. Mr. Fielibert possesses a detailed understanding of the current and future demands of the cable television, broadcast and telecommunications industries, which can help Cisco/SA new products exceed customers' expectations.

Mr. Fielibert has 22 year working experience in R&D and marketing. He was a senior vice president and chief oper-

See IBC 2007 continued on page 25

Plan to Attend the IEEE 57th Annual BTS Broadcast Symposium 31 October through 2 November 2007

The 57th Annual Broadcast Symposium, presented by the Institute of Electrical and Electronics Engineers (IEEE) Broadcast Technology Society (BTS) will be held at the Hotel Washington, Washington, DC, USA on November 1st and 2nd, 2007. Preceding the Symposium will be an engineering tutorial, also at the Hotel Washington, on Wednesday, October 31, 2007.

Broadcasting remains a dynamic, constantly evolving technology, particularly in light of the sweeping changes brought about by digital transmission for radio, television, multimedia and Internet broadcasting. The mission of the IEEE Broadcast Technology Society (BTS) is to present the latest technical developments in all aspects of digital broadcasting through its annual Symposium and its publications, including the quarterly IEEE Transactions on Broadcasting. The BTS consists of over 2,000 members worldwide with chapters located in Beijing, China; New York USA; Philadelphia USA; Moscow, Russia; Shanghai, China; St. Petersburg, Russia; Ottawa, Canada; Seoul Korea, Tokyo, Japan; Taipei, Taiwan; and Buenos Aires, Argentina.

The 2007 Broadcast Symposium will include presentation of 20 papers over two days that address radio and television transmission systems concerning digital broadcast systems being developed and implemented worldwide for terrestrial, cable, satellite, Internet and wireless. Technical areas to be covered during the Symposium include IPTV, Mobile TV, Wireless Multimedia, transmission, propagation, reception, and re-distribution of broadcast signals.

The Symposium also expects to share knowledge regarding advanced technologies and systems for emerging broadcasting applications to include reception and transmission, wireless broadband networks, e.g. IEEE 802.22 Wireless Regional Area Networks (WRANs), and information

technology for broadcasters.

The 2007 BTS Symposium program starts on Wednesday, October 31st, 2007, with an all-day tutorial. The tutorial is tentatively planned to address Digital Television systems evolution and DTV Transition issues.

The four technical sessions being planned for Thursday and Friday, November 1st and 2nd are Advanced Radio Broadcasting, Cable Television and IPTV, Mobile Digital Television Engineering, and Satellite for broadcasters. Technical paper presentations will take place each morning and afternoon with each session typically consisting of five 30-minute technical papers or a panel discussion.

An awards luncheon will be held on November 1st during which IEEE volunteers will be recognized for their time and dedication given to the IEEE Broadcast Technology Society and to the IEEE profession. On November 2nd a joint IEEE/Association of Federal Communications Consulting Engineers (AFCCE) luncheon will be held with a key note speaker from the broadcast industry.

The IEEE BTS welcomes all engineers, consultants, and others associated with the broadcast industry to attend the 57th Annual Broadcast Symposium. This event offers the latest engineering information about the cutting edge broadcast technologies for advanced digital radio, TV, antennas, propagation, cable, satellite, Internet, mobile digital TV and Wireless Multimedia..

Event Date: October 31 through November 2, 2007

Sponsor: IEEE Broadcast Technology Society (BTS)

Event: 57th ANNUAL IEEE BTS BROADCAST SYMPOSIUM

Place: The Hotel Washington, 15th & Pennsylvania Ave., N.W. Washington, D.C. 20004 USA Ph: +1 202-638-5900 or

+1 800 424 9540

Fax: +1-202-638-1594

Email reservations directly to the Hotel Washington at: reservations@hotelwashington.com or call + 1 800 424 9540 (U.S. & Canada only) or + 1 202 638 5900 (International).

Please be sure to mention IEEE 2007 Broadcast Technology Symposium. Include your arrival and departure dates and any special requests such as Smoking/Non-Smoking, etc.

Time: Tutorial Session 9:00 AM to 5:00 PM on October 31st
Technical Program 9:00 AM to 5:00 PM on November 1st and 2nd
Awards Luncheon 12:00 Noon, November 1st
Joint IEEE BTS/AFCCE Luncheon 12:00 Noon, November 2nd

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For information about the Broadcast Technology Society activities and membership, visit the BTS web site at www.ieee.org/bts or contact Kathy Colabaugh, Administrator, IEEE Broadcast Technology Society, at +1.732.562.3906 or by e-mail at k.colabaugh@ieee.org

For information about the Symposium, visit the BTS website at <http://www.ieee.org/organizations/society/bt/index.html> or contact Kathy Colabaugh, Administrator, IEEE Broadcast Technology Society, at +1.732.562.3906 or by e-mail at k.colabaugh@ieee.org

Kathy Colabaugh Promoted to BTS Administrator

The IEEE Broadcast Technology Society is pleased to announce that Ms. Kathy Colabaugh was promoted to BTS Administrator effective 26 April 2007. Kathy is managing the day-to-day BT Society administrative activities by coordinating society planning, symposiums, meetings, projects and new initiatives with the AdCom Offices, AdCom members, Committees, members and serving as the BTS interface with all elements of the IEEE organization.

Kathy first joined the BTS office in Piscataway, New Jersey in June 2001 when she came aboard as Publications Administrator for the IEEE Transactions on Broadcasting. She quickly learned the peer review process and continuously made numerous improvements to the processing of manuscripts submitted for publication by shortening the time to confirm receipt of manuscripts, coordinating with the Editor-in-Chief, distributing manuscripts to Associate Editors and to Referees in a timely and efficient manner. She organized monthly teleconferences electronically distributing agendas and manuscript status reports for the BTS Publications Committee under the direction of the BTS Vice President with participation by the BTS web site designer,



Newsletter Editor, BTS Transactions Editor-in-Chief and Associate Editors.

During the past five years, Kathy has effectively administered all the publications activities during which the number of manuscripts submitted to BTS increased from 70 in 2001 to 272 manuscripts in 2006. Throughout this time, Kathy has provided prompt, efficient administrative coordination and correspondence with the Transactions Editor-in-Chief, Associate Editors, Referees, Authors and IEEE Publications Production staff.

In August 2006, April Monroe, the BTS Administrator, went on maternity

leave. Kathy assumed her duties as acting BTS Administrator. In this capacity Kathy carries out a challenging spectrum of time critical BTS Administrator duties. In addition to her regular day-to-day IEEE BTS office activities, Kathy's duties also include supporting the BTS Committees with planning, coordinating and staffing the annual IEEE BTS Broadcast Symposium in Washington DC and the IEEE BTS International Symposium on Broadband Multimedia Systems and Broadcasting in the US. Kathy is also the BTS focal point for coordinating plans, tutorials, logistics and BTS representation at the annual International Broadcasting Convention (IBC) in Amsterdam and the National Association of Broadcasters (NAB) Convention in Las Vegas.

In April 2007, Kathy was officially promoted by the IEEE to the position of BTS Administrator. She continues accomplishing all the Society Administrative functions in an efficient, professional manner for the AdCom, BTS members and IEEE staff. The BTS Officers and AdCom extend their best wishes and support to Kathy for her continuing success as Administrator of the IEEE Broadcast Technology Society.

BTS Chapter Reports: IEEE BTS Argentina Chapter Report

by Valentin Trainotti, Chair

Upcoming presentations and seminars to be conducted by the IEEE BTS Argentina Chapter are:

Date and time: 7 June 2007 at 6:00 PM
Speaker: Eng. Jorge Osow
Title "Cellular, PCS and Trunking Antenna Technology"

The presentation will include topics on: Dipole Concept, dBi/dBd Antenna Gain, Basic Radiators: Vertical and Horizontal Radiation Patterns, Mechanical and Electrical Pattern Squints, Omnidirectional Antennas, Special Applications, Anechoic Chambers, Radiation System Patterns of Several Buenos Aires Installations,

and Directional and Sector Antennas.

Date and Time: 20 and 21 June 2007 at 6:00 PM

Speaker: Eng. Eduardo Mariani
Title: "Grounding and Equipment Protections"

This presentation will cover Grounding Systems for Low Voltage Installations, ANSI/IEEE 142 Standard, Concepts on Separated Groundings, Neutral Point and Security Groundings, Armonic Components on Non Linear Loads, Atmospheric Discharge Groundings, IEC and NFPA Standards, Grounding Geometry, Lightning Road Coverages, and the ANSI/IEEE 80 Standard

Date and Time: 4 July 2007, 3:00 PM
Title: FM and TV Transmitting Antenna Technology

Speakers (by video conference): Thomas Silliman and Kinsley Jones, ERI Inc., Chandler Indiana, USA

Date and Time: 5 July 2007 3:00 to 6:00 PM
Event: Seminar at IEEE BTS Argentina Chapter, 744, Buenos Aires, Argentina

Date and Time: 11 July 2007 at 10:00 AM
Event: Technical Visit to LSA Radio Continental AM 590 KHz 100 KW Transmitting Station. Visit will include members of the IEEE UTN Student Branch with a technical presentation by Valentino Trainotti to students who will soon be receiving their degrees in electronic engineering.

IEEE BTS Japan Chapter Activity Report

by Keiichi Kubota, Chair

BTS Japan Chapter had two joint meetings below with the Institute of Image Information and Television Engineers (ITE) during February to April 2007.

A technical meeting was held on February 9, 2007 at NHK Hiroshima Station, Hiroshima, Japan. There were six technical presentations on transmission technologies for digital terrestrial broadcasting and general topics for broadcasting technology and one special topic for Digital Rights Management for Advanced Digital Broadcasting.

On February 23-24, 2007, a technical meeting was held in Kyuka-village Minami-izu, Shizuoka, Japan. There were seven technical presentations on



Mr. Imaizumi's presentation on "Digital Rights Management for Advanced Digital Broadcasting" at Hi-Vision theatre in NHK Hiroshima Station

video compression, antenna and transmission technologies for digital terrestri-

al broadcasting and general topics for broadcasting technology and one special topic on overview and service strategy of ISDB-T One-Seg mobile multimedia data broadcasting.

The BTS Japan Chapter is planning to have four joint meetings below with the Institute of Image Information and Television Engineers (ITE).

June, 2007 at Kikai Shinko Kaikan, Tokyo, Japan.

July, 2007 at Hokkaido University, Sapporo, Japan.

October, 2007 at NHK Nagoya Station, Nagoya, Japan.

January, 2008 at NHK Fukuoka Station, Fukuoka, Japan.

IEEE BTS New York Chapter Report

by Warner Johnston, Chair

The NY BTS Chapter participated, along with Women in Engineering, the Power Engineering Society, the Tappan-Zee subsection of the New York section and the New York section in the Lower Hudson Engineering Expo.

Expo 07 is an annual event, with major sponsors being the NYSPE and the McLaren Engineering Group,

aimed at the high school student and middle school student who have an interest in a career in Engineering. Over 80 engineering employers, professional societies and colleges participated, drawing well over 300 students to the all day event, a 40% increase over last year. This year the event was held at the Westchester Community

College on March 25.

Warner Johnston will be addressing the Institution of Engineering and Technology (IET) New England Network on the subject of Closed Captioning. This will take place on October 26 in Sturbridge, Massachusetts during a joint meeting with the IEEE Worcester County Section.

IEEE Philadelphia Signal Processing/Broadcast Technology/Consumer Electronics (SP/BT/CE) Chapter Report

by Gail Rosen, Chair

It has been an eventful year for the IEEE Philadelphia SP/BT/CE chapter. In Jan. 2007, Dr. Gail Rosen, assistant professor in Electrical and Computer Engineering at Drexel University became chapter chair. On April 17th, the SP/BT/CE and the Power Engineering/Industry Applications (PE/IA) both sponsored an IEEE Night meeting at the Sheraton Hotel in University City with 30 attendees. There, Dr. Rosen

presented on her research lab's work in a presentation titled "Signal Processing for Chemotaxis-Inspired Design and DNA Analysis". Also at the co-sponsored meeting, Dr. Stan Bumble, Adjunct Professor of Engineering, Physics and Mathematics, at the Community College of Philadelphia spoke about "Networks and Pathways to a Sustainable Planet Energy Production and Environmental Health".

Dr. Rosen's presentation described the field of bio-signal processing and using biological complexity to engineer better systems. Two areas were identified as critical to understanding biology: 1) examining the overall biological function and 2) evaluating these systems in environmental (i.e.: turbulent) conditions. The Bio-Signal Processing (BSP) Laboratory at Drexel University models bio-systems such as DNA struc-

ture and chemotaxis, the way a single-cell mobilizes in response to a chemical gradient. The lab is engineering new techniques and devices for chemical tracking using bio-inspired signal processing methods. It was shown how a model of cellular membrane-receptor cooperation with modified Hebbian learning was effective in locating chemicals. Also, methods for structure discovery and analysis in DNA via

coding, communication and signal processing theory were discussed.

Dr. Stan Bumble spoke about modeling microbial metabolic networks. A new computer method was described that can help improve efficiency, cost and environmental benefits to both new and old control processes and to convert both old and new feedstocks to fuels for energy. The control-theoretic model may also help the new

fields of systems biology and synthetic biology to supply energy by harnessing microbial metabolic networks to produce fuels of the future.

The Philadelphia SP/BT/CE Chapter will be co-hosting another IEEE Night in the Fall. For more information about the IEEE SP/BT/CE Philadelphia Chapter, contact Gail Rosen, Philadelphia SP/BT/CE Chapter Chair at gailr@ece.drexel.edu.

IEEE Russia Northwest Joint Chapter Report for Broadcast Technology, Consumer Electronics and Communications

by Dmitry Tkachenko, Chair

During 2006, the following activities of the IEEE Russia Northwest Joint Chapter took place:

1. Chapter Chair Dmitry Tkachenko took part in the IEEE Broadcast Technology Society Administrative Committee meeting in Las-Vegas on 7 January 2006.
2. The Chapter participated in the International Conference CSTB 2006 in the framework of the exhibition CSTB 2006 (Moscow, Exhibition Center "Sokolniki", 6-9 February 2006). The conference was organized by the MIDEXPO Company in association with International Broadcasting Convention (IBC), International Association of Broadcasting Manufacturers (IABM), Cable TV Association of Russia and other organizations. 77 papers were presented at the conference.
3. The Chapter took part in organizing the 6th International Conference on Next Generation Teletraffic and Wired/Wireless Advanced Networking NEW2AN 2006 (St.Petersburg, 29 May – 2 June 2006). The conference was organized by Tampere University of Technology (Finland) and

4. Members of the Chapter actively participated in the meeting with IEEE President Michael Lightner in St.Petersburg on 11 May 2006.
5. Chapter Chair Dmitry Tkachenko took part in Regional Chapter Chairs Congress organized by IEEE Communications Society in conjunction with ICC'06 conference in Istanbul, Turkey on 11-13 June 2006.
6. The International Symposium on Mobile Communications was organized under the leadership of Prof. Mstislave Sivers, who is an active member of the Chapter (St.Petersburg, 27 – 28 June 2006). 18 papers were presented at the Symposium.
7. IEEE Tenth International Symposium on Consumer Electronics ISCE 2006 was held in St.Petersburg on 28 June- 1 July 2006. The Chapter was a key organizer of this symposium together with St.Petersburg State University of Film and Television. ISCE 2006 Chair Prof.

Konstantin Glasman is an active member of the Chapter. 140 papers from 22 countries were presented at the Symposium.

8. The Chapter took part in organizing a welcome reception for ISCE2006 participants that was held on June 28 with financial support from the IEEE Broadcast Technology Society.
9. A technical meeting of the Chapter took place at MART Company in St.Petersburg on 10 November 2006. Issues were discussed during the meeting concerning the current situation with the introduction of digital TV and radio broadcasting in Russia.
10. A dinner for Chapter members and interested colleagues was sponsored by the Chapter after the technical meeting on 10 November 2006. IEEE membership renewal and recruitment information was distributed during the dinner.
11. A technical meeting of the Chapter took place at St.Petersburg State Polytechnical University on 22 November 2006. The meeting was devoted to technical discussions of current technologies in the field of Peer-to-Peer networks.

The 4th ITU-T IPTV FG Meeting Report

by Hong Liu
Communications Research Centre Canada

The 4th IPTV Focus Group (FG) meeting was hosted by ITU-T in Bled, Slovenia from May 7 to 11 of this year. More than 200 persons attended including representatives from telecom equipment manufacturers (Alcatel-Lucent, Nortel, Ericsson, Siemens, Samsung, Cisco, etc.), telecom service providers (Korean Telecom, China Telecom, NTT, etc.), associations (ISMA, ATIS, IEEE/BTS, CEA, etc.) as well as research institutions (ETRI of Korea, CRC of Canada, RNIB of UK, etc.). A total of 184 incoming contribution documents and 20 incoming liaison statements were received prior to the meeting. In advance of this meeting, one contribution proposed jointly by IEEE BTS and CRC Canada was submitted to the FG IPTV, titled "Considerations on restructuring the working document: Quality of Experience Requirements for IPTV (FG IPTV-DOC-0063)".

Mr. Ghassem Koleyini, IPTV FG Chairman, opened the meeting. Mr. Matjaz Jansa, Director General of Directorate for Electronic Communications, Ministry of the Economy, Slovenia, followed with opening remarks.

The meeting agenda and work plan were then approved. The allocation of meeting documents and incoming liaison statements to the six working groups (WG) for discussion was accepted with little modification. The distribution of the contribution documents is listed as follows:

- WG 1 (Architecture and Requirements): 70
- WG 2 (QoS and Performance Aspects): 24
- WG 3 (Service Security and Contents Protection): 28
- WG 4 (IPTV Network Control): 26
- WG 5 (End Systems and Interoperability Aspects): 26
- WG 6 (Middleware, Application and Content Platforms): 43

Compared with the last meeting, the number of contributions decreased

in WG1 only, from 90 to 70. In spite of that, WG1 still had a full meeting schedule and remained very busy throughout the duration of the IPTV FG meeting.

In the plenary session on the first day, Mr. Ghassem Koleyini stressed the importance of keeping to IPTV FG milestones and timelines set for the subsequent IPTV FG meetings in order to make sure that all the work will be completed by the end of January 2008, at which time its final document will be provided to ITU Study Group (SG) 13 for review and approval. Two important deadlines are noteworthy in particular: (1) July 2007 being the last meeting to accept new material into the Service Requirements and Architecture documents; (2) October 2007 being the latest one to accept new material for all other documents.

During the previous IPTV Focus Group meeting, in order to speed up the progress of examining the contributions related to IPTV service requirements normally discussed in WG1, they were discussed in other working groups. Due to a lack of time, all these service requirements weren't addressed adequately by WG1. This resulted in some objections to certain decisions made by WG1. Consequently, all attendees first approved the proposal, IPTV-C-0427 from the Chairman of IPTV FG, to review these requirements in a joint meeting between all work groups. The contribution document, IPTV-C-608 from Korea, proposed a roadmap for IPTV standardization activity. Although the meeting noted the importance of the roadmap to the standardization, it was decided that the decision on the roadmap should be left to the next Study Group 13 meeting in January 2008 since by then, all working documents will have been submitted to them.

Two incoming liaison statements were reviewed thereafter. IPTV-IL-0048 provided information on the issue of the patent statement and licensing declaration forms with respect to technology submitted in contributions; IPTV-IL-0054 provided guidance on the use of the terms: "shall", "should", and "may". It was accepted with enhanced explanation from the Chairman of IPTV FG by concrete examples.

During the remaining meeting days, I mainly participated in all activities of WG2 since our contribution was allocated to this group. 24 incoming documents and 9 incoming liaisons were examined, and decisions were made accordingly. No new work items were identified in this meeting. The work continuously focused on the revision, clarification and update of the four existing work items, which are (1) QoE requirements for IPTV, (2) traffic management for IPTV, (3) application layer reliability solutions for IPTV and (4) performance monitoring for IPTV.

Our IEEE BTS and CRC Canada contribution proposed that WG2 follow the structure of the IPTV quality layers as presented in the ATIS-0800004 document. The BTS/CRC recommended restructuring the content of the working document of IPTV-DOC-0063. The Chairman would not fully agree to redo the document due to time constraints. However, he did consent to partially change the structure of the original text.

The following are highlights of results by WG1:

Incoming Liaison statements

- IPTV-IL-0049 from ITU-T SG 12 informed IPTV FG of its revision of the text of Q.13/12 on QoE/QoS performance requirements and assessment methods for multimedia including IPTV.
- IPTV-IL-0050 from ITU-T SG 12

informed IPTV FG of the definition of Quality of Experience which was not adopted.

- IPTV-IL-0064 from the DVB project provided the latest information on the Application Layer Forward Error Correction (AL-FEC) work, including the DVB-IPTV Phase 1.3 draft document and the blue book on AL-FEC evaluations. It was noted.
- IPTV-IL-0067 from the Telecoms & Internet converged Services & Protocols for Advanced Networks (TISPAN) informed IPTV FG of its latest work on Next Generation Network (NGN) Release 2 and provided their relevant draft documents.

Quality of Experience requirements for IPTV

- IPTV-C-571 from Nortel Networks requested the deletion of the figure on the QoE/QoS relationship in the working document [3]. This is because characterization of the dependence of QoE on the various elements of the QoS (like packet loss rate, delay, bandwidth) is not straightforward. The group reached agreement on a revised statement stating that in general a correlation exists between the subjective QoE as measured by the mean opinion score (MOS) and various objective parameters of service performance (e.g. encoding bit rates, delay, availability, etc.). This was updated in the working document [3].
- The proposal from Huawei, China in the document IPTV-C-0495 to use the corresponding material on video and audio performance requirements and requirements for network transmission from DSL Forum TR-126 [2] to update the corresponding sections in the working document [3] was accepted. Consensus was reached to integrate the pertinent contents from [2] into the working document [3]. Since a concern was brought forward concerning the justification of the derived objective data, a liaison statement was created and sent to the DSL forum for verification.
- The group reconsidered the requirement of IPTV_QoS_23 in IPTV-C-

0427 on IPTV supporting networks, which stated the networks shall satisfy the IP QoS requirements specified in Y.1541 [1]. One concern arose about IP packet loss ratios for QoS classes 6 and 7 specified in Y.1541. Some people worried that they may not fit the requirement for IPTV, especially in the case of high definition video. Furthermore, with application layer reliability solutions in place, these IP packet loss ratios could be relaxed so that it is helpful to ease the performance requirements of the transport networks in terms of IP packet loss rate. As a result the requirement was rewritten such that networks that support IPTV are required to follow the IP QoS class and associated performance requirements specified in Y.1541. It is recommended that the selection of the specific QoS class depend on the available application layer reliability solution and the service requirements. The revision was then discussed and accepted in the joint meeting all work groups.

Traffic management for IPTV

- IPTV-C-468 from Nortel Networks further clarified the role of admission control in networks supporting IPTV services. IPTV-C-469 proposed cross layer interaction for the support of IPTV service. They were adopted for integration into working document [4]
- IPTV-C-494 from Huawei proposed to modify the text of "Admission Control" and "Multicast" regarding the Traffic Management Mechanisms for the Support of IPTV Services in the working document [4]. This change was adopted.

Application layer reliability solutions for IPTV

- IPTV-C-579 from Sumitomo Electric and IPTV-C-586 from Digital Fountain, Nokia, and Siemens Network strongly encouraged IPTV FG to adopt DVB-IPI AL-FEC solutions presented in the working document [5]. After discussion, a consensus was reached in the group that if AL-

FEC is required, then the DVB-IPI solution should be endorsed. Since there is no formal agreement between DVB and ITU-T, it was not integrated into the working document [5] for the time being.

- IPTV-C-540 from Korea recommended that AL-FEC use should be optional, not mandatory. After discussion, an agreement was reached that FEC may not be necessary depending on the underlying transport network engineering.

Performance monitoring for IPTV

- IPTV-C-505 from PixelMetric Corporation, Singapore proposed the monitoring of parameters for channel line up, service meta-data, channel zap time etc. Its contribution IPTV-C-506 suggested measuring the performance of IPTV by monitoring the parameters of the MPEG-2 transport streams. Both contributions were adopted and incorporated into the working document [6].
- IPTV-C-509 from PixelMetric Corporation and IPTV-C-573 from China Telecom were accepted. Both of their proposed concerning IPTV performance metrics are to be integrated into the working document [6].
- IPTV-C-545 from Korea about on channel zapping time in IPTV performance monitoring was selectively put into the related sections in documents [3] and [6].

As a consequence, four working documents [3-6] were updated and their edited versions have been revised and approved in the final plenary meeting of May 11. Two outgoing liaison statements were generated and they were sent to both the DSL forum and ITU-T Q.14/12

Regarding my involvement in the other group activities, I also took part in some of discussions in WG1 and WG6. There was a lot of activity relating to the IPTV architecture. Consensus was reached that the IPTV architectural approaches consist of Non-NGN IPTV based on existing IPTV networks, NGN-non-IMS IPTV and NGN-IMS-IPTV. As a result of harmonization discussions, new versions

of the architecture diagrams were produced and then adopted. The more detailed diagrams created in these sessions were still in dispute and have not been included in the IPTV architecture working document. They were placed in living document list for further verification.

In summary, six meeting reports were edited and approved in the plenary session on the last day. The sum of 17 working documents and 13 outgoing liaison statements were created by all working groups respectively. Some of the living documents from the living lists were updated during the meeting.

The next meeting of the IPTV FG

will be held July 23-31, 2007 in Geneva, Switzerland.

References

1. [ITU-T Y.1541] ITU-T Recommendation Y.1541 (2006), "Network Performance Objectives for IP-based Services"
2. [DSL TR-126] DSL Forum TR-126 (2006), "Triple-play Service Quality of Experience (QoE) Requirements"
3. [IPTV-DOC-0086] ITU-T IPTV FG IPTV-DOC-0086, "Working document: Quality of Experience Requirements for IPTV"
4. [IPTV-DOC-0087] ITU-T IPTV FG IPTV-DOC-0087, "Working document: Traffic Management Mecha-

nism for the Support of IPTV Services"

5. [IPTV-DOC-0088] ITU-T IPTV FG IPTV-DOC-0088, "Working document: Application layer reliability solutions for IPTV"
6. [IPTV-DOC-0089] ITU-T IPTV FG IPTV-DOC-0089, "Working document: Performance monitoring for IPTV"

About the Author

Mr. Hong Liu is a research engineer at the Communications Research Centre Canada (CRC). His current research interests include DTV system, DTV dat-acasting, video processing and streaming, multimedia communications. Mr. Liu is a member of IEEE and BTS.

United States Digital Television – The Challenges Continue

The third article in this series describing the United States DTV transition will resume with the 2007 Fall Issue of the IEEE BTS Newsletter. To review the previous first and second DTV Transition articles published in the Winter

2006 and Spring 2007 Newsletters, please visit the IEEE BTS web site at www.ieee.org/bts and go to the section on the home page where the Newsletter is located and click on the area which states "click here for previous issues".

Your comments on this topic are most welcome. Please contact me directly at wmeintel@computer.org

**Bill Mcintel, BTS Vice President
and Editor BTS Newsletter**

DTV Hot Spot at NAB 2007: A Focal Point for Mobile System Proposals

By Jerry Whitaker, VP Standards Development, ATSC

With a focus on Digital Evolution, the Advanced Television Systems Committee (ATSC) and the U. S. National Association of Broadcasters (NAB) again this year sponsored and organized the "DTV Hot Spot" at NAB2007. The exhibit (held April 16 through 19 in Las Vegas) featured previews of a wide array of new DTV applications. Hot Spot technology demonstrations included:

- Advanced VSB (A-VSB) for improved indoor and mobile/handheld reception.
- Mobile/Portable/Handheld (MPH) technology for a variety of mobile applications.
- An operating single-frequency net-

work (SFN).

- Distributed transmission test generator and analyzer.
- Demonstration of the capabilities of the ATSC Advanced Common Application Platform (ACAP) Standard, including development tools and consumer solutions.
- ATSC receiver software and development tools.
- Advanced DTV multicasting services.
- Digital-ENG data return channel capabilities using an over-the-air DTV signal.
- A trial implementation of a data return link (DRL) system for use with remote broadcast systems.
- Implementation of the ATSC Soft-

ware Data Download Standard and a novel broadcast monitoring system.

- Home networking.
- Practical implementations of the CEA-909 Smart Antenna interface.
- DTV analog-to-digital set-top converter boxes.

Organizations demonstrating these technologies at the DTV Hot Spot included AMD, BitRouter, ETRI, HANA, Harmonic, Harris, KBA, Microwave Radio Communications, MSTV, NAB, Rohde & Schwarz, Samsung, Unisoft, UpdateLogic, and Zenith/LG. The intent of the "Hot Spot" was to highlight the ongoing evolution of technologies and products based on ATSC standards.

Mobile and Handheld at the DTV Hot Spot

Not surprisingly, a great deal of attention was focused on the two mobile/handheld systems being shown: A-VSB from Samsung/Rohde & Schwarz, and MPH from Harris/Zenith/LG.

These demonstrations were well-timed, given that barely a week earlier the ATSC had formally announced it was launching a process to develop a standard that will enable broadcasters to deliver television content and data to mobile and handheld devices via their DTV broadcast signal. Tentatively named "ATSC-M/H," the standard will be backward compatible, allowing operation of existing DTV services in the same RF channel without adverse impact on existing receiving equipment. A key element of the work is to ensure that broadcasters will be able to allocate a portion of their 19.39 Mbps/8-VSB signal to mobile and handheld while continuing to transmit services such as HDTV.

Discussion of ATSC M/H has been underway for some time, having been designated a major priority in the ATSC Strategic Plan, approved by the Board of Directors last December. As envisioned, ATSC-M/H will support a variety of services including free (advertiser-supported) television and interactive services delivered in real-time, subscription-based TV, and non-real-time content download for playback at a later date. It could also be used for transmission of new data broadcasting services such as real-time navigation data for in-vehicle use.

Samsung and Rohde & Schwarz demonstrated their A-VSB technology, which is a proposed enhancement to the DTV system being considered by the ATSC Specialist Group on Transmission (TSG/S9). The current focus of the TSG/S9 work is on improvement of fixed reception. Laboratory tests have been completed and field test were about to begin as this issue went to press.

At NAB2007, Samsung and Rohde & Schwarz showed how A-VSB could

enable mobile DTV reception and be used as a mechanism to implement a single frequency network.

The MPH in-band mobile DTV system—developed jointly by LG Electronics, Zenith, and Harris—was also demonstrated at the DTV Hot Spot. Results of field tests of the system conducted in Columbus, Ohio (at WBNS), were shown in a video presentation that compared the operating terrain, received spectrum, and reproduced MPH video program.

A-VSB and MPH both use a multiple-stream approach, with the main service stream for existing DTV and HDTV services, and the enhanced stream for one or more mobile, pedestrian and/or handheld services. Both systems are said to be backward compatible, not precluding or preventing operation of current ATSC services in the same RF channel or having any adverse impact on legacy receiving equipment.

In addition to the demonstrations in the DTV Hot Spot, both groups conducted impressive live, mobile demonstrations using a bus driving around downtown Las Vegas. Both demonstrations used Las Vegas broadcast facilities of Sinclair Broadcast Group.

Technical papers given during the Broadcast Engineering Conference at the NAB Convention provided general overviews of the systems, and early test results.

Moving Forward

It was clear from the mobile DTV demonstrations and the high level of interest at the DTV Hot Spot that there is some urgency in developing mobile and handheld video services. Broadcasters have indicated that they would like the opportunity to announce new ATSC based mobile and handheld broadcast services before the close of analog services in February 2009. The planned work schedule for a mobile/handheld solution, therefore, is based on this premise. The target dates for completion of the standards documentation are intended to take account of the time

needed for professional and consumer manufacturers to develop equipment for implementation before such services can be introduced. This emphasizes the need for the standards work to be started and completed as soon as possible.

In May the ATSC issued a Request for Proposals (RFP) for mobile and handheld services. The general categories included in the RFP are:

- Scope of the planned work.
- Overall architecture, emphasizing that ATSC is looking to standardize on a complete systems solution.
- Target project schedule.
- Details regarding the materials required for submission.
- The consideration process by which the Technology and Standards Group (TSG) will review the submissions.
- Administrative and process issues.

With the mobile DTV demonstrations at the NAB2007 DTV Hot Spot as a backdrop, work was expected to begin soon on standardization within ATSC. As with all ATSC work, protecting legacy receivers and the existing valuable services is a top priority. In addition, ATSC references the standards of other organizations where appropriate, as reinventing the wheel is seldom a useful exercise. And, wherever possible, harmonization with other industries and services is an important goal.

If you would like to be involved in this or other ongoing work with ATSC, please contact the author at jwhitaker@atsc.org.

About the Author

Jerry Whitaker is Vice President for Standards Development at the Advanced Television Systems Committee (ATSC). He supports the work of the various ATSC technology and planning committees and assists in the development of ATSC Standards and related documents. He currently serves as Secretary of the Technology and Standards Group and Secretary of the Planning Committee, and is closely involved in work relating to educa-

tional programs. Mr. Whitaker is a Fellow of the Society of Broadcast Engineers and a Fellow of the Society of Motion Picture and Television Engineers. He is the author and editor of more than 30 books on technical top-

ics, including: *The Standard Handbook of Video and Television Engineering, 4th ed.*; *NAB Engineering Handbook, 9th ed.*; *DTV Handbook, 3rd ed.*, and *The Electronics Handbook, 2nd ed.* Prior to joining the

ATSC, Mr. Whitaker headed the publishing company *Technical Press*, based in Morgan Hill, Calif. He has served as a Board member and Vice President of the Society of Broadcast Engineers.

IEEE RECOMMENDED PRACTICE FOR DTV EMISSION MASK COMPLIANCE MEASUREMENT

by Greg Best
Chair, IEEE BTS G2.2 RF Standards Committee

This is the first of a series of three articles from the IEEE BTS RF Standards Committee.

The objective of the Recommended Practice is to provide a straightforward, practical measurement process for Station Engineers.

INTRODUCTION AND BACKGROUND

I can remember Bill Hayes (DOE at Iowa Public TV) asking me "Would you like to help out with this committee?" when I called him (Committee Chairman) to ask about the RF standards committee and what it does. I wasn't sure so I asked a whole lot of questions about the committee and what its objective was. To put it succinctly, the immediate task was to be able to accurately and consistently measure DTV spectrum to determine if the signal would meet FCC specs. That was back in 2002 and a lot of time and energy has gone by since then.

The actual origin of the committee started much earlier--soon after the FCC determined the emission mask for DTV transmitters. Transmitter designers and engineers then had to figure out how to measure compliance with it. Within the group of standards organizations, IEEE is the typical organization that provides measurement procedures. The ATSC sought the IEEE's help and it came through the form of the Broadcast Technical Society.

This is the first of a series of three articles that addresses the document that is the result of the committee's

work. This segment addresses the overall objective, the committee's make-up and evolution, major tasks, a very brief statement of the methodology, and status today. Future articles will cover some of the key pieces of the document, obstacles overcome, the challenges faced in scripting the document, dialogue with other broadcast industry companies and individuals, and measurements in the field. Contributions in these areas will be come from other committee members with key roles.

ENGAGING THE MISSION

At the beginning of the original Star Trek, a 5 year mission is announced so at least they knew what they were in for. When the official IEEE G2.2 RF standards committee meetings began in 2002, we did not know ours would also be a 5 year mission. As with most volunteer organizations, things take longer than expected. As with most tasks, the devil is in the details. And so it was with our group.

Two projects were authorized within the IEEE standards organization structure, and the one designated to provide measurement methods for DTV spectrum was tackled first since it was apparent that it was going to be the most challenging. The objective of the committee became very clear when we first took the opportunity to meet at Iowa Public TV's flagship station in Des Moines (KDIN) to interpret the FCC rules and try to measure DTV transmitter for compliance with the emission mask. Like every other trans-

mitter engineer, we hooked up the DTV analyzers of different manufacturers and used the default settings to see what we got. We did expect to get slightly different answers but not only were they significantly different but one piece of equipment said we met the "close-in" FCC mask and the other didn't and neither one could measure to the 110 dB limit defined in the rules. So obviously, we needed a third piece of equipment to provide some arbitration. Thus we brought in the trusty spectrum analyzer which resulted in both more questions and answers. So again it was back to the drawing board to resolve the answers. As a committee, we learned a lot about spectrum analyzers and also the various DTV signal analyzers.

In 2003, Bill Hayes asked if I would be willing to take over the responsibility of leading the G2.2 committee. I agreed because the work was very interesting to me and I could devote what time was necessary. At that time other people also came on board. Our committee included consultants, representatives from transmitter manufacturers, test equipment manufacturers, and real station engineers. Over the 5 year period to the present, the DTV transition required more of both the transmitter and test equipment manufacturers' time so their participation was limited to key items and invited opinions. The committee has stayed pretty constant over the past 3 years and has resulted in consistency, which has benefited the committee.

OBJECTIVES AND TASKS

The main objective of the committee was to define a measurement process such that a station engineer at any station could use modest test equipment and achieve accurate measurements without having to be a PHD or an expert in DTV test and measurement. Therefore, the body of evidence the committee produced had to be adequate to describe why certain parameters were required for the spectrum analyzer set-up and a simple enough step-by-step procedure that someone could follow it without needing to be competent in brain surgery.

One of the major tasks was to have a clear interpretation of the FCC rules. Among the committee, there were different viewpoints of how to interpret the FCC rules. No guidance was given by the FCC on how to measure emissions although we knew there was some rationale to the emission mask definition. After reviewing the subject with the FCC, they recognized the fact rules were indeed vague. After deliberation with many key industry contributors, the FCC issued a Public Notice on May 10, 2005, which clarified the acceptable approaches in the overall measurement procedure.

Two major items drove the committee to base its measurement procedure on the use of the spectrum analyzer. One was the discovery that the most advanced DTV signal analyzers could not measure the DTV spectrum to the letter of the FCC rules and the other was the fact that the use of a spectrum analyzer was better understood and the stations were more likely to acquire a spectrum analyzer for general purpose use instead of purchasing expensive DTV analyzers. DTV signal analyzers have their place but measurement of adjacent channel spectrum over 110 dB dynamic range is not their forte.

The two main areas of emissions to be measured were the adjacent channels to the DTV signal and other emissions which typically are either

spurious emissions or harmonics. The committee's first goal was to address the adjacent channel measurement because it was more of a day-to-day problem for broadcasters. The measurement of harmonics/spurious emissions was a special segment of the spectrum that was thought to be easily understood and to be less of a practical problem in the overall scheme of things. I would say that was one of the committee's biggest understatements of all. More information on this subject will be presented in subsequent articles.

THE RESULTS—WHAT'S REALLY BEHIND DOOR #3

The result of this hard work is a document called a Recommended Practice rather than a Standard. The use of a Recommended Practice allows other methods to be used to determine compliance. In other words, the measurement procedure says that this is the easiest and recommended way to measure DTV emission mask compliance but not necessarily the only way to measure it.

To summarize the end result, the document describes the use of a medium-level-performance spectrum analyzer and a breadbasket-sized bandstop filter that will allow an everyday station engineer to verify whether the DTV transmitter is in compliance with emissions in the adjacent channel by measuring the energy in twelve 500 kHz wide sub-bands on either side of the desired channel. In nearly all situations, the measurement can be accomplished without even taking the transmitter off the air and without having to know any details about the emission mask filter. The next article will describe the key parts of the procedure.

While the committee initially focused on the measurement of full service transmitters, it also included the measurement of LPTV transmitters in the scope of the work because LPTV digital service was just coming

on board (FCC adopted DTV LPTV rules in 2004). The Recommended Practice document has a section of definitions, some references to FCC rules, the main body of the measurement procedure including illustrative examples for major steps of the procedure, and a body of background information that helps to explain what is needed in certain steps and why it is necessary, as well as avoiding pitfalls in spectrum analyzers usage.

STAY TUNED FOR WHAT'S NEXT

As the conclusion of this standards process draws near, it has been a true privilege serving with the past and present members of the committee. Their commitment and interest in the subject has made it possible for an average station engineer to make these measurements with modest test equipment. The participation and support of the FCC during the entire process has been great. The next step is the balloting process for the Recommended Practice by the IEEE standards organization. By the time this article reaches you, it is hoped the Recommended Practice will have been adopted.

If you have questions or comments to the IEEE BTS RF and Video/Audio Standards Committees or this particular recommended practice you can contact Greg Best at 816-792-2913 or at gbconsulting@kc.rr.com.

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Greg Best is President of Greg Best Consulting, Inc. His firm performs broadcast engineering consulting services and serves the RF communications industry in general. Greg earned his BSEE and MSEE degree from the University of Missouri-Rolla and MSEE degree from Illinois Institute of Technology. He has published many papers on TV Transmitter Systems and Design. Greg is a registered Professional Engineer, member of AFCE, IEEE, SBE, as well as serving as an associate editor for the IEEE Transactions on Broadcasting.

THE DO'S & DON'TS OF TRANSPORT STREAM LEVEL NETWORKING

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0.0 ABSTRACT

MPEG transport streams are making their way into broadcast and cable plants. A transport stream is a different vehicle that can carry multiple programs in a single cable or carrier. This represents a new highway for programming material, and this new highway opens new possibilities; however, it has its own set of laws, its own enforcement tools, and its very own issues. This paper will provide the reader with enough information to get up to speed in the MPEG transport highway.

1.0 INTRODUCTION

Broadcasters are not at their first transition of contents transport highway.

Composite video was their very first one. Component analog video was introduced in the 80's with limited success. Components Digital (SDI) was massively adopted by the broadcast community. All these un-compressed video transport vehicles had their own sets of rules. (One video per stream, Video equalization, Maximum distance, Minimum return loss requirement, support of embedded audio, etc)

The MPEG transport stream is the highway of compressed television signals. It opens new opportunities: Reduced bandwidth, Multiple services, Drop & insert, etc. It also comes with new rules: (MPEG compliance, 2 different syntaxes, etc).

This article will review a few MPEG transport concepts then answer some frequently asked question on the subject.

2.0 THE ABC OF MPEG TRANSPORT

2.1 System layers

Just like The OSI model used in the computer networking industry, the MPEG compressed signal is carried

over several layers:

- The Physical layer, (Cable & Modulation & coding)
 - The transport layer
 - The application Layer (DVB, ATSC)
- Transport streams are mostly carried on the following Physical layer:
- SMPTE-310
 - o SMPTE-310 relies on a coax transmission system based on a synchronous feed @ 19.39 Mb/s
 - DVB-ASI
 - o DVB-ASI relies on a coax transmission based on a subset of the SDI specification. The signal is always transmitted @ 270 Mb/s. However a clever stuffing protocol permits transmission from 1 to 214 Mb/s.
 - IP
 - o IP mostly relies on Unshielded Twisted Pair (UTP, or cat-5) cable, Transport streams are encapsulated in 1388 bytes packets, carried mostly as UDP traffic.

2.2 Transport stream

Transport stream (TS or TP) is a format specified in MPEG-2 Part 1, Systems (ISO/IEC standard 13818-1). Its design goal is to allow multiplexing of digital video and audio and to synchronize the output.

2.21 Serial Format

The MPEG data has to be serialized in order to be transmissible over cable or RF. The serialization process is made according to a strict protocol based on Packet based multiplexing.

The encoder has to fit all program elements in the transport stream:

- Audio
- Video
- Data

The MPEG transport stream relies, unlike IP, on fixed length packets. The length of a standard MPEG packet is 188 bytes

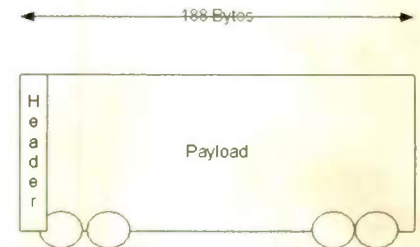


Figure 1 Transport Packet

The best human scale model for a data packet is a train wagon. The wagon carries a certain payload. In data terms it can be expressed in the number of bytes it carries. In the specific case of MPEG it is 188 Bytes. Bytes look all the same so a header has to be added to the packet so the de-multiplexer can know what is the content or the destination of the data packet.

2.22 Program Elementary stream

A Packetized Elementary Stream (or PES) is so created



Figure 2 packetized elementary stream (PES)

The Program elements are:

- Video including caption & Program clock reference
- Audio
- Data

The elements can be differentiated in the stream, even if all packets look the same via a very flexible set of index tables called MPEG Tables:

2.23 MPEG Tables

The MPEG tables are:

The Program Association Table, or PAT, is the mother of all tables It tells the equipment that reads the transport streams:

- The Transport stream ID (A num-

ber unique to each transport stream that identifies the origin of the stream)

- How many services are present in the stream
- Location (in PID #) of each services index table (PMT's)

The Program Map Table or PMT is an index table that tells the equipment that reads the Transport stream the location (in PID numbers) of each of components of the service:

- Video
- Audio('s)
- data

2.24 Definition of a PID

The PID or Program Identifier is a number (13 bit integer) located in the transport packet header. The latter is used to index MPEG packets. Just like IP routers, the MPEG TS handling equipment doesn't have to read all the 188 bytes packets it relies solely on the PID number to elect if the packet is required, and where it shall be routed to.

The PID number is located in the transport stream header:

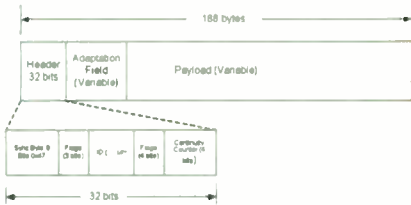


Figure 3 Typical MPEG Packet

2.35 Handling of the MPEG Tables

The moment the MPEG handling equipment is connected to a TS, the acquiring equipment is always looking for The Program Association Table (PAT). The latter has no problem finding it since the PAT has a fixed PID assignment (PID = 0).

The PAT will provide the locations of all the program services available on this program stream by calling their Program Map Table or PMT's

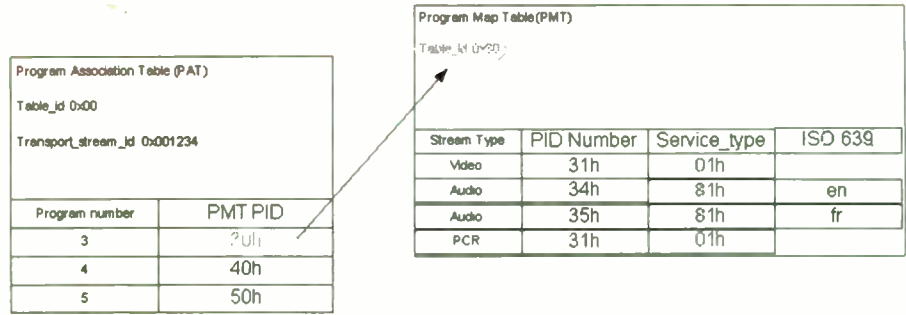


Figure 4 typical MPEG tables

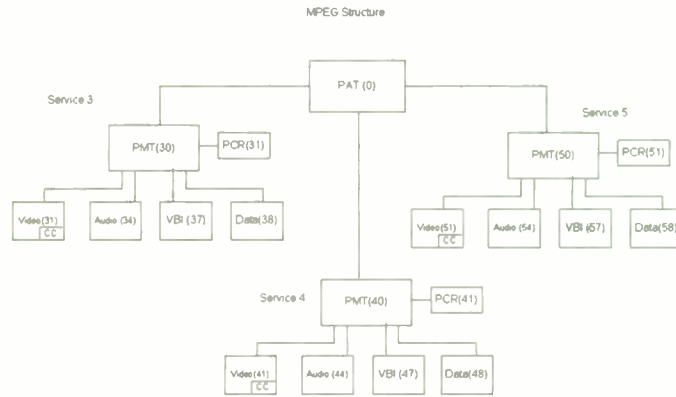


Figure 5 Typical MPEG Transport Stream Tree diagram

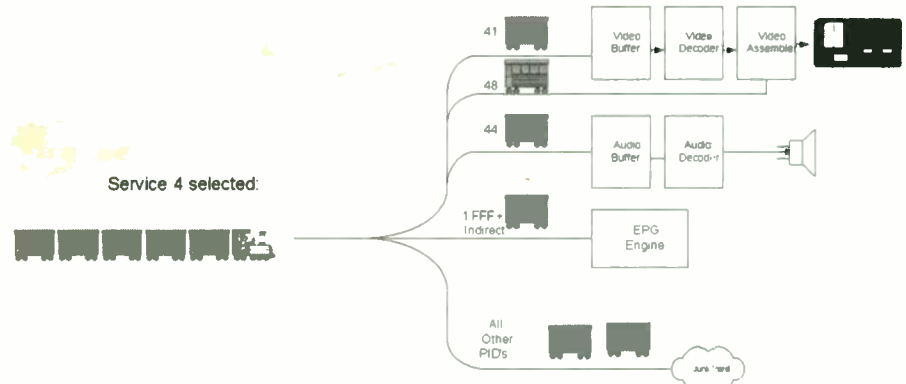


Figure 6 De-multiplexed MPEG Transport Stream

In this example the PAT points to 3 PMT's however only one is displayed.

Figure 5 shows a typical tree diagram for a multi-program transport stream. Once the MPEG handling has acquired all these tables it is ready to route the packets to the respective hardware responsible for decoding the signal. Depending on which services the user has selected, different packets will be routed to the audio & video decoders. Most other packets will be discarded.

2.36 MPEG descriptors

Service descriptor

Once the PES reaches the audio or video decoder, additional information is required to instruct the decoder on the scheme that was originally used to encode the signal:

- Typical Coding standards:
 - o Video:(MPEG-1, MPEG-2, AVC, etc)
 - o Audio (MPEG layer 1, Dolby AC-3, etc)

This information is carried on a 8 bit number called a service descriptor. Note that the values are expressed in hexadecimal format.

Service	Descriptor
Mpeg-2 video	01h
Mpeg layer 2 audio	03h
Dolby AC-3	81h

Figure 7 MPEG service descriptors

Language Descriptor

Furthermore as several audio services of several languages may be present on the PES, the decoder needs to be instructed on the Language carried on each video services. The Language descriptor was established to index audio services. The language selection is made using a worldwide standard called ISO-639 that defines most current languages, the latter defines a 2 letter code for most known languages. Figure 8 provides examples of language descriptors:

Language	ISO 639 Descriptor
English	en
French	Fr
German	de
Finnish	fi
Polish	Pl
Portuguese	Pt
Russian	ru

Figure 8 MPEG Language descriptors

2.37 Stream capacity

Any MPEG transport stream has a given data rate allocation that is normally based on hardware limitation, ex: an ATSC transmitter is limited to 19.392658 Mb/s. Most terrestrial networks are sold in increments of 20 Mb/s: 20, 40 or 60 Mb/s. However if we add all the elements of the stream audio + video + data and the nominal data rate of the stream is not quite met, the leftover payload will be filled with packets packed with zeros called Null packets. In order to be recognized as such by any equipment in the chain. All null packets must be carried on PID = 1FFFh.

The difference between the TS nominal rate and its useful payload is called the headroom. Ex: a 50 Mb/s stream on which 45 Mb/s is occupied with audio + video + data, is referred as a TS with 5 Mb/s or 10 % headroom.

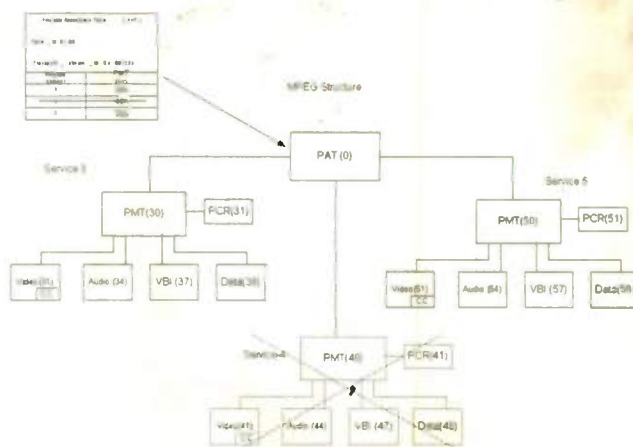


Figure 9 Modified MPEG stream, referred from figure 5 example

2.38 Stream syntax

At the application layer, the sets of rules that applies to a transport stream and its components is called a Syntax, there are 3 main syntaxes in use:

- MPEG. Basic level (PAT, PMT, etc)
- ATSC For terrestrial transmission in north America (All MPEG syntax + navigational info based at PID 1ffB (PSIP))
- DVB For satellite & terrestrial networking (All MPEG syntax + navigational info based at PID 16h (DVB-SI))

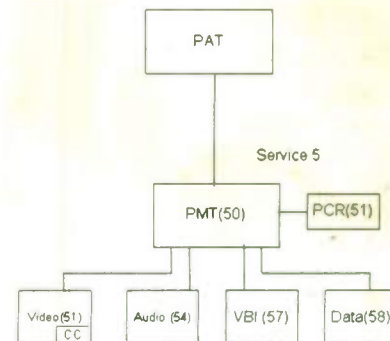


Figure 10 single program Transport stream to add

grams, the stream grooming equipment has to:

- Modify the PAT so the unwanted elements are not referred to in the Table
- Discard the unwanted PID's (all service elements + PMT)

3.0 FREQUENTLY ASKED QUESTIONS: Can unwanted programs be filtered out from a multiple programs transport stream?

In order to filter unwanted pro-

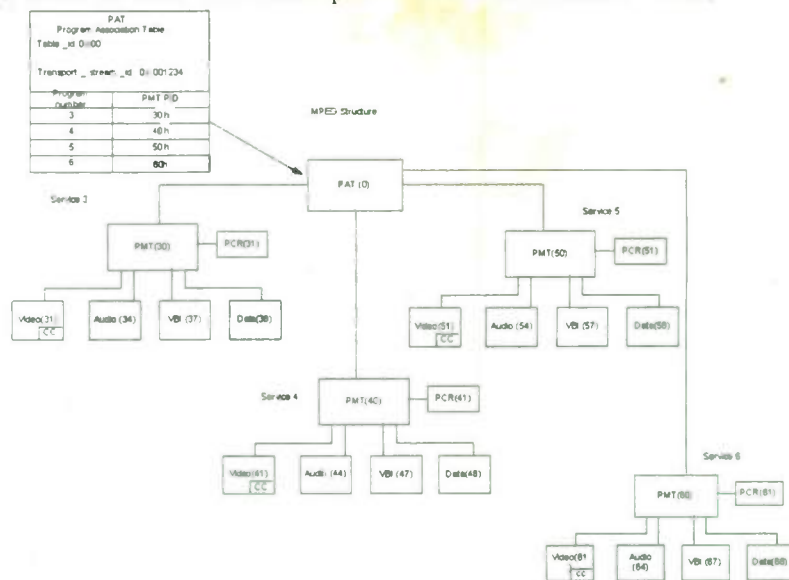


Figure 11 augmented Multi program transport stream

Can services incoming from 2 different TS be merged together in a single transport stream?

Merging operations are possible. An MPEG multiplexer has to be used, and the following tasks have to be performed:

- Ensure sure that there are no service and PID's allocations are identical (i.e. 2 service #2 or 2 PID's = 44). If this is the case the multiplexer will rename one of them.
- Verify that the total payload of the new expanded stream doesn't exceed the maximum permitted output rate.
- Modify the PAT so all the services are represented.
- Pass all the required PID's.

Could service 1 be re-named to another number (5 for example)?

Service re-mapping (in MPEG Jargon) is a common feature of most MPEG multiplexers. The latter just re-formats the PAT and PMT's accordingly.

Furthermore, could PID numbers be re-named?

Yes. Any of the PIDs may be renamed as long as no conflicts is created. However some PID numbers are to be avoided because they may be use in the next service layer (ATSC, DVB). PID # 1FFB, 16 is reserved for navigational information. 1FFF is reserved for null packets and will be discarded by any equipment no matter what it may carry.

Can MPEG descriptors be altered?

Changing service or language descriptors is not advisable, ex: an audio service running with Dolby AC-3 compression is normally carried on a PID holding the service descriptor 81h. If the latter is changed to 3h which means MPEG layer 2 audio it will become un-decodable.

Can PID's that are not defined in any of the MPEG tables be transported in an MPEG TS ?

The carriage of Ghost PID's (another piece of MPEG jargon used to describe

orphan PID's) remains a delicate operation. A multiplexer can pass any Ghost PID's as long as:

- They are declared in the mux Ghost PID windows
- They do not represent any conflict with any of the PID's present in the TS.

Caution: When a Ghost PID is allowed to pass, the MUX loses control over its size, the user must be absolutely sure that no excessive amount of data will flow trough these a PID's unless sufficient headroom is present in the TS.

Ghost PID's may be re-incarnated downstream in the broadcast chain, to be used at the application layer.

Can a TS be carried over different physical layer?

Transport stream translation are possible, as long as you respect the physical layer intrinsic bandwidth limitations are respected:

SMPTE-310 physical layer is limited to 19.392658 Mb/s. Obviously, a 30 Mb/s DVB-ASI stream can not be translated into SMPTE-310 unless services are dropped until the limitation is met.

ASI has a Bandwidth limitation of about 214 Mb/s.

The Ethernet physical layer has limitation of its own. It is based on MPEG tolerance to packet jitter. This limitation varies depending on link design.

Can DVB-ASI be distributed in a broadcast plant using the existing SDI routing infrastructure?

The DVB-ASI and SDI share the same electrical layer (270 Mb/s coax, NRZ coding); however their coding layers are different, so DVB-ASI is polarity sensitive where SDI is not. Some video distribution amplifiers are known to feature 4 non-inverting outputs + 4 inverting ones. The non-inverting outputs shall be chosen to carry DVB-ASI.

Could a TS carried over an Ethernet electrical layer be carried along with other IT traffic ?

This is possible, however appropriate

care shall be applied as the MPEG transport stream carried on Ethernet has no management layer, no Quality Of Service or QOS is applied on it.

Successful implementation has used some of the existing IT management tools such as VLAN. Although it has worked reliably over under-subscribed links, The MPEG performance is very likely to degrade in the presence of packet jitter typical of busy IT transport infrastructure.

How can a transport stream compliance of any given Syntax be assessed?

A Stream analyzer will give you stream conformity information based on 2 reference document:

- ETR 290 for DVB Based stream
- ATSC A78 for the ATSC based stream

Both documents will dictate the alarm that you have to handle immediately, the one you will have to handle soon, and the one that doesn't really matter in the short term.

Can a TS be transferred from a given syntax to another?

Syntax transfers are possible, however they remain a delicate intervention as each syntax (ATSC or DVB) is using fixed PID numbers for the carriage of its navigational information index table. In the syntax translation process, navigational information may get lost in the process. Ghost PID's will unavoidably be created. Special MPEG set-up may have to be done to preserve this information. If the signal has to be re-incarnated into the original syntax, this becomes a job for an MPEG expert.

Can broadcasters interconnect with a BDU (cable-casters & Satellite operators) via a transport stream?

In fact, that is the preferred format for most BDU's, however; there are a few operational rules to follow:

- Changes in program numbers, PID's numbers, etc requires advanced notice with the BDU.

- Stream compliance has to be maintained at all times
- The Nominal rate of the transport stream has to remain constant at all times.

About the Author

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Dr. Shuji Hirakawa received Ph.D. degree from University of Tokyo in 1978. As a Ph.D. student, he pioneered research on "coded modulation". His groundbreaking work led him to receive the IEEE Golden Jubilee Paper Award in 1998. After graduation, Dr. Hirakawa joined Toshiba Corporation and now he is a Senior Manager of Corporate Standardization Group, Technology Planning Division of Toshiba. In the last 30 years, Dr. Hirakawa was involved and led the research and development of HD MUSE, digital satellite broad-

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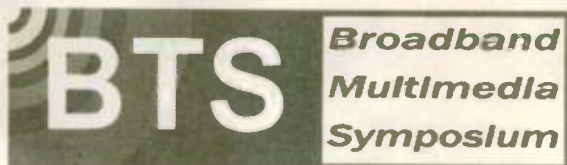
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"Multiple Technologies for Multimedia"

March 31 – April 2, 2008
Las Vegas, Nevada USA

Co-located with **CTIA WIRELESS 2008**
and **IEEE WCNC 2008**

CALL FOR PAPERS

IEEE Broadband Multimedia 2008 is the third annual edition of this industry-oriented premier forum for the presentation and exchange of technical advances in the rapidly converging areas of multimedia broadcasting, telecommunications, consumer electronics, and networking technologies. Leading engineers, researchers, and service providers from around the world will convene again to present and discuss state-of-the-art research results and challenges in the application and implementation of broadband multimedia systems – both wireline and wireless. This year, contributions are especially solicited on IPTV standardization issues, and on various broadcast-overlay, cellular, and broadband wireless technologies – such as DVB-H, FLO, ATSC-M/H, DMB, 3G/4G, MBMS, and WiMAX.

Potential topics:

- **Multimedia systems & services:** Mobile TV • IPTV • Internet TV • DTV • Datacasting • Non-real-time services • Interactive systems • Content management • Field trials & test results • Service deployments • Standards • Broadcast-overlay/cellular/wireless broadband networks
- **Transmission & networking:** Channel modeling & simulation • Channel coding • Modulation & multiplexing • Signal processing for transmission • Propagation & coverage • Congestion/capacity management • Traffic & performance monitoring • Handoff issues • Networking & QoS
- **Multimedia processing:** Audio technology • Video coding • Video processing • Quality assessment & QoE • Content protection & watermarking • Content adaptation & scaling • Error resilience & concealment • Rate control • Retrieval & indexing • 3-D & multi-view video
- **Multimedia devices:** Acquisition technology • Display technology • Set-top boxes, DVRs & home networking • Mobile, portable & handheld devices • Program guides & navigation

CALL FOR TUTORIALS: Proposals for extended-length tutorials are solicited on the topics above.

CALL FOR PANELS: Proposals are solicited for panels on technology, application, business, and policy-related issues and opportunities for the broadband multimedia and broadcasting industry.

E-mail an extended abstract of about 1000 words to multimedia@ieee.org. Include at least two key words to indicate the topic by choosing among those listed above. Indicate that the abstract is submitted to IEEE Broadband Multimedia 2008. Include the corresponding author's full name, job title, organization, address, telephone, fax, and e-mail address.



IEEE

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IEEE Consumer Electronics Society
26th International Conference on
Consumer Electronics 2008

January 9-13, 2008 Las Vegas, USA
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Co-Located with the International Consumer Electronics Show

The International Conference on Consumer Electronics (ICCE) is soliciting technical papers for oral and poster presentation at ICCE 2008. Now in its 26th year, ICCE has a strong conference history coupled with a tradition of looking forward attracting leading authors and attendees from around the world. Papers reporting new developments in all areas of consumer electronics are invited, including but not limited to those listed below. Student papers and papers of a tutorial nature are particularly encouraged. This year, papers relating the Consumer Aspects of Emerging Healthcare Technologies are particularly sought for a special session on the topic.

TOPICS

- **HOME ENTERTAINMENT** Home Gateway, DTV, Home Theater, PVR, Interconnects, Game Systems, Interactive and Directed Programming, Internet Integration, Advanced DVD and CD, Displays
- **MOBILE COMPUTING & COMMUNICATION** Mobile Broadband, Handheld & Wearable Computers, Personal Multimedia Devices, Next Generation Cellular, AV Streaming to Handheld Devices
- **A/V TECHNOLOGY** Still & Video Cameras, Analog and Digital Audio, 3D Video, Recording, Storage, Compression, Transcoding, Applied Signal Processing, Content Indexing, Networked A/V, **Video Enhancement, Visual Quality Assessment**
- **RF & WIRELESS** Antennas, Acquisition, Equalization, Spectrum Usage, Software Radio, Wireless LAN, 802.11 Standards, Bluetooth, RFID, WPAN
- **CONSUMER NETWORKS** Wired & Wireless Multimedia, QoS, Security, Peer-to-Peer, Internet Appliances, Home Control, Bridges, Interoperability, Application Control, Home Architecture
- **AUTOMOTIVE ENTERTAINMENT & INFORMATION** Navigation, A/V Systems, Driver Assistance, Networks, Communication Aspects, Sensors and Control
- **SECURITY & RIGHTS MANAGEMENT** Copy and Redistribution Protection, Payments, Trusted Computing, Parental Controls, Legal and Regulatory Issues, Data Collection, Biometrics, Privacy, Encryption
- **ENABLING TECHNOLOGY** Advanced Semiconductors, Algorithms, O/S, Development Tools, Test Equipment, Advanced Displays, Power and Conventional Batteries, Small Fuel Cells, Standards, Intellectual Property, Cost Reduction, Compliance Testing, Human-Computer Interface, Special-Needs/ Assistive Technology, Recyclable / Green Engineering

AUTHOR INFORMATION

Authors are invited to submit a 2-page summary according to the posted submission guidelines. Only electronic submissions will be accepted via the web at <http://www.icce.org>.

At least one author of each paper MUST pre-register for the conference by October 3, 2007 for papers to be included in the program.

Notification of Acceptance / September 05, 2007

Camera-Ready Paper Due/ October 3, 2007

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