

Broadcast Technology Society Newsletter

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



PAUL SHULINS

BTS Symposium attendees filled the event's presentation room to near capacity.

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BTS Symposium Tries Out New West Coast Venue

Taking event 'on the road' generates positive response from participants

By James E. O'Neal

SAN DIEGO, CALIF.

For the first time in its 63 year history, the IEEE's annual Broadcast Technology Society Symposium went on the road, opening its doors to a west coast audience at the Westgate Hotel here. The Oct. 9–11 event drew more than 110 paid attendees from as far away as Australia and New Zealand to participate in three days of non-stop tutorial sessions, paper presentations, roundtable forums, and social events, all centering around radio and television engineering.

Relocation of the Symposium to San Diego from its longtime Washington, D.C. moorings was a trial balloon measure to attempt to stimulate attendance by making the event more accessible to

BTS members and others who could not conveniently attend east coast conferences. There was some initial uncertainty about the wisdom of taking an event that was so deeply rooted in a single location on the road, but by all indications the new venue was a success. And Symposium co-chairs Paul Shulins and David Layer both reported praise and high marks for the Westgate Hotel event.

"After months of planning it was very gratifying to see the event come together so nicely," Layer said. "I received a lot of positive feedback from attendees regarding both the Symposium program and the venue. I think taking the Symposium 'on the road' is going to help the BTS attract new members and increase the level of involvement of existing members."

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President's Column

William Meintel, BTS President



As I write this, our grand experiment in moving the Annual Broadcast Symposium (ABS) to San Diego after being in the Washington, D.C. area for more than 60 years has just concluded. I believe the experiment worked, and although the attendance was not as high as I would have liked, it was on a par with what we have in recent years.

However, the good thing in my opinion was the number of new faces that I saw in San Diego. One of the main objectives of the experiment was to attract new attendees and that goal was met. Another objective was to have greater attendance at the sessions. In the past few years, a number of good sessions failed to draw many attendees; however, this year all sessions were well attended. All in all, I am well pleased with the results and expect to see more improvement next year when the ABS moves to San Antonio.

Most of the credit for the success of our experiment and this year's ABS goes to Eric Wandel and his committee that came up with the idea, to ABS co-chairs David Layer and Paul Shulins, and also the tremendous support of Murat Karsi San Diego chapter chair. Of course we all know that such an event cannot be successful without a great deal of effort by many people, including the presenters and the support given by our sponsors, and last but surely not least, to those who believe that the ABS is a worthwhile event and showed up to fill the seats. Many thanks to all who made it work and I hope to see y'all in San Antonio in 2014.

Although I believe the experiment with the ABS is working and that it will ultimately lead to a better and more sustainable symposium, I would welcome your comments concerning the experiment. I would also like to hear suggestions about how the ABS could be further improved including other potential venues. Don't be afraid to give us some ideas even if they seem radical. I think everyone wants this event to succeed and maybe something radical is what will make that happen.

In making your comments please keep in mind that the main reasons for the experiment in the first place were the flat attendance, sometimes low turnout at specific sessions—even from those registered to attend, and the high cost of having the event in the Washington, D.C. area. I would also note that the combination of these factors has in recent years called into question whether to even continue holding the event. For those of you who have not been involved in the decision making and planning, I would point out that the revenue this Symposium has been generating has not offset the cost. BTS has only been able to continue holding the event because of income from other sources.

In my opinion the program has been improving every year and therefore both the attendance and the sponsorship should

continue to improve. However, what is really needed is more marketing, and the best marketing is word-of-mouth. Those of you who have attended and believe it is a worthwhile experience need to promote it to your friends and colleagues. It is especially a good event for the younger people in our industry, since they not only get the value of some great content but the invaluable experience of talking and socializing with industry veterans. There is no better way to network.

Since the last issue of the **Newsletter** was published, the annual IBC Show has taken place, and once again was very successful with a record attendance of 52,974. This is of course very good news for BTS, for as one of the IBC partners we derive a substantial portion of our budget from the IBC Show.

However, with the closing of the 2013 IBC Show we are saying goodbye to our longtime IBC board representative Mike Bennett. After skillfully representing BTS for many years, Mike has decided to retire—too many trips across the pond to attend BTS AdCom meetings have finally taken their toll. Many thanks to Mike who has served us well in negotiating the politics of the IBC and in helping BTS become a much more active partner. In recent years Mike has also been extremely helpful in the arrangements for our semi-annual AdCom meetings that have been held during the IBC Show. Although I believe he has actually viewed this as a benefit rather than a chore, as he could kill two birds with one stone (or at least a short plane ride) by being able to attend both IBC and the AdCom meeting and avoid another long trip to the States. Once again, thanks Mike for a job well done; enjoy your retirement and please keep in touch.

Bill Hayes is now the IBC board representative. After Mike notified me of his intention to retire, I made the decision to appoint Bill as his replacement. That decision was based on Bill's longtime involvement in the IBC. For the past several years, Bill and his wife Ellen have "manned" the BTS booth at the IBC Show and that, along with Bill's tenure as BTS president, have allowed him to develop a good relationship with many of the IBC board members and staff, making him the logical choice. It is also helpful that Bill enjoys the work and has an employer who supports his involvement in the BTS. Thanks Bill for taking on yet another BTS duty.

On a different subject, in previous columns I have discussed the upcoming television spectrum auction in the United States and had planned to include some additional comments in this edition; however, our editor has suggested that I cover this in a separate article. Therefore, if you are interested, my comments on some of the international aspects involved are found in a separate article in this issue of the **Newsletter**.

As society president, I always welcome your input about my column or any other issues affecting BTS.

Bill Meintel
President
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From the Editor

James E. O'Neal, BTS Newsletter Editor



Busy times these—it seems that the 2013 IBC Show was barely over when it was time to hop on another airplane and head west for the BTS fall Symposium in San Diego, then with barely a week in between to catch up on things at home, it was to the airport again for another California trip; this time the SMPTE Conference and Exhibition in Los Angeles. However, I'm in good company on these treks, as I see a lot of BTS people in the audiences (and in the airports).

The San Diego iteration of the BTS Symposium seems to have done a lot to re-stimulate the event, with a number of new faces in the crowds there. San Diego also proved to be a good choice for a west coast conference venue. The hotel selected was first-class; the weather (for the most part) was great, allowing conference lunches and an evening reception to be held outdoors, and for those who got there early, or stayed after the conference ended, there was plenty to see and do in the San Diego area.

As I write this, the SMPTE Conference is in full swing, with a full day having been devoted to ultra high-definition television. UHD TV (aka 4K and sometimes 8K video) was no stranger at the BTS Symposium, or at the IBC Show. It looks as if it's the coming thing and we better start preparing ourselves for it. (Personally, I think it has much more of a future than 3D, which, after a lot of hype, seems to have just about completely dropped from the landscape—if you attended the IBC Show, you had to look hard to find anyone touting stereoscopic television; I only spotted two booths with 3DTV displays.)

Of course, with UHD comes one very basic problem, and that's how do we get it to the television viewer? Presentations at the Symposium and the other shows all target the enormity of the UHD TV signal in terms of bandwidth and transmission data rate—for 4K, a whopping eight times what we are accustomed to handing in present day 1080 HDTV. And that may be the tip of the iceberg. The BBC was on hand in the IBC "Future Zone" to graphically demonstrate that UHD TV is better viewed at higher frame rates than we are providing right now. The exhibit espoused rates twice or three times what we use for HDTV. Transmitting such a mountain of information, especially when combined with the ever increasing shortage of spectrum space, may seem to be impossibility. However, I'm sure that someone is working on the problem right now. (Perhaps, while in the IBC "Future Zone" you also noticed NHK's exhibit on HEVC coding and that organization's plans for transmitting UHD TV.)

Speaking of trying to fit 20 pounds of video into a five-pound bag, this is really nothing new.

Perhaps some of you are aware of a rather special anniversary in December of this year—Dec. 17 to be exact. That's the day in 1953 that the FCC legitimized NTSC color. Happy 60th birthday good old NTSC! You served us well, and are still serving a goodly number of us. Yes, mainstream NTSC color transmission went away in June 2009 with the mandatory

switchover by U.S. broadcasters to digital TV transmission at high-power stations, but there are still quite a few low-power TV broadcasters who are on the air in NTSC, and also stations operated by our neighbors to the north and south who have yet to pull the switch on NTSC. Ditto the cable systems that are converting DTV signals to NTSC for a portion of their customers and also the many government-subsidized set-top converter boxes that many viewers are using to provide NTSC feeds to their older analog sets. Yes, this over-the-air NTSC and cable transcoding will eventually go away, but when you figure in the countless millions or billions of NTSC-encoded videotape recordings that exist on the planet, it's going to be a long, long time before NTSC color goes away completely.

I would like to offer a special commendation to those members of the second NTSC group that was convened in the early 1950s to solve the problem of developing a backwardly-compatible color TV system for our nation. Then, just as now, this was seen as a task involving packing a lot of extra information within an existing fixed amount of bandwidth. The groups involved (and it wasn't just RCA, as some seem to think) did some tremendous creative thinking and a whole lot of research and development in a very short time to develop a color transmission system that has stood the test of 60 years. Equally brilliant minds seem to have solved the UHD transmission problem in a similarly creative fashion.

On another front, if you haven't already noticed, this issue of the **Newsletter** includes a bit more content than we've had in recent numbers. In fact, I've actually had to hold up some stories for inclusion in the next **Newsletter**. As an editor, this is the kind of problem that I like to have. I'm very pleased that we are starting to get more news content from our members, especially in the form of BTS Chapter reports. However, this increased volume of contributions is bringing with it another sort of problem. A goodly amount of the information and stories is being sent to my personal and business email accounts, not the one specially set up for **Newsletter** purposes. Just as is the case with most of you, I get a very large volume of mail through these other accounts, and due to this volume it's possible that your **Newsletter** contributions could get overlooked or even sidetracked as "junk" mail. Please make sure that any email with stories intended for publication in the **Newsletter**, or correspondence to me about **Newsletter** matters, is sent to BTSEditor@IEEE.org; otherwise I may not see it. Thanks. Also, when sending in your contributions, please do not embed images in the text. This only slows down the editorial process. Please send all images as separate .jpg files. This will help me to get the **Newsletter** out all that much faster.

If you've been in most any retail store lately, it's difficult to escape the fact that the year-end holidays will soon be with us. In closing, I'd like to take this opportunity to extend to our readers wishes for a very merry and festive holiday season and also wish for health, happiness, and prosperity for everyone in the coming year.

James O'Neal
Editor

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BTS Symposium Tries Out

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"It was a big experiment and we're very pleased at the turnout," said Shulins. "We're seeing a lot of familiar faces, but we're also seeing some new faces which was our real goal here—to expose the Symposium to new people. We didn't know exactly how it would turn out, but the venue is wonderful and the people are wonderful here and we're hoping to extend it next year when we move it to Texas."

(Shulins referred to the plan now in place to hold the 2014 Symposium in San Antonio, Texas.)

Tutorials Launch Symposium Events

As has been a long-standing tradition, all-day tutorial sessions were first on the Symposium's long list of organized events. The Wednesday morning and afternoon tutorials examined future television technologies, with the morning presentations centered around transmission techniques and chaired by Richard Chernock. Qualcomm's Kent Walker led off with a look at eMBS/LTE and was followed by Andrew Murphy of the BBC's research and development group who enlightened the audience about the enhancements available in the latest iteration of the DVB terrestrial broadcast standard, DVB T2. Murphy was in turn followed by Dr. Hui Liu from China's CMMB Vision organization who spoke about the CMMB emerging standard for mobile video and



Murat Karsi, San Diego Chapter Chair, also served as Symposium local arrangements chair.



Dr. Ajay Luthra presented the luncheon keynote address during the Wednesday tutorial sessions. He spoke about the difficulties in transitioning to 4K television.



San Diego's Westgate Hotel hosted this year's Symposium activities.

broadband services which enables delivery to a variety of handheld viewing devices.

Ultra High-Definition Television

A noontime box lunch keynote presentation by Dr. Ajay Luthra on "The Road to 4K Ultra HDTV and the Bumps, Curves, Forks and Potholes in It" separated morning and afternoon tutorials.

Dr. Luthra reviewed the evolution of digital and high-definition television, examining the increasing transmission challenges in dealing with progressively higher resolution images.



(l-r) Jean-Marc Jot, Graham Jones and Jeffrey Riedmiller participated in a panel discussion on next-generation broadcasting audio as part of Wednesday's tutorial events.



In a break from the strictly indoor activities at all previous symposia, the delightful San Diego weather allowed three of this year's events to be held outdoors. This was the scene at Friday's awards luncheon.

"In going from SD TV to ultra high-definition you have eight times more of everything—the bandwidth, processing power, everything has to go up a factor of eight," said Dr. Luthra, noting that without new improved coding technologies, "it would not even be possible to talk about it [transmission of UHD TV]."

Wednesday afternoon brought more tutorial activity with sessions on HEVC coding by Dr. Yan Ye and a panel discussion on "Audio for Next Generation Broadcasting" chaired by Dr. Deep Sen and featuring panelists Jeffery Riedmiller, Jean-Marie Jot and Graham Jones.

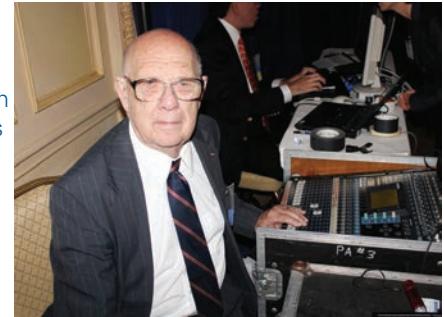
The Symposium's traditional "welcome reception" followed the first day's activities. Plans had been made to hold the event on the hotel's rooftop area, but some fast moving Southern California rain showers forced the event indoors. The change of venue didn't dampen spirits, however, with new acquaintances and old friends alike enjoying conversation and refreshments.

Thursday morning brought with it the official opening of the 2013 Symposium, with opening remarks and a welcome extended by event co-chairs David Layer and Paul Shulins.

The morning's technical session, "Technology for TV's Future" was chaired by Murat Karsi, and featured presentations by Frieder Juretzek, Rich Chernock, Pablo Angueira, James Kutzner and Young-Woo Suh which covered a range of topics including a study comparing conventional high-power, high-tower transmission vs. low-power, short-tower TV broadcasting, experimental 4K video



Ralph Malaker was one of several San Diego Chapter members who volunteered as video camera operators.



John Reiser kept his 35 year record of providing Symposium house audio services intact by traveling to San Diego with his usual assortment of audio tools and mixing skills.

terrestrial transmission, and a look at both ATSC 2.0 and 3.0 broadcasting.

This time the San Diego weather cooperated nicely, allowing Thursday's joint BTS/AFCCE buffet luncheon to be held on the hotel's rooftop terrace. However, the traditional luncheon keynote presentation, "Separating TV Services from the Platform—Today's Reality," given by the Sinclair Broadcast Group's Mark Aitken, had to wait until the group reconvened back in the hotel's Versailles meeting room, as Aitken's presentation included PowerPoint slides. [A summary of Aitken's remarks is presented elsewhere in this Newsletter. Ed.]

Following the luncheon activities, the afternoon's "Solutions for Today's Challenges" session kicked off, with Joe Giardina serving as session chair. Papers on a number of contemporary topics were presented, including implementation of the ATSC mobile emergency alert standard, low-delay



Bill Hayes joined Amanda Temple (center) and Kelly Smith at the registration table in greeting Symposium registrants.



Symposium events were streamed live to the World Wide Web, with NewTek providing equipment and operator Brett Collins of Absolute Live Productions. Here Collins (l) explains the finer points of the NewTek TriCaster to Bob Seidel (c) and Tom Gurley (r).



(l-r) Rich Chernock, Wayne Luplow, Bob Plummer and Kelly Williams take a break from the day's activities to enjoy a bit of food, drink and fellowship at Wednesday evening's Welcome Reception event.



Bright San Diego sunshine made "shades" mandatory when David Layer presented the Matti S. Siukola Memorial Award to Merrill Weiss.



At Thursday's joint BTS/AFCCE luncheon, David Shavely, AFCEE president, presented a special service award to David Layer in recognition of his five years as chairman of AFCEE's scholarship committee.

digital wireless mics, and the specification and measurement of passive intermodulation levels. Presenters included Merrill Weiss, Wayne Luplow, Dr. Kazuaki Wakai, Tom King and Prabhu Hosur.

Thursday evening activities centered around the traditional manufacturers' reception, which was held under San Diego's nighttime sky on the Westgate's rooftop terrace.

Radio Gets the Spotlight

Friday's opening session was devoted to radio-related technologies and was chaired by Milford Smith. Presenters included Frank Foti, Al Salci, Ben Dawson, Gregory F. Shay, Steve Lockwood and Timothy B. Terriberry, with their papers covering topics ranging from IP networking of audio to new FCC rules covering AM transmitter pattern interference caused by neighboring structures.

Awards Luncheon

At the conclusion of the morning's radio sessions, the event moved outside again to the hotel's rooftop terrace area for the annual IEEE/BTS awards luncheon, with event sponsors being recognized and awards bestowed. Co-chairs David Layer and Paul Shulins recognized 2013 Symposium session chairs Rich Chernock, Murat Karsi, Joe Giardina, Milford Smith, Bob Plummer, as well as the individuals taking care of "behind the scenes" Symposium duties. In addition, Murat Karsi received special recognition for his service as Symposium local arrangements chair.

Layer and Shulins also recognized BTS president, Bill Meintel, for his leadership and support of the Symposium and for making it possible to take it to San Diego this year.

This year's Matti S. Siukola Memorial Award, which is presented for the paper chosen best from the previous year's Symposium, went to Merrill Weiss for his 2012 presentation "Interference from Passive Intermodulation (PIM)—Keeping the Red Flag Flying."

Following the presentation of the Siukola Award, President Meintel commended Layer and Shulins for their years of service as Symposium co-chairs.

Upon completion of awards ceremony, the group moved back inside to the meeting room where Bob Zitter, formerly with HBO and now an industry consultant, presented his views on the direction that television may take in the next five years. [Coverage of his Zitter's presentation is presented elsewhere in this Newsletter. Ed.]

Interference and with the Global Spectrum Crunch

Following Zitter's remarks, the last formal Symposium session was convened by Bob Plummer. As originally planned, this was to have consisted of two separate panel discussions, with the first covering recent C-band interference problems and the second examining global spectrum issues. Unfortunately, the U.S. government

shutdown, along with visa problems prevented some of the invited panelists from appearing and the two discussions were combined into a single “Spectrum Issues Worldwide” session, with five panelists who were able to attend (Winston Caldwell from Fox, Jeff Watts from SES, Doug Lung from NBC Universal, Elena Puigrefagut from the EBU and Bill Meintel of MSW) appearing together to speak on some of the spectrum challenges facing all developing nations of the world and participating in a question and answer session.

Notes of Thanks and Appreciation

The recently formed San Diego BTS chapter provided a large amount of assistance in ensuring that the Symposium ran smoothly in its 2013 location. Special thanks are in order for Murat Karsi, Chapter chair, whose help was invaluable in making sure that the Symposium went off without any hitches, even though its organizers were a continent away. Thanks are due also to the following San Diego Chapter volunteers who helped to make the event a success by volunteering their time and efforts: Tom Bilotta, Saharnaz Baghdadchi, Stephen Peters, Chris Hancock, Chau G. Le, Steve Bower, Rong Rong Lu, Ralph Malaker, Upkar Dhaliwal, Donald Pian, Priyanka Chavan, Art Davis, Abhishek Choksi and Tom Cylkowski who helped in such areas as Symposium promotion, streaming camera operation, and more. The Symposium was also pleased to welcome a number of new faces from the San Diego area this year as both speakers and audience members.

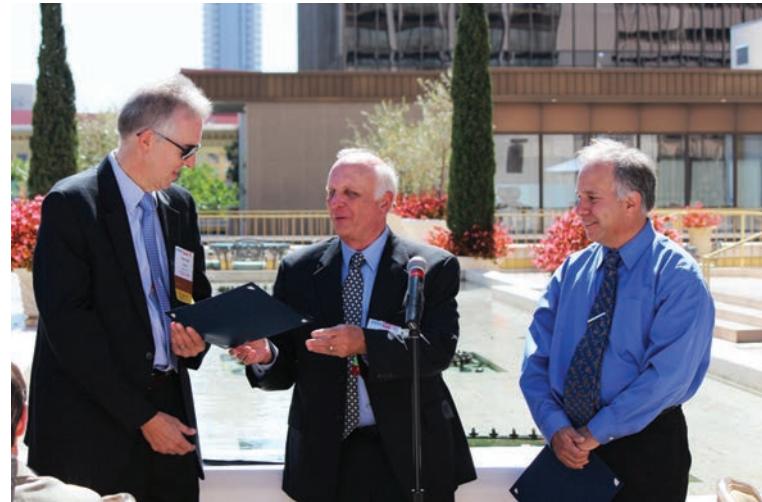
A virtual component was added again to the Symposium with live Internet streaming and archiving of all events through the efforts of Tom Gurley who once again stepped up to the plate to organize this. Acknowledgement is also made to John Reiser, who didn't let the 3,000 miles separating his home in Alexandria, Va. and San Diego keep him from taking charge of house audio duties, something John has handled for some three and a half decades now. Also journeying cross-country were Piscataway-based Amanda Temple and Kelly Smith. Their considerable assistance in keeping conference administrative details flowing smoothly deserves special recognition. The efforts of James Fang in once more keeping presenters' PowerPoint slides flowing smoothly also need to be acknowledged. This year, Fang was aided by Technical Committee co-chair Roz Clark.

A note of thanks is also extended to NewTek, which provided streaming equipment, as well as the services of Brett Collins of Absolute Live Productions to operate it. Thanks are due too to Canon U.S.A., Inc., for supplying the HD cameras used in connection with the streaming and also to Jung-Jin Ahn, Canon's pro market representative, for providing on-site camera operator training services.

The efforts of other event sponsors, including Broadcasters General Store, Nautel, Sierra Automated Systems,



(l-r) Paul Shulins presented certificates of recognition to James Fang and John Reiser for their continuing contributions to Symposium support operations.



BTS president Bill Meintel (c) is thanked by David Layer (l) and Paul Shulins (r) for helping make it possible to hold the 2013 Symposium in San Diego.

Shively Labs, ERI, Harris Broadcast, Jampro, Kintronic Labs, Myat, Qualcomm, Radio Frequency Systems, SPX/Dielectric, duTreil, Lundin & Rackley, Sony, Wheatstone, Orban, the Telos Alliance, Tieline, Richland Towers, BSW, Comrex, and SCMS, are also appreciated.

Perhaps the biggest thanks of all should go to Symposium co-chairs David Layer and Paul Shulins, who for the past three years have selflessly done a great deal of the heavy lifting needed to make the event the success it is.

Next year's Symposium will be held Oct. 14–17 at the Hilton Palacio del Rio hotel in San Antonio, Texas. Details about the 2014 Symposium event will be available at the BTS Website, www.ieee.bts.org.

Readers are reminded that the archived presentations of 2014 Symposium is now available on demand at the Virtual Symposium website, <http://bts.ieee.org/broadcastsymposium/virtual>.

Mark Aitken Offers Plan for Resurrecting Local Broadcasting in Symposium Keynote Address

Industry leader says broadcasters are 'behind the times' and must change

By James E. O'Neal

SAN DIEGO

In his Oct. 10 keynote presentation, "Separating TV Services from the Platform—Today's Reality," Mark Aitken, vice president of advanced technology at the Sinclair Broadcasting Group, stressed that changes must be forthcoming by local broadcasters in order to keep their services viable.

Aitken delivered the BTS Symposium joint BTS/AFCCE luncheon and opened his remarks with a wakeup call to broadcasters:

"From the beginning, broadcast television was really the way that you delivered one-to-many within a marketplace, but we're getting our butts creamed by every other competitor that comes along—whether it's cable, satellite, fiber, the other wireless guys—the fact is that our lunch is being eaten." He noted that television broadcasting revenues have considerably diminished over the past few decades, largely due to the emergence of heavier and heavier competition from cable and other programming providers.

Restructuring Will Be Essential for Industry Viability

"We're a \$15 billion industry and we're receding," said Aitken. "I have to bend down into the local marketplaces and see that our ability to deliver advertisements—while it's still a healthy market—is a market, has categorically shrunk over the last 20 years. Folks like Comcast have come along—in the Baltimore market last year alone Comcast sucked \$50 million in advertising dollars that used to be ours, so the ability to differentiate who our users are and to deliver to them



Mark Aitken

the content—the 'goods'—via the bits that we have available to us is going to be an important part of reinventing this industry.

"All those things that the Internet does so well—being able to differentiate audiences and bring together audiences with content ... that they're wishing to have—we need to be doing that, and we need to be doing it smart, and we need to be doing it better because we're behind the times. So we have this opportunity to leverage a new platform and the platform really is about making best use of spectrum in new ways and ways that are fundamentally different than this monolithic view of broadcast television. And the question we have to ask ourselves is 'what are the other things we could be doing with those bits besides delivering program content?'"

Looking Beyond Conventional Practices

Aitken noted that while delivering content was not necessarily a bad thing, stations needed to start looking at other ways to bring in revenue streams.

"Today our business is about primarily one thing and that is advertising—delivering an audience to people who are trying to sell something,"

Aitken said. "There is certainly a lot more that we could be doing with what we have, both in terms of a platform and in terms of content.

"A lot of what we've been talking about is how do we take broadcasting and turn it into a real industry, not just a collection of small industries dealing in a local market [and] there's a big distinction between broadcasting and content creation."

What to Do With the Spectrum We've Got

In broadcast, you've got a diverse collection, if you will, of spectrum at work," said Aitken. "You've got VHF and UHF spectrum which is fundamentally different in many of its assets, and there has to be a way to put content onto different platforms—and when I say platforms, it's not just about broadcast television, it's about all the platforms that we ought to be on. We hear about OTT; well we need to be there. We hear about opportunities as MVDOs and we need to be there. There are lots of opportunities and lots of different platforms that we ought to be on, but the question is how do we make that happen collectively and as an industry in a way that allows us to distinguish ourselves from others?"

Aitken examined the fundamental differences in UHF and VHF spectrum, observing that there are advantages to each. He noted that the UHF band allows broadcasters to reach small handheld viewing devices and tablets and plays well with SFN topologies, while VHF has the "ability to propagate to households with more bits than anybody can...."

Aitken suggested that U/V broadcasters in a given market might be able to capitalize

on the strengths of each other's signal coverage by a sort of resource pooling.

The 'Broadcast Market Exchange'

"We've come up with this idea of a broadcast market exchange and it's very simple," said Aitken. "In the world of virtualization that many of us are familiar with today, the ability to take bits and bring those bits together and make smart decisions as to how those bits can be distributed for the most value in the most effective way across the available platforms and mediums available is at the core of the broadcast market exchange.

"Think of this as the intelligent network that you spill your bits into that's capable of making business decisions, of bringing together relationships that have been defined in that environment, and making something bigger happen than otherwise could happen."

He advocated a "pooling of bits" by a group of local broadcasters and their

"doing virtual business deals inside that environment" to allow all players to take advantages of the TV broadcast spectrum collectively within a given market, stating that: "...we're not talking hocus-pocus...what we're talking about is literally the kind of smart infrastructure that has been leveraged by our wireless competitors today".

Aitken observed that broadcasters could choose to just ignore all of the industry change going on around them and be complacent and go out of business, or they could change and adapt.

"It's optional," he opined. "You don't have to be there; you can be the island of a broadcaster that you are and do what you've always done and watch the sun settle in the far distance, but the fact is that I think there is a lot that can be done within broadcasting that can increase the value of this industry by a four to seven times multiple."

Become an ATSC Member

In concluding his remarks, Aitken encouraged all interested players to join the Advanced Television Systems Committee, stating that: "ATSC is not just open to broadcasters. If you have a material interest in the activities of broadcast television there's a place for you at the table and we need your engagement. As I said, I think that probably the most refreshing part of the activity underway at the ATSC right now...has a lot to do with the notion of bring global standards together, harmonizing those standards, and creating a platform that's quite literally is capable of playing globally, but more importantly can play directly into the pocketbooks of our owners and principals and shareholders and provide real value out of the RF spectrum that we have today and that we need in the future, and play a pivotal role in shaping what's known as communications in the United States for decades to come."

Innovation doesn't just happen.
Read first-person accounts of
IEEE members who were there.

Photo: NASA

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Bob Zitter Delivers Symposium Friday Keynote

Former HBO CTO predicts continuing evolution in TV viewing/delivery practices

By James E. O'Neal

Bob Zitter, a media technology advisor and former chief technology officer at HBO, presented the 2013 Symposium's Friday keynote address, following a buffet lunch served on the Westgate Hotel's rooftop terrace.

Zitter's talk was entitled "Television Industry Trends in the Next Five Years," and in it he offered his thoughts about a number of business and technological changes that he expects may take place in the near future.

Zitter first, however, offered a "disclaimer" to preface his remarks, stating:

"I do want to apologize in advance to some of the traditional broadcasters in the room because I thought that especially for a Friday afternoon it would be good to be a bit provocative to raise some topics that [you] might accept."

Predicts Cloudy Future for Mobile TV Broadcasting

Perhaps the most profound of these topics were Zitter's views about television consumption on handheld and mobile devices. After offering an apology to colleagues involved in ATSC work in this area, Zitter stated the following:

"I am a skeptic when the broadcast industry talks about using their spectrum for mobile so that consumers can watch television on these things [handheld devices] or tablets," Zitter said. "Consumers want to watch television on these things or tablets, but they're already doing so. Almost everything they want is already available or can be or downloaded from the cellular carriers' networks. Yes, there is the issue [that] they're paying for that—data caps and all of that—but so far [this] hasn't been an inhibitor at all for consumers who want to watch programming in a mo-



Bob Zitter

bile space. I believe it's an honest debate about whether we should burden the cost of these devices by putting technology in [them] to receive over-the-air signals. I don't believe the consumer is going to see any benefit to it."

"At the end of the day I think that mobile is something that people are going to want to watch, but I don't see it happening through an ATSC standard using the over-the-air spectrum devices that need to add some circuitry or software."

Hints That More Spectrum Cuts May Happen

Zitter also made a prediction about further reduction in broadcast TV spectrum.

"Spectrum pressure is not going to get better; I believe that it is going to get worse...." He said. "There are a number of reasons for that. The demand for additional spectrum for wireless is going to not stay flat; it is going to increase as usage of this technology simply increases and as consumers want to use wireless technology for video. That's going to change what their expectations are in terms of reliability of service and the demands on the bandwidth that are available to provide it. The consumer and the wireless compa-

ny's perspective are going to fuel continually what's going on in Washington, particularly as it tries to be responsive. And at the end of the day . . . out of the 111 million TV households that exist in the United States today, 100 million of them get their television from MVPDs like cable, telephone companies or satellite. That says that there are no more than 11 million homes that rely on over-the-air transmission for television, and some number of those 11 million homes don't rely on over-the-air; they rely on the Internet. That weighs in on politicians attempting to deal with how...that spectrum is put to use in terms of delivering television."

Where TV Viewing and Broadcast Network Operations Are Heading

Zitter also believes that the days of "linear" or real-time television viewing are numbered, stating that more and more programming is being consumed on a delayed basis.

"We at HBO have believed for many years—and there are a growing number of people who do this—that the viewership of television on-demand is only growing and quite frankly is growing rapidly," said Zitter. "The live ratings wind up being perhaps about 50 percent, or no more than 50 percent of the aggregate viewing numbers for the show. People are using technology—whether it's on-demand, whether it's the Internet, whether it's DVRs—to control what they want to watch when they want to watch it. That was why HBO created on-demand in our subscription-only demand service in 2001. I can tell you from my grandchildren that they just don't watch anything in linear—even sports—they're getting into the habit of watching through DVRs."

He also believes that television networks will be restructuring themselves in order to survive marketplace changes.

"At the end of the day broadcasters recognize—certainly the broadcast networks—that their business could not survive if it was limited only to support of advertisers," Zitter said. "They needed to [use] the model that cable programmers have been developing—not HBO, but the ad-support programmer—which is a dual revenue stream: support from advertising, as well as a share of what consumers are paying MVPDs, and that's something they ... need to survive, and to some degree their MVPD partners are working with them on that."

"It really is saying that if you look at broadcast networks in the future with less spectrum available and most of their viewership coming through MVPDs for which they're getting paid, then the difference between a broadcast television network and ... a cable network such as USA or TNT is really very minimal. Those networks will look and act more and more like cable networks."

Moving Into An All-IP Platform

Zitter also predicted that more and more IP technology will find its way into areas that were formerly driven by

conventional broadcast-type hardware, mentioning a shift that is already taking place within the cable TV industry.

"In terms of cable, there is a lot happening," Zitter said. "The distribution technology that cable is using is changing, and they can't change fast enough from QUAM to IP technology."

"The cable operators want to change this technology for many of the reasons that we were talking about earlier with respect to radio [IP environments]—you can take advantage of the cost curve of using essentially IT equipment where it's appropriate. We have been doing that this at HBO for a number of years. You might have broadcast-quality servers playing out to air, which is the most expensive storage we have, and then we have tier one and tier two IT storage storing the vast library of our programming which maybe doesn't need that level of reliability."

"The other reason they're changing is really two-fold. We all know, and we've all complained, that the cable operators would roll out set top boxes [with] user interfaces that were clunky and haven't changed in 10 years. The reason for that is it's all burned into the chips based on the processors that the set top boxes could handle at the time they were deployed, and since it's such a large investment for them, not something they would change rapidly."

But when they take the approach of using IP technology, aside from lower priced equipment in the home that can be more software-based, it allows them to do things further upstream either in their headends or in the cloud, or whatever. That means that if they want to change the user interface or come up with some new product or offering they can do it a lot faster and be more responsive, and hopefully from their perspective, do things as rapidly as anyone else in the Internet space."

In his presentation, Zitter also fore-saw changes in television program "bundling" policies by cable and satellite delivery companies, as well as a move away from today's fixed data service rates imposed by telephone and cable providers.

"What I expect to see them doing is starting to offer a lower priced tier for the lower data rates that people used to have at five Mbps and higher tiers for higher capacity," Zitter said. "They're ready for the revenue to shift as people start watching more of their video through IP with variable pricing so they can capture as much of that as possible."

He also predicted a move by the industry to adopt more efficient video coding technologies and also a dramatic increase within the average home of Internet-connected devices.

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IBC Show Sets Record With 52,974 Attendees

BTS AdCom meeting held concurrently with IBC event

By James E. O'Neal

AMSTERDAM

Broadcasters from around the world again descended on this quiet metropolitan city, arriving in record numbers this year to learn about the latest in broadcast technology at the 2013 IBC Show held at Amsterdam's RAI Center Sept. 12–17. According to show organizers, this year's official attendance was 52,974, up almost four percent from the 50,937 attending last year. More than 1,400 exhibitors—up from 1,300 last year—filled the show's 14 exhibition halls and outdoor exhibit areas, and a total of 431 papers and presentations were delivered at the event.



Amsterdam's RAI Center was once again host to the IBC Show, with more people than ever before flocking to see outdoor and indoor exhibits and to take advantage of the more than 400 papers presented this year.

The 2013 IBC Show featured the latest in broadcasting technologies, with all elements of the technical side of television and radio production and transmission prominently on display inside the RAI Center's spacious exhibit halls or on the outside display area set aside for mobile production trucks and satellite equipment.

Even the weather cooperated to make the show an enjoyable and worthwhile experience. Although Amsterdam weather can be quite wet at this time of year, raincoats and umbrellas were needed only occasionally. Clear skies and mild temperatures prevailing for much of the IBC Show week.

As the IEEE's Broadcast Technology Society is a one-sixth stakeholder in the Show, the event is of special interest



All of the major broadcast equipment players and their latest technologies were very much in evidence at the IBC Show.



The fall BTS AdCom meeting was held concurrently with the IBC Show this year, with 21 members attending in person and six more by conference telephone.



After several decades of service as IBC Show BTS liaison, Mike Bennett decided it was time to retire. Here BTS President Bill Meintel presents a commemorative plaque to Bennett in recognition of that service.



Bennett's duties as IBC liaison were formally turned over to Bill Hayes. This transition of power was a somber and serious moment and both gentlemen did their best to observe the solemnity of the occasion.

to our organization, and a number of BTS members made long-distance treks from many parts of the world to attend. The BTS is always visible and prominently represented via a staffed "table" located in the area set aside for other sponsoring organizations. This provides an opportunity for show attendees to meet with BTS representatives and learn more about our organization and to sign up for IEEE membership if they wish.

Some Show Highlights

Perhaps the biggest IBC Show "takeaway" this year was the very visible push to ultra high-definition television imaging, with 4K video being touted and displayed by many of the Show's exhibitors. Not to be outdone, NHK was set up once again in the IBC's "Future Zone" with a look at that organization's latest developments in 8K imaging and transmission. Also of interest in the "Future Zone" were demonstrations by the BBC on the higher television frame rates needed to accompany a greater number of scanning lines, and a look into what the home "television set" may evolve into within a few years as visualized by NDS-Cisco. That company's exhibit "tent" was continuously packed with persons wishing to get a glimpse of the "panelization" concept being espoused by Cisco and its presenter, James Walker. If Cisco's path to future television viewing becomes reality, TV screens will be as large as the consumer likes, constructed of uniformly-sized very thin display panels attached to wall surfaces and communicating with one another to form a seamless display which would be limited only by physical wall space and the viewer's pocketbook. These panels would also be relatively non-intrusive, reverting to a transparent state when switched off and allowing the room's existing wall treatment to be seen through them.

Not to be outdone in displaying possible future television technologies were the Fraunhofer-Gesellschaft research organization folks. At their stand, IBC Show attendees received demonstrations of two very unusual TV cameras.

One of these provided a full 360-degree coverage via 10 small cameras arranged in a circle and looking up into angled mirrors. Computer processing was used to seamlessly "stitch" output from the individual cameras into a composite 360-degree image that was displayed on a large flatscreen panel. Fraunhofer also brought along another "composite" imaging device that consisted of 16 small cameras being mounted close together in a 4×4 grid configuration to create a high dynamic range (HDR) camera. The individual cameras are adjusted to respond to only a small portion of the light output from the subject being imaged and thus allowing capture over a very large range of lighting conditions. Computer processing again "seams" individual images to provide detail in the brightest and darkest picture region and every illumination level in between.

Another IBC Show "look into the future" was the move to an all-IP broadcasting infrastructure. While this move has already happened in the area of radio, its arrival in television has been a bit slower. Show exhibitors provided plenty of testimony that the days of conventional television plant infrastructures are indeed numbered. Stay tuned.

Amsterdam AdCom Meeting

The BTS AdCom fall business meeting takes place alternately between the IBC Show and Fall Symposium venues, with 2013 being an "IBC" year. Despite the travel distance for some, a total of 21 AdCom members attended the Sept. 14 meeting in person and another six participated by long distance telephone. While a large amount of business was transacted in the nearly four-hour meeting, one of the more significant events was the official changing of the guard of BTS IBC Partnership Board representation from Mike Bennett to Bill Hayes. Bennett has served in this capacity for some three decades and earlier this year had sent BTS members his notice of intent to retire after the 2013 IBC Show. Vice President Hayes graciously agreed to take on Bennett's

duties in this regard, with the torch being officially passed from Bennett to Hayes at the AdCom meeting.

As Bennett also officially resigned from the BTS AdCom, this meeting was his last one. President Meintel used the opportunity to present him with a commemorative plaque acknowledging his many years of service to the organization.



IBC's Partnership Village features "tables" for each of the show's stakeholders (IEEE, the Society of Motion Picture and Television Engineers, the Royal Television Society, the International Association of Broadcasting Manufacturers, the Society of Cable Telecommunication Engineers and the Institution of Engineering and Technology) where representatives of these organizations can interact with IBC attendees and provide information about their respective organizations.



The Fraunhofer Institute brought several unusual technology exhibits to the IBC this year. One of them was this special camera designed to provide 360-degrees of coverage.



"Poster Sessions" have become popular at many IEEE conferences and other events. They are also now part of the IBC Show landscape and this year's entries drew plenty of attention.

Make Your Plans for the 2014 IBC Show

Most attendees would agree that the 2013 IBC Show was a very rewarding and productive experience. If you haven't attended this Amsterdam broadcasting show, you should consider making plans to attend the 2014 event and give it a try.



The BTS table provided an opportunity for show visitors to meet with BTS members. Tom Butts (l), TV Technology magazine editor-in-chief, stopped by to say hello to vice president Bill Hayes and his wife, Ellen.



Another Fraunhofer television imaging entry was this 16-camera High Dynamic Range matrix which can provide image detail over a very large contrast range.



Amsterdam and the 2014 IBC Show beckon. Will you be among the crowds at the RAI Center next September?

The U.S. Television Spectrum Auction and Its International Complications

By William R. Meintel
President IEEE-BTS

In some of my previous **Newsletter** President's columns I have discussed the proposed repurposing of television spectrum in the United States for wireless broadband. This is to be accomplished through an auction process whereby television broadcasters would voluntarily auction their spectrum to the government (reverse auction) and the government would in turn auction (forward auction) the recovered spectrum to those who would use the spectrum to provide broadband wireless service.

My previous discussions have focused on the need for the spectrum and whether there would be enough broadcasters willing to participate to make the effort viable. This time I would like to look at a different aspect of the proposed process that I believe must be resolved before any auction should take place. That aspect is the effect the proposed changes would cause with respect to our neighboring countries, Canada and Mexico.

In order to implement a viable new wireless broadband network, not only is there a minimum amount of spectrum required (believed to be about 60 MHz) but, as a practical matter that spectrum needs to be a contiguous block. However, since only a portion of the current broadcasters are likely to participate or have their spectrum "purchased" the reclaimed spectrum will be randomly distributed throughout the band and the country. That being the case, a "repacking" of the existing television band would be required and that would almost certainly mean packing more stations into the remaining spectrum.

U.S. Border Issues Affecting Repacking

The repacking in the United States would be complicated and will likely require the physical relocation of some stations as well as the acceptance of additional interference. However, in the areas along this country's borders it would be even more complicated due to interference protection required by the international agreements with our neighbors.

Based on the current agreements with Canada and Mexico there are a significant number of stations and/or allotments in those countries that the United States has agreed to protect. The current counts are listed in Table I.

Although many of the "stations" in the above list in reality may just be vacant allotments, this does not negate the protection requirements. However, this could make it easier for our neighbors to negotiate, as no existing services would be impacted.

Currently, 223 U.S. full-power TV stations (13 percent of all full-power stations) have some impact on one or more of the Canadian and Mexican stations contained in Table I.

Table I. Stations the United States Is Required to Protect

Band	Canada	Mexico
Low VHF	186	29
High VHF	324	35
UHF	1,383	255
Total	1,893	319

As an example of 159 U. S. stations currently causing interference to one or more Canadian stations there are:

- 34 in New York State including seven licensed to Buffalo and six licensed to Syracuse
- 24 in Washington State, with seven licensed to Seattle and six licensed to Tacoma
- 23 in Michigan, with six licensed to Detroit

A similar situation exists in Mexico with 64 U. S. full-power stations causing interference to Mexican stations including:

- 27 in California, with five licensed to San Diego and six licensed to Los Angeles
- 23 in Texas, with five licensed to San Antonio and two licensed to Austin
- 13 in Arizona, with five licensed to Phoenix and six licensed to Tucson

It is noted that the above example only shows stations licensed to the specific cities and does not include others that are located near these cities, but technically licensed to another community. It is further noted that these examples do not include any U.S. Class A stations (low-power stations that have the same status as full-power stations in the spectrum auction).

Spectrum for Television Broadcasting or Wireless Broadband?

This situation will limit the number of channels available for repacking not only in the border areas, but throughout the country due to the relationship one television market has with its adjacent markets. Beyond this obvious problem there is also the additional issue of what the spectrum will be used for in the future by our neighbors. If they continue to use the entire band for television, there would be a severe impact on wireless broadband operation in the United States. With television station powers typically in the tens to hundreds

Upcoming Events of Interest to BTS Members

- **Jan 7–10, 2014** – Consumer Electronics Show; Las Vegas, Nev.
- **Jan 10, 2014** – IEEE BTS AdCom Meeting, 2–6 p.m.; LVH Hotel, Las Vegas, Nev.
- **Jan 27–29, 2014** – Audio Engineering Society Semantic Audio Conference; London, U.K.
- **Feb 22–25, 2014** – NRB Convention & Exposition; Nashville, Tenn.
- **April 5–10, 2014** – NAB Show; Las Vegas, N.V.
- **April 26–29, 2014** – Audio Engineering Society 136th Convention; Berlin, Germany
- **May 16–18, 2014** – Early Television Foundation Conference; Hilliard Ohio
- **June 12–14, 2014** – Audio Engineering Society Audio Forensics Conference; London, U.K.
- **June 12–15, 2014** – IEEE International Technology Management Conference (ITMC2014); Chicago Marriott O'Hare hotel; Chicago, Ill. (draft paper submissions due Dec. 15, 2013)
- **June 25–27, 2014** – IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB); Beijing, China
- **Sept 11–16, 2014** – IBC 2014 Conference and Exhibition; Amsterdam, Netherlands
- **Sept 10–12, 2014** – NAB Radio Show; Indianapolis, Ind.
- **Oct 14–17, 2014** – IEEE BTS Annual Broadcast Symposium; Hilton Palacio del Rio, San Antonio, Texas
- **Oct 20–24, 2014** – SMPTE Technical Conference & Exhibition; Hollywood, Calif.

If you have information on broadcast-related events that may be of interest to other Broadcast Technology Society members, please submit them at least three months in advance to the **BTS Newsletter** editor at BTSeditor@ieee.org.

of kilowatts and wireless broadband powers typically less than 1 kW, the use of spectrum for wireless broadband could likely be rendered useless in the border areas. It is noted that we have already had some experience with this situation in the United States with wireless operation on former television Channel 52 being severely impacted by television stations operating on Channel 51 in the same area. (Television channels above 51 were reallocated to other services at the time of the transition to digital in 2009.)

On the other hand, if our neighbors opted to also use the spectrum for wireless broadband and do a repack of their television spectrum, then there would be competition for the remaining the television spectrum as well as for the repurposed spectrum. Either scenario would reduce the spectrum availability in the United States.

The best scenario would of course be for a common use of the spectrum on both sides of the border, as that would allow its most efficient use. Another issue that's facing the United States is that there may be no incentive for our neighbors to negotiate. In a negotiation, one must have something to offer the other party so that both will benefit from the ultimate arrangement. In this spectrum case it would appear the United States has little or nothing to offer unless there is some unrelated issue where the country would be willing to make a concession in order to modify the current spectrum agreements.

At this point, we have not heard much about how the international negotiations are progressing. Therefore, until agreements are reached with our neighbors on how the spectrum is to be used on both sides of the border, the protection criteria that will be applied, and exactly what will need to be protected, it seems senseless to proceed with an auction. Without such agreements in place, it will be very difficult to accurately determine the amount of viable spectrum being reclaimed, the number of stations that will need to be repacked, or the spectrum available for repacking.

Rising Stars Program Continues at IBC 2013

Encouraging tomorrow's broadcasters

AMSTERDAM

The “Rising Stars” program at the IBC Show is alive and well and continues in its mission to nurture our next generation of broadcasters. The program grew out of an IEEE BTS focus group several years ago that came to the conclusion that very few young people seemed to want to work in the field of broadcasting.

The Rising Star program is aimed at college level students and reaches out to those enrolled at various universities, technical colleges and academies. Typically about 100 students are able to take advantage of the program, with the BTS sponsoring two of these. Potential

“Stars” must prepare a student paper making a case for their inclusion in the program.

Selected students are provided with funding to cover IBC Show travel and hotel expenses, and are afforded special treatment at the Show. This includes a pass for admission to exhibit halls and technical presentations. There’s also a special “Rising Star” lounge for the students, as well as a luncheon and evening party given in their honor. The BTS-sponsored students are required to prepare a post-show essay describing their experiences. It has become something of a

Newsletter tradition to publish these essays and the writings of this year’s BTS-sponsored students appear below.



IBC is a Dream: a Story of a Russian Student about Trip to IBC2013

By Timofey Aleshin
Student
St. Petersburg State University
of Film and Television

ST. PETERSBURG, RUSSIA

A student scientific conference “Information Technologies in the Media Industry” was conducted at St. Petersburg State University of Film and Television early this July with five students being selected as winners of the competition. They were awarded grants to participate in the International Broadcasting Convention 2013 (IBC 2013), an exhibition and conference dedicated to the media industry, and held in Amsterdam, Netherlands.

I was one of the students selected at the student conference for participation at IBC2013 with the sponsorship of the IEEE BTS. This was unexpected for me, but I felt happy. Thank you, IEEE!

I felt a bit nervous the day before the trip to Amsterdam as I had a lot of questions including: What will I find be there? How well will the people there will understand my English?

After a very comfortable trip from St. Petersburg to a hotel in Amsterdam all of my problems were resolved. I felt myself comfortable and relaxed and looked forward to IBC 2013.

The next day a tram brought us to the RAI exhibition center where the IBC 2013 was held. I was impressed with the friendliness of the RAI staff. They made each guest feel important. The first session of the first day that I attended was “My Own Private Stadium: Engaging Sports Fans with the Second Screen.” This was an interesting presentation of new

“second screen” concept, with the presenter showing us clearly how a multi-channel video signal could be used for watching sports.

Beginning on the second day my events on IBC whirled like a kaleidoscope. I attended conference sessions and visited exhibition stands, and communicated with video professionals and future professionals. I participated in the IBC Rising Stars program along with a number of students from Europe who want to work in the field of broadcasting. It was an exciting experience.

The IBC Rising Stars program was useful not only in making new acquaintances, but also



Timofey Aleshin

with the program's presentations on how to properly write a resume and how to get a job. There were also interesting lectures about contemporary issues in broadcasting conducted by leading experts, along with tours around the exhibition halls.

I do need to talk about the exhibits. The IBC exhibition halls provide a huge space for a myriad of exhibitors and their products. These range from small or start-up companies to giant manufacturers. During the six days of the show I tried to visit all of the stands, but found that it was impossible. I'm just happy that I was able to speak with representatives of a number of companies from various countries. These persons were very accessible and thoroughly knowledgeable about their products.

During the IBC conference we were also able to meet some influential people in the broadcasting business; this will help our prospects of rising further within the broadcasting industry. These professionals shared with us their experiences and knowledge in the field of broadcasting and I would like to thank them for giving us some of their time.

It goes without saying that IBC 2013 provided a lot of good experiences to all of us who were there. There are new acquaintances, new knowledge and new status in the community of broadcasters. I'm sure that I will visit IBC again—I definitely want to return in the future!

My Trip to IBC2013

By Viktoriia Chafonova
Postgraduate Student
St. Petersburg State University
of Film and Television

ST. PETERSBURG, RUSSIA

Allow me to introduce myself; I'm Viktoriia Chafonova and am a second-year postgraduate student at St. Petersburg State University of Film and Television.

On July 4–5 this year, I participated in the 11th international student competition: "Digital and Information Technologies in Electronic Media Industries 2013" event. The first prize was a fully paid trip to Amsterdam to attend the IBC 2013 conference and exhibition.

I won this student competition and this opportunity to attend IBC2013 with the sponsorship of the IEEE. I was issued a "Silver Pass" which allowed me to visit all conference sessions and all exhibition halls.

The IBC conference sessions were devoted to actual problems and technologies associated with the future of broadcasting. The most interesting themes for me were: UHD television, the "second screen," big data, IP, personalized TV and the "cloud."

While at the conference, I attended many interesting lectures and sessions. These included "The Next Wave of Technology," "In Conversation With Tony Wang," "IP in the Broadcast Studio—A Tutorial Session Produced in Association with IEEE," "Games and Screens," and "Cutting Edge—Enhancing and Streaming Immersive Images."

I had a lot of interest in the sessions on the "second screen" and attended several sessions dealing with it: "Second Screen and Social Innovations," "Show Me the Money: Where is the Value in Second Screen Content?" and others. The panelists appearing in the "My Own Private Stadium: Engaging Sports Fans with the Second Screen" session related that the role of data and sport is fundamental, and it is not

enough to simply supply sports-related data to users, but you also need to tell the story with the data.

Another important aspect of the IBC is its exhibition which showcases the latest developments in production equipment, new applications, "smart devices" and many other electronic media technologies. More than 1,000 companies from all over the world were there to show off their developments.

As I am from Russia, I was very pleased to see Russian companies represented. These included the Television Research Institute, the Russian Satellite Communication Company and TriaxesVision (a glasses-free 3D production expert).

As the theme of my university dissertation is 3D, I visited many companies that presented 3D technologies, including Sisvel Technology, Emotion3D and 3D ImpactMedia. In the process I gained a lot of new and useful information for my research work.

During IBC2013, I had the opportunity for conversations with some very interesting people, including such IBC headliners as Mike Bennett, who has served on the IEEE's IBC partnership board; Michael Lumley, IBC conference chairman; Dr. Nick Lodge, chair of the IBC's technical papers committee; Dr. Martin Salter, director and trustee of the IABM educational foundation; and David Crawford, a professor at the U.K.'s University of Essex. I wish to thank them for the opportunity to meet with them.

I would also like to thank Irina Gazeeva, who is my research supervisor and assistant professor at the St. Petersburg State University of Film and Television.

I will always remember IBC 2013! I loved this excellent conference and the fantastic exhibition. IBC 2013 provided me with a great opportunity to meet interesting people—experts and professionals in the field of electronic media industry. It also gave me the opportunity to acquire new knowledge to help me better navigate this big world of TV broadcasting, electronics media and the entertainment industry. IBC 2013 provided me with a lot of wonderful and unforgettable experiences and I hope to return some day.



Viktoriia Chafonova

New Distinguished Lecturers Added to Roster

Tim Carroll and Pat Waddell join DL ranks



Tim Carroll

Tim Carroll and Pat Waddell, both experts in their respective broadcast technology fields, have been added to the BTS group of distinguished lecturers. Carroll is founder and president of Linear Acoustic and Waddell is manager of standards and regulatory issues at Harmonic.

Carroll will be lecturing about audio loudness considerations in connection with mobile television deployment and Waddell will discuss several contemporary broadcast issues, including audio and video compression.

The Distinguished Lecturer program was established several years ago to serve BTS members by enhancing their professional knowledge with programs on the latest developments in the field of broadcast technology. Lecturers are made available upon request by BTS chapters throughout the world, thus providing access for the chapter members to individuals who are



Pat Waddell

well-known for their expertise in various areas of broadcasting technology.

Carroll has been heavily involved in developing systems for management of multichannel surround sound audio and for treatment of loudness issues in broadcast audio. In addition to being an IEEE member, Carroll is also a member of AES, SBE, SMPTE and BKSTS and has been actively involved in standards and practices work within those organizations. He is the chief technical officer of the Tellos Alliance and is actively involved in on-going ATSC and EBU work. He is also an Emmy Award recipient

Waddell has more than 35 years of broadcasting industry experience, is a SMPTE Fellow, and represents Harmonic in standards activities in several groups, including the ATSC, DVB, SCTE and SMPTE. He was awarded the ATSC's 2010 Bernard Lechner Outstanding Contributor Award and has shared in four Technical Emmy Awards.

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TV Coverage of the Kennedy Assassination

Breaking news 50 years ago

By James E. O'Neal

ALEXANDRIA, VA.

Used to be, when Nov. 22 rolled around, most anyone could remember where they were and what they were doing when the news broke about President Kennedy being gunned down on the streets of Dallas in 1963.

I was 16 then and in my third year of high school. I got the bad news, along with the rest of my 1 p.m. English class, from the school's principal who delivered it over the PA system. I had already been working in broadcasting for a couple of years, pulling a weekend shift at a local station.

I have plenty of memories of that Friday and the next three equally sad days, but it's not my purpose here to share my personal experiences. I want to focus on is technology—what broadcasters had available then for getting this "story of the century" out to the world versus what we now have and largely take for granted.

Image Orthicon Cameras

If you'd been at Love Field or the Trade Mart in Dallas on that particular Friday, you likely would have noticed some state-of-the-art image orthicon TV cameras. These beasts of that era were hard to ignore with their large profile and a weight nearly 100 pounds. Cameras, as was the case with most broadcast gear back then, were driven by scores of vacuum tubes. Interconnecting cables for broadcast cameras were about the size of a large garden hose, and considerable rack space and cooling was required for support electronics.

Even in a city the size of Dallas with its multiple TV stations, there weren't that many television cameras due to their cost—more than \$150,000 in today's dollars—and the constant adjusting and maintenance required. Lenses and support hardware were equally expensive, heavy and hard to move around. (Speaking of lenses, while "Zoomars" were available, not everyone had them, as TV broadcasters had spent quite a few dollars on fixed-focal length lenses and wanted to fully amortize this investment before moving to the new-fangled zooms.)

In news events as important as a Presidential visit, it was common practice for stations to share resources; generally, video from the remote cameras was made available to any station that furnished equipment and crews. (Contrast this to the small, inexpensive video cameras today that can run for years with nothing more in the way of maintenance than a battery charge every so often.)

By November 1963, NTSC compatible color was almost a decade old, but telecasting was still largely done only in shades of grey. This was due to the extreme cost of color gear then. Adjusted for inflation, a 1960s color camera sold for more than \$400,000. These early models were even more bulky and ponderous than the monochrome cameras of the day. Few studio productions and very few outdoor events were captured in color in the early '60s. (An equally low percentage of the viewing public had bought into color, so it was probably just as well.)

The image orthicon TV cameras of 50 years ago, in addition to being expensive and large, were not especially user-friendly. By no means were they "instant-on." Going from a cold start, a warm-up period of around 10 minutes, along with some careful adjusting, was required before video was stable enough to be put on the air.

Maybe you've heard the story about CBS not being able to go live with Walter Cronkite as he read the news flash about the JFK shooting. It was done as a voiceover a "bulletin" slide. After things got back to normal following the assassination, a standing order was enacted at the network that mandated a hot camera to be available 24/7 in the CBS network newsroom.

CBS was not the only network affected by the inability to go to live video right away. In reviewing the NBC recordings on YouTube included below, that network had the same problem. In their case, however, a color film chain was available, so the slide for the voiceover was aired in color.

We've all gotten caught at some time or another with our proverbial pants down, and this certainly befell NBC that afternoon. In reviewing the network's initial coverage after the camera had warmed up sufficiently to go with live video, the scene it captures appears extremely unpolished, almost amateurish. While very professional and accomplished journalists—Chet Huntley, Frank McGee and Bill Ryan—did their best to deliver the breaking story, the tools to assist in the effort were embarrassingly few. Resources that even small market television stations have today weren't part of that 1963 NBC coverage.

Perhaps most striking is the total inability to get telephone audio on the air. A reporter who was with the Kennedy motorcade, Bob MacNeil, succeeded in getting a line through to New York, but due to technical difficulties or perhaps control room limitations, it was impossible to put his call on the air. In desperation, McGee, holding the telephone handset, asks the MacNeil to speak slowly and then repeats what he hears into his studio microphone.

A few minutes later a small “telephone amplifier” is handed to McGee by someone off-camera and is affixed to the phone handset. This cheap device immediately breaks into feedback, creating more problems than it’s supposed to solve. McGee resumes mouthing MacNeil’s words until a proper telephone hybrid connection can be set up somewhere within the vast 30 Rock NBC enterprise.

Speaking of McGee and his microphone, it’s impossible not to notice the difference in mics then and now. News microphones were almost exclusively large electrodynamic units mounted on desk stands. The tiny, almost invisible tie-tac electrets condenser lavs ubiquitous today didn’t exist then. Even the network news set of 50 years ago draws attention to itself in its overall plainness and drabness—just a plain backdrop of wood paneling with no logos or any other artwork.

Lower Thirds, IFBs and Prompters

The use of graphics was extremely limited, as there were no electronic character generators in 1963. Everything for lower-thirds had to be lettered by a staff artist or put together with press-on lettering and then photographed. After the film was processed, the frames were mounted in glass-covered slides and handed off to a projectionist who loaded them into a slide changer on the telecine. This process kept graphics to a bare minimum—none of the constantly moving headlines, snipes, or any other clutter that hides a lot of the screen in today’s news programs.

Another thing missing 50 years ago was the IFB earpiece. Air talent took cues from the floor director in most cases. In reviewing the surviving assassination coverage, it’s hard not to notice a lot of off-camera “audio” as others in the studio verbally cued the news presenters to breaking information. You’ll notice too that the “talent” makes no bones about reading from paper copy. As the assassination was a breaking story, there wasn’t much choice—prompting devices did exist, but these were strictly mechanical and almost as difficult as the aforementioned lower-third slides to update.

A news script or individual story had to be hand typed using a special typewriter that made very large letters. Once the script was typed onto a continuous length of paper, this had to be spooled and loaded into the prompter itself. In most cases, prompters were placed on floor stands alongside cameras, rather than being mounted on the cameras themselves. Multiple prompters were problematic due to the necessity of synchronizing these mechanical “script pullers.”

Press service copy was received at a maximum speed of about 60 words per minute. Getting this from the news room to on-air involved ripping the printout off the machine, running it down to the studio and handing it off to the air talent. Newsroom automation didn’t exist. In the 1963 broadcast newsroom, the most technically advanced piece of equip-



Dallas ABC affiliate WFAA-TV used this mobile unit to cover the Nov. 22, 1963 assassination of John F. Kennedy. The camera atop the bus appears to be a Marconi Mark IV, which used a 4.5-inch image orthicon pickup tube. The hearse carries JFK’s body from Parkland hospital to Love Field for transport back to Washington, D.C.

ment would have been the IBM Selectric typewriter—there were no computers, no desktop editing, not even a very sophisticated telephone system.

Another thing we take totally for granted today is stable video. Looking back 50 years ago, it was a totally different story. There were no frame syncs. This is very obvious when NBC took a remote feed from the United Nations and then another from NBC affiliate WBAP-TV in Ft. Worth, Texas. The vertical roll and image tearing associated with taking asynchronous video were commonplace 50 years ago; viewers didn’t complain or even notice—it was just part of television.

Black & White

I mentioned color video earlier. While most broadcasters and even networks didn’t do much with it then, there were some exceptions. One of these was WBAP-TV. The first few cut-ins from that station depicted the Ft. Worth anchor in color. This ended after the third or fourth feed from that station to New York. Apparently someone at NBC felt that the affiliate was upstaging the network and killed the color on those feeds from that point on.

In reviewing the Ft. Worth inserts, it’s interesting to note that WBAP-TV had better luck in airing a live phone call from the field. The “beep” every few seconds superimposed on the conversation brings back a lot of memories. This beep was mandated by regulatory bodies to ensure that the person whose conversation was being aired or recorded knew it was not an ordinary phone call. The beeper was supplied and installed by the phone company and couldn’t be disabled easily.

There were no smartphones or even cellphones back then. The same goes for personal computers, camcorders, handheld TVs, or even microprocessors. The integrated circuit had been patented, but was still had a long way to go before it appeared in electronic equipment intended for

either the general public or broadcasters. Transistors had been on the scene for a decade or so, but were still in their relative infancy and couldn't do many of the things their tube precursors did. Also, they were fairly fragile and finicky and for those reasons had not made their way into much broadcast gear.

Capturing & Editing News

What about news footage in 1963? This was basically limited to motion-picture film, ubiquitous in television broadcasting then. The 16 mm movie cameras, chiefly Arriflexes, Auricons and Bolexes, used by many stations weren't in the same league as today's tiny models that capture hours of HD content on solid-state memory cards. And film playback wasn't exactly instantaneous. Developing could take a half-hour or so and then the film was turned over to an editor.

Long before television, film editing had been honed into a fine art by Hollywood. However, edits were essentially permanent. If you cut and cemented together the wrong frames, some content was going to be lost in trying to correct matters. News footage was almost always done with direct positive film stock, as it would have been too time consuming and expensive to develop a negative and then strike a positive print for editing.

In 1963, videotape was seven years old, but was still very primitive as judged by later standards. Broadcasters relied on two-inch tape costing hundreds of dollars for an hour-long reel. The machines that used this medium were equally large and costly, so they were few and far between.

Videotape editing was even more time consuming, exacting and unforgiving than film editing, as it required developing the magnetic tracks with a special solution of suspended iron particles to make them visible to the editor through a special microscope. This gave the editor an indication of where to physically cut the tape with a razor blade. As images couldn't be viewed directly, frame-accurate cuts were impossible. Also, the editor had to be extremely careful to make sure that the splices weren't done mid-field, as the playback video would roll and the VTR output would be unstable until the servos relocked again.

ENG 1960s Style

Remote video? As stated, the cameras used 50 years ago weren't shrinking violets. They required large trucks to haul them and their tube-type support gear. These vehicles were usually modified buses or heavy-duty "step vans," certainly not the lightweight highly mobile ENG vehicles we have today. Just as with the big field production trucks of today, special arrangements had to be made to park these early news vehicles, and in most cases, off-shore power feeds had to be secured as extremely large generators would have been needed to support the load imposed by the vacuum

tube gear and the air-conditioning needed to cool it. Due to their size and associated acquisition and operating expense, ownership usually was limited to larger stations, and it was rare stations to have more than one such remote vehicle.

Connectivity from the field was also an issue. If you were fortunate to be in a large city, the phone company might have some coax installed in strategic locations that could be rented for special event coverage. Orders usually had to be placed well in advance to access these coax lines. Having them patched through to the station wasn't cheap. The only other way to get video back to the studio was via portable microwave links. Again, these were tube-driven and bulky. Another reason for using modified buses as remote vehicles was that their roof area could support the heavy cameras and large tripod-mounted microwave dishes and heads.

While communications satellites did exist in 1963, that industry was in its very early infancy. There was no regular service available, and even if there had been, mobile and portable uplinks would not exist for many years.

AT&T had the only game in town when it came to cross-country video/audio connectivity, and this was limited to larger cities. Capacity also was limited. In looking back 50 years, it's somewhat amazing that the New York networks were able to receive even the limited amount of video from Dallas/Ft. Worth evidenced in the surviving recordings.

Covering breaking news has always been a challenge for television journalists. At times, it involves a great deal of ingenuity and determination. This is just as true now as it was 50 years ago. Despite the occasional fluffs, fumbles and missed cues, however, the broadcast coverage of the tragic events in Dallas on Nov. 22, 1963, was riveting and compelling. When you look back at the limitations of the equipment available for that coverage, it seems rather miraculous that it could have happened at all, much less have been done as well as it was.

This coverage continued on into Washington with the arrival of the plane carrying President Kennedy's body at Andrews Air Force Base and the Monday coverage of the funeral procession through Washington, D.C., and on to the burial ceremony at Arlington Cemetery. The amount of work that went into setting up camera positions, pulling cables, testing circuits and overall coordination of this coverage was staggering, especially given the very limited amount of time for these preparations and the size and limitations of the television gear and connectivity then available.

I have to wonder if we could have done as well today.

(This article originally appeared on the TV Technology website and is used by permission of that publication.)

Fr. Landell de Moura, a Forgotten Wireless Pioneer

Brazilian priest held early U.S. and Brazilian radio patents

By Marcelo S. Alencar
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*[Editor's note: I had the privilege of meeting Marcelo Alencar at the Broadband Multimedia Systems and Broadcasting conference in London earlier this year where he enlightened me about a relatively unknown Brazilian radio pioneer, Father Landell de Moura. I thought that **Newsletter** readers might be interested in learning more about this inventor and asked Marcelo to prepare the following article for us.]*

Father Landell de Moura was a brilliant Brazilian inventor who became interested in radio not long after Marconi began his experimentation in Italy. Fr. De Moura constructed his first wireless transmitter for message transmission in 1892. Within two years he had perfected his system sufficiently to operate at distances of some eight kilometers—from the Av. Paulista to the top of Sant'Anna hill in São Paulo, Brazil. He obtained both U.S. and Brazilian patents on his wireless system and his name should be added to the long list of wireless pioneers and inventors. This article is intended to provide background on both Fr. De Moura and his accomplishments in the field of wireless communications.

Roberto Landell de Moura was born on Jan. 21, 1861 in the city of Porto Alegre, Rio Grande do Sul, Brazil. He was the fourth of twelve brothers, sons of Inácio Jose Ferreira de Moura and Sara Mariana Landell de Moura, both descendants of traditional families of the state of Rio Grande do Sul. As a child, he became interested in the sciences and eventually attended the Pio American College in Rome, Italy and also the Gregorian University in that city, studying physics and chemistry. He entered the Roman Catholic priesthood at the age of 25 in late 1886.

Upon returning to Brazil, he took up residence at the house of priests at the Morro do Castelo [Castle Hill], a Jesuit enclave in Rio de Janeiro. There he had the opportunity of exchanging some ideas about the transmission of sound via electricity with D. Pedro II, Emperor of Brazil. This

was a subject that had fascinated D. Pedro II for many years and eventually led him to finance part of Alexander Graham Bell's work.

Fr. De Moura, after a great deal of difficulty, finally obtained a Brazilian patent (#3279) in 1900 "for a device appropriated for the transmission of the word at a distance, with or without wires, through space, earth and water."

It is also worth reproducing an article that was published in São Paulo's *Jornal do Commercio* on June 10, 1900 about one of Father Landell's experiments:

"Last Sunday, on Sant'Anna hill, in the city of São Paulo, Father Landell de Moura did an experiment with several of his inventions, with the object of demonstrating some laws he discovered while studying the propagation of sound, light and electricity, through space, earth and the aqueous element, which achieved brilliant success. These eminently practical devices are, like many corollaries, deduced from the above-mentioned laws. . . . present at the experiment [were] Mr. P.C.P. Lupton, representative of the British Government, and his family, among others."

Even more interesting is the description given by Fr. Landell of two of his inventions:

"The Anematophone is a wireless device which has the same effects of regular telephony, but with added clearness and safety, as it works even under wind and bad weather. This device is impressive by the entirely new laws it reveals to us, likewise, what follows: The Teletition, a kind of wireless phonetic telegraphy, which two people can use to communicate with each other without being heard by anyone else. I believe that with this system of mine we could transmit electric energy, through great distances and with a lot of economy, without the need of wires or conductor cables."

Fr. De Moura eventually offered the patents on these inventions to Mr. Lupton to allow the wireless transmission technology to be developed in England. However, according to Landell's relatives and friends, Lupton was a formalist man and was not scientifically enlightened, and not believing in the practical (and commercial) utility of wireless telephony, declined the offer.

In 1901, Fr. De Moura traveled to the United States to seek patents for his inventions there, as, at that time, it would have been difficult to mass produce such technology in Brazil. He initially thought that this would be a fairly short trip, but



Father Roberto Landell de Moura.

it stretched into some three years during which he managed to captivate North American scientific sympathizers with his inventions, and was described by a New York Herald journalist in a 1901 newspaper article as "a gentlemen...who had reached the pinnacle of his genius."

Of his three major important inventions—the wireless telephone, wireless telegraph, and wave transmitter—he considered the former the most important and three months after his arrival in the United States filed for a patent on the wireless telephone (Oct. 4, 1901), delaying patent applications on the other inventions as he believed that it would be only a matter of weeks before the wireless telephone patent would be granted.

The U.S. Patent Office, however, was not satisfied with the theoretical exposition in his application.

According to De Moura's brothers Pedro and João, his theories were so revolutionary—they declared to him at that division—that the patent could not be granted without the presentation of a model of the device for practical demonstrations.

After the rejection of his initial patent application, Fr. De Moura eventually filed for patents on the other two inventions; the wireless telegraph on Jan. 16, 1902 and the wave transmitter on Feb. 9, 1903. However, the Patent Office still insisted on working models of these devices, which de Moura eventually was able to provide. He prevailed and eventually was granted the three patents, but only after meticulous proofs and second-proofs that consumed two years. (The patent on the wave transmitter (#771,917) was granted on Oct. 11, 1904 and the patents on the wireless telephone (#775,337) and wireless telegraph (#775,846) were simultaneously granted on Nov. 22, 1904.

Fr. De Moura returned to Brazil early in 1905, planning to remain for only a few months and then return to New York where more scientific resources were available for to help him turn his ideas into inventions. His intention was to continue to pursue his scientific work. However, this was not to be and he remained in Brazil for the remainder of his life.

Monsignor Roberto Landell de Moura died on July 30, 1928 at the age of 67 in Porto Alegre. By that time his early work and patents on wireless communications had been all but forgotten.

No. 775,337.

Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

ROBERTO LANDELL DE MOURA, OF NEW YORK, N. Y.

WIRELESS TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 775,337, dated November 22, 1904.

Application filed October 4, 1901. Serial No. 77,576. (No model.)

To all whom it may concern:

Be it known that I, ROBERTO LANDELL DE MOURA, a citizen of the Republic of Brazil, and a resident of the city of New York, borough of Manhattan, county and State of New York, have invented a new and Improved Wireless Telephone, of which the following is a full, clear, and exact specification.

The object of my invention is to transmit and receive intelligence at a distance by means of sound and electrical waves, corresponding to articulate speech, without the aid of wires.

In the accompanying drawings like characters indicate like parts in all the figures.

- 15 Figure 1 is a diagram showing the apparatus at one of the stations, both for transmission and receiving. Fig. 2 is a sectional view of certain parts of the apparatus. Fig. 3 is a partial elevation thereof viewed from the front. Fig. 4 is a sectional view of a device for augmenting the sound-waves in receiving signals.
- 20 This apparatus consists generally in a device for transmitting and receiving vocal sounds and speech and includes a signaling device for attracting the attention of an operator. This signaling device is herein shown merely to exhibit the connection of the same with the telephone proper.
- 25 A divisional application claiming this sig-

end means for producing an air-blast comprising a chamber E, containing a fan 11. When one uses the fan and it is in action rotated by suitable power and a person talks into the mouthpiece 9 or 10, a blast of air opens valve 14 and passes up with the sounds from 9 through the tube 15, and the sound-waves with the blast of air are projected by the member 16 against the deflector 17 and by this are sent forth through the interior of the barrel C, which is also traversed inside by the pencil or ray of composite light from 18.

At 17 I show a plate of quartz-glass suitably framed and adjustable by means of the screws 24.

18 is a source of light, preferably an electric-arc lamp, whose light is rich in violet rays.

At 19 is a mirror, consisting of a back 20, which may be of polished metal or glass and of parabolic shape to reflect only actinic or violet rays. I do not confine myself to this form of light or the means shown for rendering its rays parallel or to the particular means for sifting out all but the violet or actinic ultra-violet rays, as any means may be employed that will produce violet or actinic rays or augment their intensity.

Back of the mirror and at intervals around the barrel of the transmitter are ventilating openings 22 and 23, the latter provided with

Fr. deMoura's wireless telephone patent.

His name did make the news in Brazil some four years prior to his passing. This was on the occasion of a public announcement of the startup of a high-power radio broadcasting station in Curitiba, Brazil. At the time—Nov. 3, 1924—he had been elevated to the status of Penitentiary Canon in the Church and in an interview with the editor of the Porto Alegre newspaper, *Última Hora*, de Moura made the following statement which seems to indicate that he was also an early experimenter in the field of thermionic devices:

"God used my humble person to raise the veil that covers the secrets of nature, although the radiotelephony system, in use at present, is based on the principle of the superposition of the electric vibratory movements and the application of a light bulb [vacuum tube] similar to the Crookes light bulb, with three electrodes, a bit modified, and which serves the purpose of transmitting and receiving telephonic and telegraphic messages alike, without the need of a conducting wire."

Indeed, we are indebted to Fr. De Moura for the discovery of this principle and the invention and application of the vacuum tube. It is interesting that no one before him had employed electromagnetic waves (Landellian waves, as they

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Sound the Alarm: A History of Disaster Detection and Warning Technologies

The telegraph and radar were among the first to be applied

By Robert Colburn

Electrical and computing technologies have greatly enhanced the ability to warn of impending natural disasters. Before electrical communications, a severe storm simply traveled faster than observers could warn of its formation.

The invention of the telegraph stimulated the formation of networks of weather observers. In 1848, James Pollard Espy of the Franklin Institute, in Philadelphia, helped establish a network of observation stations to report weather conditions. The following year, the Smithsonian Institution, in Washington, D.C., supplied weather instruments to telegraph companies so they could transmit information over an extensive observation network. In 1868, Cleveland Abbe, director of the Cincinnati Astronomical Observatory, suggested that warnings should be issued three days in advance for storm systems and six hours for hurricanes.

Tornado Watch

In 1883, astronomer Edward Holden, director of the Washburn Observatory at the University of Wisconsin, in Madison, proposed an electrical warning system for tornado-prone areas. It would have depended on an arc of telegraph wire to the south and west of a town (tornadoes in the Northern Hemisphere typically travel from the southwest to the northeast) at a radius of 3 to 4 kilometers.

Grounded at each end, the wire was to be connected to the local telegraph office and have drop-offs at houses along the way. Each house would have been outfitted with an apparatus containing a bell that used a coiled spring (similar to one in an alarm clock) and an electromagnet that would have prevented the bell from ringing as long as current flowed through the wire. A battery at the telegraph office would have kept a constant current passing through the line. But if an approaching tornado snapped the wire, the current would have stopped and the bell would have rung, warning residents to take shelter.

Not only was the system never built, but also use of the word tornado in weather forecasts was banned by the U.S. Weather Bureau from 1885 to 1938. The bureau feared it would panic people or discourage them from settling in tornado-prone areas. What's more, business owners complained of the financial losses caused by tornado warnings

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The U.S. Weather Bureau commissioned its first weather radar in 1947 at Tinker Air Force Base, in Norman, Okla.

when customers and employees stayed home and took shelter. Despite such misgivings, an experimental tornado-warning program began using radio in 1943 to alert listeners in St. Louis and Kansas City, Mo., and in Wichita, Kan. In 1948, a radio broadcast warned of a tornado that touched down near a residential area of Wichita. The tornado caused a lot of destruction but no fatalities.

Even though lives were undoubtedly saved, businesses complained. H.M. Van Auken, general manager of the Wichita Chamber of Commerce, denounced the broadcast. He criticized the Weather Bureau for creating "unfavorable publicity" and jeopardizing the community's industrial development by using the word tornado. Even after the Weather Bureau lifted its restriction on using that word in a weather report, the Federal Communications Commission continued for another 16 years—until 1954—to ban television and radio from broadcasting tornado warnings.

But technology marched on. Developments in radar and in computer modeling led to the next major advances in the detection and warning of severe weather.

On to Radar

In 1946, the U.S. Army Signal Corps began modifying surplus World War II gun-laying radars for use in weather detection. The Weather Bureau commissioned its first weather radar in 1947. The following year, two Air Force officers, Capt. Robert Miller and Maj. Ernest Fawbush, observed that weather conditions around Tinker Air Force Base, in

Norman, Okla., were similar to conditions that had spawned a tornado in the area. They then tracked an approaching storm on radar and were able to issue a warning before the tornado touched down.

As radar technology improved, so did severe-weather predictions. In 1953, Glenn Stout and other engineers at the Illinois State Water Survey, in Champaign, noticed a distinctive hook-shape echo on their radar screens and were able to correlate it with a tornado.

Japan's Mount Fuji Weather Radar System is an example of a sophisticated

detection and warning apparatus. Almost immediately after it began operation in 1964, it detected an approaching typhoon more than 800 km away. The radar system, which was planned by the Japan Meteorological Agency and built by Mitsubishi Electric Corp., was named an IEEE Milestone in 2000.

In 1971, 10-centimeter pulsed Doppler radars became operational. Such radars were designed to detect anything that moves and measure its velocity. Because the radars can measure relative wind velocities, they are able to detect tornadoes even when the hook signature itself is not visible.

They cannot show whether the vortex is aloft or touching the ground, however. At about that time, seismographs—long used for detecting earthquakes—were being developed to detect the characteristic vibrations produced by a tornado funnel when it touches the ground.

Satellite-based remote-sensing systems, which became more advanced in the 1980s, have also been used for the detection and warning of disasters, including floods and tsunamis.

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Fr. Landell de Moura

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were sometimes referred to then) generated by the mentioned bulb, or triode, for the transmission of information. It was not until 1907 would Lee De Forest unveiled his famous "audion" three-element "light bulb."

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FCC Report

By Bob Weller



*[Editor's note: The **BTS Newsletter** began running a report about ITU activities in its last issue. I thought it would be equally informative to include a reporting of some of the Federal Communication Commission's activities and prevailed upon the BTS's Bob Weller to take ownership of this. He graciously agreed and the following column is what I hope to be the first of many "FCC Reports."*

Also, I should point out that at just about the same time as Bob delivered the column to me, the U.S. federal government shutdown came to a close—at least for a few months.]

As I write this, the U.S. federal government has been partially shut down for 16 days with some 883,000 employees having been furloughed. About 1,700 of those employees work for the Federal Communications Commission. In fact, fewer than three dozen FCC employees were either exempted from the furlough (generally because they are political appointees and are not paid from the budget set by Congress for the agency) or were considered essential (generally because they operate the high-frequency direction-finding network or have diplomatic or other national security/public safety responsibilities). I didn't fall into any of those categories. I'm just one of about 266 FCC engineers (more than half of which work at its Washington, D.C. headquarters) who were on furlough for nearly three weeks, so I really can't comment too much about current events at the FCC in this Report. Instead, I'll provide some information about what I and some of the other FCC engineers I work with at the FCC are typically involved in.

One of my roles is to act as arbiter of certain technical matters that are either in dispute, or due to regulation or policy require specific review (often because a waiver of some rule is being sought). Most engineers submit defensible requests, but others are beyond the pale. Some technical consultants (I won't call them engineers) offer arguments that are not technically supported by adequate technical analysis. A more cynical explanation might be that they are trying to gain unfair advantage, as there's no way that the FCC's 266 engineers can scrupulously review every one of the tens of thousands of applications for authorization that are submitted each year.

Engineers generally deal in facts and absolutes. We like the precision of numbers. We like computers because they deal strictly in ones and zeros. Engineers solve complex problems by breaking them down into simple components that can be answered with minimal fuzziness. The thing is, though, that

the answer to an engineering question should not depend upon who is asking it or the impact of the answer.

My group reviews most applications involving "supplemental showings" of coverage for broadcast station's principal community coverage or main studio location. This is usually because the conventional F-curves are deemed by the applicant to be grossly inadequate predictors of coverage. Sometimes, that's an accurate characterization.

The F-curves were never intended to be accurate predictors of coverage or interference along particular paths. That is because the F-curves rely on the concept of "average terrain," rather than an explicitly defined terrain profile. In other words, the F-curves use an abstraction of the terrain, rather than a precise representation of it. Historically, the determination of an "average terrain" elevation was made using USGS topographic maps, but today nearly everyone uses a digital terrain elevation database, such as the USGS Digital Elevation Model (DEM). Similarly, the path profiles used in most deterministic propagation models are also derived from a terrain database. While paper maps have nearly unlimited potential for manual interpolation between elevation contours, digital representations of terrain have a fixed resolution (about 1-second of arc or about 30 meters, in the case of the USGS DEM) and algorithmic interpolation methods can produce artifacts.

For example, data that is arbitrarily sampled from the continuum of real terrain elevations can lead to well-known problem called aliasing. Frequent users of the USGS DEM have become quite good at minimizing so-called "spatial aliasing" problems, but when those data are arbitrarily resampled or interpolated, the consequence may be spurious results. I've been surprised to see terrain profiles constructed from hundreds of points per kilometer of "interpolated" DEM data, even though the underlying data supports a resolution of just 33 points per kilometer. Unless you have a deep understanding of how the interpolation is being done, this is asking for trouble. Similarly, profiles constructed from a few points (or perhaps just one point) per kilometer may not be representative of the true terrain profile along that radial. Propagation software that makes use of terrain data is typically very flexible and an understanding of the implications of terrain sampling parameter choices is essential. When the default sampling interval (usually selected by the software developer) does not provide the desired results, one should not assume that the default settings are inadequate and proceed to adjust the parameters until the results miraculously match those desired.

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ITU Report

By David Guerra



First, a brief introduction.

The Radiocommunication Sector of the International Telecommunications Union is currently structured into seven Study Groups (SG). SG 6 (Broadcasting Service), is composed of three Working Parties (WP) in the current study period that began in 2012. Both, the WPs and SG 6 hold face-to-face meetings twice a year, once in the spring and the other in the fall. Administrative personnel, sector members, along with associates and members from academia can attend also. Attendees from various states, companies and universities are present at the meetings. Participants can submit contributions, input documents related to open ITU-R questions to be studied, or even raise new questions and take part in the working and drafting groups created in the WP's plenary meetings to develop the output documents.

Such output documents are adopted by agreement within a WP and become input documents for the SG meeting where they may become the basis for Recommendations and Reports published by ITU-R. Of course, this is after the necessary processes of amendment, discussion and agreement.

WP 6A, (Terrestrial Broadcasting Delivery) has not always existed, nor did its precursor, WP 6D. As recently as 2002, terrestrial delivery was dealt with in WP 6E. It was in this Working Party that concern was raised about the effects of high data rate telecommunication systems carried via electrical utility or telephone transmission lines on HF radio communication. (This is known as power line telecommunication (PLT) [and also BPL or Broadband over Power Lines, in some regions of the world; editor].)

Prior to this event, any actions related to such potential interference issues had fallen under SG 1 (Spectrum Management).

Early on, it was WP 1A (Spectrum Engineering Techniques) that led the way for the development of compatibility studies by asking for contributions from other WPs in order to develop a new draft report.

Several contributions were submitted to WP 6E in order to assess the potential interference caused by unwanted radiation from PLT systems. Documents concerning lab tests and methodology for conducting more detailed testing were collected to address WP 1A's request for input. These documents were also used for developing a separate Recommendation that addressed issues falling under the purview of SG6—specifically, protection requirements of broadcasting systems that operate below 80 MHz from

wired telecommunication systems interference. These WP 6E efforts led to a controversial draft of the Recommendation in Oct. 2005, whose approval in SG 6—oddly enough—was objected to by one Administration after being adopted in WP 6E. The objection provided some inevitable time for additional contributions in the following year, with the North American Broadcasters Association (NABA) and CBS Inc. being very active along with some Administrations and with the full support of World Broadcasting Unions. Unfortunately, between the latter and some other Administrations, the point of disagreement remained the value to be recommended for the maximum radiation threshold for PLT emissions.

The deadlock continued beyond the beginning of the new study period, with SG 6 suggesting that the preparation of a Report reflecting various studies was in order. It also flagged the need to closely coordinate and collaborate with other SGs, with ITU-T, and with any other standards organizations involved in the matter. However, with regards to tangible results, after extensive discussion in 2008, the only way forward, so to speak, was development of a new Report and a new Recommendation from scratch.

This Report was issued in 2009 and established noise levels that a broadcast receiver operating at below 80 MHz can tolerate. Objections to these figures were immediately raised, even though they had been collected and collated from existing ITU-R Recommendations. Others requested more time to verify the figures and still others reiterated that such a Report could be developed only by SG 1.

(A Spanish idiom comes to mind: "Marear la perdiz"—literally "evading the issue").

In the meantime SG 1 had already approved the Report SM.2158 (Impact of power line telecommunication systems on radiocommunication systems operating ... below 80 MHz), which recommended that the increase in the total noise floor due to PLT should be less than 0.5 dB for broadcasting. At this point ITU-T SG 15 approved Recommendation G.9960 (Unified high-speed wire-line based home networking transceivers). This allowed PLT systems to operate at higher power levels than previous specifications, thus being capable of producing radio interference up to 300 MHz via harmonics even if operating below 80 MHz.

Finally, after more than eight years and almost 100 contributions, the 2010 fall meeting of WP 6A and SG 6 yielded two remarkable results. The first of these was the establishment of a Rapporteur Group on PLT. Secondly, no administration could disagree with the approval of Recommendations ITU-R

BT.1895 and BS.1895, which provide protection criteria for terrestrial broadcasting systems.

These Recommendations state “*that the total interference at the receiver from all radiations and emissions without a corresponding frequency allocation in the Radio Regulations should not exceed one percent of the total receiving system noise power*” and “*that the total interference at the receiver arising from all sources of radio-frequency emissions from radio communication services with a corresponding co-primary frequency allocation should not exceed 10 percent of the total receiving system noise power.*”

Moreover, the recent SG I-issued Recommendation ITU-R SM.1879 (The impact of power line high data rate telecommunication systems on radiocommunication systems below 30 MHz) was specified for dealing with emerging high-speed PLT systems.

From 2011 on, the work has continued in SG 6 and SG I on extending Recommendations to include the 80 to 470 MHz frequency range. The close collaboration within ITU has

enabled the assessment of compliant spectrum masks for ITU-standardized PLT systems.

Nevertheless, there are new items on the to-do list. The project ITU-T G.Fast envisions the use of radio frequencies at least up to 80 MHz on telephone wires for the last part of the local loop. This and other projects such as the High Speed Network over Coax (HiNoC) system and the project on smart grid power management may require updating the aforementioned Recommendations and Reports.

If this had been a fable, a triple moral could have been the conclusion.

First, and unfortunately, regulation is always two steps behind innovation and technology. Second, it's quite difficult to reach agreements when scarce resources such as radio spectrum are at stake. Lastly, (and fortunately for engineers such as ourselves), there are lots of ideas to be developed and lots of work that can be done to optimize the use of radio spectrum in terms of accommodating emerging communication services along with existing ones.

FCC Report

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Contemporary comedian Stephen Colbert might refer to this as “truthiness,” an assertion that “feels right” without regard to evidence, logic, intellectual examination, or facts. Engineers should know better. As in many things, there’s room for interpretation when modeling radio propagation, but an allowance for interpretation requires reasonable judgment supported by engineering analysis. When I started in this industry, there was a catch-all FCC rule that required that licensees follow “good engineering practice” in the absence of specific guidance. While that phrase was eliminated from the FCC rulebook long ago, credible engineers should still practice good engineering and attempt to educate those who do not.

The opinions expressed in this column are solely those of the author and do not necessarily represent the views of the Federal Communications Commission or any of its Commissioners.

Newsletter Deadlines

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

Issue	Due Date
Spring	January 23, 2014
Summer	April 26, 2014
Fall	July 21, 2014
Winter	October 28, 2013

Chapter Reports

IEEE Princeton/Central Jersey BTS Section Hears Presentation on ARRL Product Measurement Procedures

The April 16, 2013 Princeton/Central Jersey Section (PCJS) BTS chapter meeting was held jointly with the David Sarnoff Radio Club at the American Red Cross building in Princeton, N.J. and featured Ed Hare, W1RF, laboratory manager for the American Radio Relay League (ARRL). Hare's presentation was entitled "The ARRL Lab: Trials, Tribulations and (Tall?) Tales." He discussed lab communications transceiver measurement procedures, along with his EMC work on broadband over power line (BPL) technology for the 27 attendees present.

Hare described the ARRL product review process in which products such as amateur radio transceivers are purchased and then lab-tested in a RF-shielded room. When the evaluation is completed, a review of the product is written and test results are shared with the manufacturer before publication of the review in the ARRL's monthly magazine, ***QST***.

Hare noted that such performance reviews provide a good bit of data for amateur radio operators and such reviews often help the manufacturers as well, as they might not be aware of a particular issue that surfaces during the lab tests. Major tests performed include power output, two-tone IMD (splatter), receiver sensitivity, gain compression/dynamic range and phase noise measurements.

Radio Frequency Interference (RFI) was the second part of Hare's presentation. He explained that noise from switch-



PCJS Section Chair Dr. Rebecca Mercuri and presenter Ed Hare.

ing power supplies and BPL noise directly degrade AM radio performance and noted that he's working on an RFI book which will provide practical cures for RFI problems.

Hare went on to describe his industry work within the ARRL EMC programs, including involvement with the IEEE and ANSI standards, the Consumer Electronics Manufacturing Association and the IEEE EMC Society.

A question and answer period followed Hare's presentation.

Submitted by Joe Stack, BTS Chapter Chair

San Diego Chapter Adaptive Bit Rate Streaming

Southern California area BTS members and IEEE San Diego Section members learned about Adaptive Bit Rate Streaming (ABR) during a two-hour presentation by Dr. Prabhu Hosur of AT&T Labs, Austin, Texas on Oct. 11th, 2013. The presentation was titled "Characterization of Video Quality of Experience in Adaptive Bit Rate Streaming."

The presentation consisted of an analysis of ABR streaming subjective quality as a function of screen size, display resolution, and streaming bit rate is presented. Dr. Hosur next provided an analysis and experimental results of contemporary iPad and Android devices in the presence of limited connection bandwidth restrictions.



(l-r) BTS San Diego Chapter chair Murat F. Karsi greets Dr. Prabhu Hosur.

The San Diego BTS chapter was very pleased to host Dr. Hosur for this presentation and discussion and wish to express thanks to him for taking time to make this presentation. Some of Southern California's top broadcast industry executives and video streaming experts were in the audience.

A period was set aside after the presentation for discussions and comments on the technology and business aspects of adaptive bit rate streaming, with active participation from attendees.

Due to the multi-disciplinary nature of the topic, the meeting was a joint venture of the San Diego BTS Chapter and IEEE San Diego Section and Computer Society.

Submitted by Murat F. Karsi, chair, BTS San Diego Chapter

Ce Zhu, BTS Distinguished Lecturer, Addresses Beijing Chapter

BEIJING

The IEEE BTS Beijing chapter organized a seminar on Oct. 21, 2013 at Beijing's Tsinghua University which featured Prof. Ce Zhu, a BTS Distinguished Lecturer.

Zhu's presentation was on "Temporal Dependent Rate Distortion Optimization (RDO) in Motion Compensated Video Coding: An Attempt to Global RDO."

Zhu began by discussing the role of rate distortion optimization in video coding and describing its current status, specifically highlighting the importance and challenges to achieving global RDO. He then provided insights into the global RDO problem, and put forth a source distortion propagation model for the newly formulated temporal dependent RDO. Zhu concluded his presentation by presenting some experimental results with the new temporal-dependent RDO approach and discussed future work on the global RDO with applications to the new coding standards and 3D video.

The one-and-a-half hour seminar was followed by discussions about the global RDO in video coding and applications. Some 20 people attended Zhu's presentation,



Prof. Ce Zhu

including a number of Tsinghua University faculty members and students.

The Chapter hopes to have additional opportunities to serve our community in the future by hosting such well-received presentations as this one.

Submitted by Jian Song

New URUGUAY BTS Chapter Stages Six Events in Eight Months

During the first 10 months of 2013 the newly constituted Uruguay IEEE BTS Chapter has been very active. The Chapter now has more than 20 members and has hosted a number of programs since its inception. Here are some highlights of those programs.

- On March, 4, 2013 the Chapter enjoyed a presentation by the NHK's Yasuto Hamada. His lecture was entitled "The Present and Future of Broadcasting in Japan and Its Relations With Telecommunications." Hamada informed his audience about broadcasters in Japan and NHK broadcasting initiatives. He also discussed the various aspects of digital broadcasting in Japan, including its objectives, Super High Vision UHD TV, energy-efficient broadcasting equipment, and Hybridcasting. Hamada also talked about NHK's disaster relief broadcasting, with emphasis on the network's coverage of the March 2011 earthquake and tsunami disaster. The event was organized by the IEEE Uruguay Section and the engineering faculty of the University of Montevideo and took place at that institution.



Irene Pazos Viana, chair of the BTS Uruguay Section and Rafael Sotelo, Section vice chair.

- Another Chapter activity took place on March 20, 2013 featuring BTS Distinguished Lecturer Valentino Trainotti and his presentation "HF and VLF Broadcasting Antennas." It was also held at the University of Montevideo and organized by the IEEE Uruguay Section and the University's engineering faculty. In addition to HF and VLF antennas, Trainotti also covered radio wave propagation and VHF and UHF transmitting antennas.

- The Chapter hosted a July 25, 2013 event with Anderson Fagiani, a DTV specialist at INATEL, Brazil providing a program on Fagiani's digital television work in Brazil, as well as in several other South American countries and Africa. His presentation took place at the Centro de Desarrollo de Contenidos y Laboratorio de Televisión Digital.
- Rafael Sotelo, Vice Chair of the IEEE Section and director of the ITC department at the University of Montevideo presented an Aug. 14, 2013 program on the global Future of Broadcast TV (FOBTV) initiative. His lecture took place at the Jornadas Informáticas del Uruguay. The event was jointly organized by the IEEE Uruguay Section and the Uruguay BTS Chapter.
- A Sept. 2, 2013 program was held at the University of Montevideo and featured a lecture on NHK antenna work by Nobuyuki Sato, an NHK broadcast antenna engineer who is currently working in Uruguay as a JICA (Japan International Cooperation Agency) digital television expert. The event was jointly organized by the IEEE Uruguay Section and the Uruguay BTS Chapter. It took place at the University of Montevideo.
- The IEEE Uruguay Section, BTS Chapter and University of Montevideo engineering faculty organized an Oct. 18, 2013 program on "Distributed File Systems for Audiovisual Contents" presented by Juan Brenes. It took place the University of Montevideo.

Information for this report was provided by Rafael Sotelo.



Rafael Sotelo (l) with Anderson Fagiani, a DTV specialist at INATEL, who provided the Section's July program.



NHK antenna engineer Nobuyuki Sato presented the Uruguay Chapter's September program.

Distinguished Lecturer Wu Presents Cloud Transmission Tutorial for Spanish Chapter

BILBAO, SPAIN

BTS Distinguished Lecturer Yilan Wu was invited here to present a special program to the IEEE BTS Spanish Chapter about Cloud transmission. The Aug. 12, 2013 program was conducted at the University of the Basque Country faculty facility and attracted an audience comprised of BTS members, PhD students and professors from the school's Department of Communication Engineering.

As explained by Dr. Wu, the new Cloud transmission technology is a flexible multi-layer system that uses spectrum overlay technology to simultaneously deliver multiple program streams with different characteristics and robustness for different services (mobile TV, HDTV and UHDTV) all in one RF channel. According to Wu, the Cloud system is one of the candidates for the ATSC 3.0 standard, is aligned with the COFDM and LDPC techniques used by DVB-T2, and is one of the key technologies being currently analyzed within the Physical Layer Technical Group of the Future of Broadcast Television (FOBTV) organization.

The transmitted signal is formed by superimposing a number of independent signals at desired power levels to form a multi-layered signal. The signals of different layers can have different characteristics, i.e., different coding, bit rates and robustness. However, for the top layer signal characteristics are chosen to provide a very robust transmission that can be used for mobile broadcasting service to handheld devices. Bit rate is traded for more powerful error correction coding and robustness such that the receiving signal-to-noise ratio (SNR) threshold is a negative value in the range of -2 to -3 dB. The negative SNR value indicates that the system can withstand combined noise, co-channel interference and multipath distortion powers that are higher than the desired signal power. Such a low threshold makes the top layer highly robust against co-channel interferences, multipath distortion and Doppler effects.

Dr. Wu's lecture was organized by the IEEE BTS Spanish Chapter as part of the BTS Distinguished Lecturer program.

Submitted by Dr. Amaia Arrinda, Chapter chair

Pros and Cons of Cloud Production Discussed in New York Meeting

NY BTS CHAPTER TEAMS WITH NY SMPTE SECTION FOR JOINT MEETING

The New York IEEE Broadcast Technology Society Chapter held a joint meeting with the New York Section of SMPTE on Oct. 15, 2013 at the NEP Penn Studios in New York City. The meeting was attended by about 55 persons, including nine IEEE members. The topic was "Cloud Applications in Production and Post Production Contribution," with six presenters grouped into two panels.

The first panel addressed cloud applications for feature/episodic/reality television and featured Todd Prives of Zyncrender, Richie Murray of Bridge Digital (representing Forbidden Technologies), and Ben Roeder of Sohonet. The second panel examined the use of cloud applications for broadcast/production/sports and featured Tim Claman of Quantel, Mark Overington of Aframe and Eric Weinstein of iStream Planet.

The panels concluded that while the two sets of cloud applications differ significantly (the first set typically has no live component and is based on the feature model of pre-production, principal photography and post production, while the second set often has a live component and/or same-day contribution elements that must be edited rapidly in order to make air). However, there was significant agreement from all panelists about the value of and place for cloud computing. In particular, there was agreement that while migration from legacy location-based post has started, it's not going to be a rapid switchover and it may not be the solution for everyone.

The principal advantage of cloud-based systems, as described by the panelists, is that the clients need little to no specialized hardware on site. The resources, including the high-resolution files and processing systems (or rendering engines) live in the cloud, so clients typically work with lower-resolution or heavily compressed proxy files and the client software can be a Web application running in a browser. Concerns expressed about utilizing the cloud include availability, content protection (redundancy) and security.

Quantel's Tim Claman summarized the use of cloud technology into opportunities and risks, with the former including ubiquitous connectivity, fluid collaboration, increased asset utilization, pooled provisioning, reduced redundancy, optimized workflows, automated processes, transparent reporting, smoothing-out of peaks in capacity, charges for only what was actually used, a lower barrier to entry and exit,



(l-r) Panelists Ben Roeder, Todd Prives and Richie Murray.



(l-r) Panelists Mark Overington, Tim Claman and Eric Weinstein.

and economies of scale. Cloud risks include: loss of control, unpredictable latencies, security breaches, service outages, interoperability issues, increased fragility, future upgrade hassles, unpredictable performance, dependency on vendors, unpredictable expense, higher costs, and the risk of future operating expense cuts.

Both panel discussions were followed by spirited question and answer periods, with members of the audience expressing concerns over operational cost, security, availability of resources, bit rates and local infrastructure needed and whether cloud applications would support AXF, a standard currently in development in SMPTE.

The joint meeting was produced by John Cerquone of Quantel and Jeff Cohen of Sohonet.

The New York BTS Chapter and the New York SMPTE Section is co-sponsoring another meeting in November on the UHDTV ecosystem. The date and venue for this meeting had not been set as of press time.

Submitted by Bill Miller.

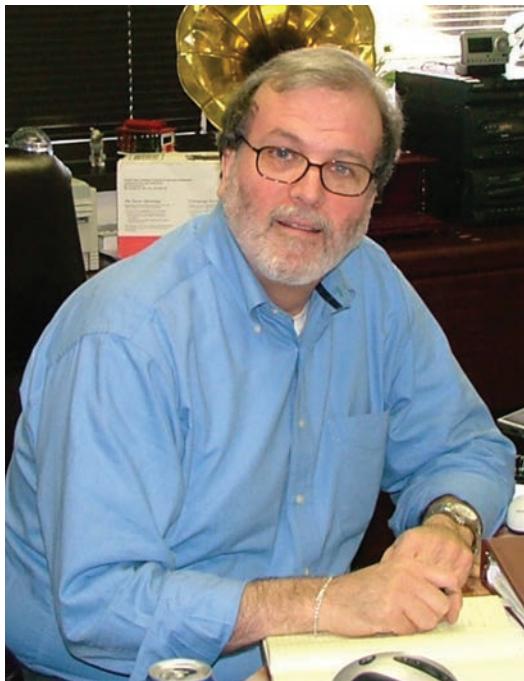
In Memoriam

Engineering Consultant Richard Mertz Dies at Age 65

Richard Mertz, vice president of the Cavell, Mertz & Associates engineering firm, died on Oct. 29, 2013 at his home in Rockville, Md. of pancreatic cancer. He was 65.

Mertz was a longtime member of the broadcast engineering community, having worked in that field for more than 40 years. He had been a Broadcast Technology Society member for many of those years.

Mertz had been associated with the Cavell, Mertz & Associates firm for some 25 years, joining it when it was known as Cavell, Mertz & Perryman. Prior to that, he had served as a staff engineer and project manager at Jules Cohen & Associates, P.C., and had also served as director of engineering for the United Broadcasting Co. and had been manager of technical operations at NBC's WRC-AM facility. Prior to his entry in the Washington, D.C. broadcasting market, Mertz had been employed at several Jefferson-Pilot radio operations in North Carolina and Georgia, including WBT and WQXI, where he designed and built transmitter and studio facilities.



Richard Mertz

Most recently he worked with clients that would likely be affected by the FCC's television "channel repacking" initiative. He also assisted television station operations in transitioning from analog to digital operations and in helping them maximize digital transmission power.

Mertz had served on industry group panels dealing with such areas of broadcasting as AM stereo, multiple ownership and RF exposure protection. He authored a number of technical papers presented at the NAB and IBC trade shows. Mertz also published a column in **Radio World** magazine. He had served as chapter chairman of the Washington, D.C. SBE Engineering Society. He held both commercial and amateur radio licenses.

Mertz was born in New York, N.Y. and graduated from Oglethorpe University with a Bachelor of Science degree in physics. He is survived by his wife Patricia and two sons, Simon and Oliver.

A memorial service for Mertz was held on Nov. 3, 2013. Contributions in Mertz's memory may be made to the Pancreatic Action Network. Information about this organization is available at www.pancan.org.

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Letter to the Editor

More on EAS

Editor,

I received my **BTS Newsletter** in today's mail and noticed that you had published my previous letter and this brought a smile to me, as I know that the **Newsletter** is read by industry leaders and staff engineers at the FCC. Maybe it will give them pause to reconsider the nation's alert channel.

I and others previously planted the seed to use CNN for alerting purposes at several of the EAS Summits, but to no avail. However, if you step back and look at it, CNN is, and has, been the distributor of emergency alerts. Most recently, CNN carried news about the "Boston marathon bomber" incident from the first bulletins to the capture of the suspect. FEMA staffers we worked with when I was on the PEPAC board of directors reported watching the events of 911 unfold on CNN. In trips I made to the Springfield IEMA EOC and Chicago E911 center, I noticed that CNN was prominently carried on the big screen in the operations center. It appeared to me that CNN is at the center of information dissemination at these Op-Centers. Why not make it the "official emergency alert channel?"

One of the suggestions that I and others made that the 2008 Washington, D.C. EAS Summit was for DirecTV, or Dish Network (satellite program providers) to offer a secured subscription channel for first alert responders; i.e. fire house personnel, police, E-911 centers, and similar emergency preparedness centers. When not sending an alert they could provide recorded coverage of past events, fires, disasters, and the like. Such an outlet would serve as the nation's training channel, alert channel, and could also be an audio EAS channel. Reception hardware for these sat services is simple—just off-the-shelf consumer devices. First responders would be issued authorization cards just like you get for any premium channel. I imagine that many first responder locations already have sat antennas and receivers in place, and this sort of communications is probably more survivable and reliable than anything else in place. If DirecTV or Dish Network were to go down, then problems are at a "level 10" and by that time receiving emergency information will be the least of your concerns.

It will be interesting to see if anyone follows up with comments to this proposal. Most of us realize that EAS is only a revenue stream for the FCC. Because of the CAP (Common Alert Protocol) requirement, all of the cable/TV/radio EAS ENDEC units had to be replaced at great cost. Yet the FCC cannot regulate state EOC's to install CAP at state level. The CAP product is most suitable to cell phones and email alerts. The Illinois EOC they dropped a PC-based alert system as they had no budgetary funding line to pay the subscription for it. Yet grants were available to put the system in Illinois 911 centers, Local Primary EAS linking radio stations, and at each of the 101 county emergency centers.

To me, CAP is just another layer atop an already bad plan. I have been on record as opposing CAP and have been very vocal against the deployment of a product with a use dependent on any of the non-survivable linking schemes. I don't want to see my station ownership (or anyone else) having to spend money on yet another alerting system to augment the "broken one" that's already in place.

Warren Shulz

(*Mr. Shulz has been an IEEE member for more than 30 years and is a retired broadcast engineer. He served at the Illinois EAS SECC chair from 1994 to 2010 and as the PEPAC secretary between 1996 and 2010. He served as the chief engineer of Chicago's WLS-AM/FM radio stations from 1989 to 2011.*)

The **IEEE Broadcast Technology Society Newsletter** welcomes correspondence from its readers regarding articles published in the **Newsletter** or other subject matter that may be of interest to BTS membership. All correspondence will be read and acknowledged; however, due to space limitations there is no guarantee that every letter will be published. Please limit your comments to no more than 600 words. We reserve the right to edit letters received for clarity and to fit space requirements. The **Newsletter** assumes no responsibility for any statements made by its correspondents. E-mail comments should be addressed to BTSeditor@IEEE.org.



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The IEEE Technology Management Council invites the thought leaders and innovators in engineering and information technology disciplines to submit a paper or tutorial for presentation at the 2014 International Technology Management Conference. ITMC2014 provides a unique collaborative environment for engineering & technology professionals to discuss what the future holds in technology management.

This year's theme, "TECHNOLOGY ON THE GO", opens with a day of tutorials followed by two and a half days of paper and panel sessions. The process for presenting a paper or tutorial at the 2014 ITMC starts with your submission of an abstract/draft paper or tutorial. Your submittal should address topics related to the management of technology that are relevant to our theme, such as:

Green and Agile	Collaboration and networks
<ul style="list-style-type: none"> • Energy conservation & harvesting • Maintaining quality, accessibility and security • Medical device innovation • Product development with agile management 	<ul style="list-style-type: none"> • BYOD – extended infrastructure • Cloud computing – SaaS, hybrid cloud • Data integrity, security, reliability, document management • Healthcare information management – health metrics, patient care, record access and management
Foresight and strategies to explore new markets	Special tracks and workshops
<ul style="list-style-type: none"> • Big data, informatics • Internet of Things, telematics • Innovative PLM • Predictive analytics 	<ul style="list-style-type: none"> • Six Sigma • Agile Project Management • Education programs in MoT, R&D

Key Dates

Abstract/initial draft paper submission	15 December 2013
Notification of acceptance	15 January 2014
Draft paper due	15 February 2014
Final paper due	15 April 2014

Conference and Author details are available at <http://ieee-tmc.org/itmc2014>



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June 25th – 27th, 2014, Beijing, China

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The IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2014, the 9th in the series, will be held in Beijing, China. The symposium is the premier forum for the presentation and exchange of technical advances in the rapidly converging areas of multimedia broadcasting, telecommunications, consumer electronics, and networking technologies. For details, please check the following link: <http://www.cytsmice.com/pco/bmsb2014/>

<p>General Chair</p> <ul style="list-style-type: none"> Jian Song, Tsinghua Univ., China <p>General Co-Chairs</p> <ul style="list-style-type: none"> Pablo Angueira, Univ. of Basque Country, Spain Albert Heuberger, Fraunhofer Institute II Ulrich Reimers, Tech. Univ. of Braunschweig, Germany Yiyan Wu, Comm Research Centre Canada Feng Zou, Academy of Broadcasting Science, SARFT, China <p>Technical Program Chairs</p> <ul style="list-style-type: none"> Jintao Wang, Tsinghua Univ., China Byeungwoo Jeon, Sungkyunkwan Univ., Korea Bo Ai, Beijing Jiaotong Univ., China Namho Hur, ETRI, Korea Amaia Arrinda, Univ. of Basque Country, Spain Christian Foster, Univ. of Erlangen-Nürnberg, Germany Jian Xiong, Shanghai Jiaotong Univ., China Demin Wang, Comm. Research Centre, Canada Tao Jiang, Huazhong Univ. of Science Technology, China <p>Financial Chairs</p> <ul style="list-style-type: none"> Amanda Temple, IEEE - BTS; Shaoyuan Wu, CYTS, China 	<p>The symposium seeks technical papers on the following topics:</p> <table border="0"> <tbody> <tr> <td>1. Multimedia systems and services</td><td>4. Multimedia processing</td></tr> <tr> <td>1.1 Mobile TV</td><td>4.1 Audio technology</td></tr> <tr> <td>1.2 IPTV & Internet TV</td><td>4.2 Video coding and processing</td></tr> <tr> <td>1.3 DTV and broadband multimedia systems</td><td>4.3 Content adaptation and scaling</td></tr> <tr> <td>1.4 VoD, interactivity, datacasting</td><td>4.4 Error resilient and concealment</td></tr> <tr> <td>1.5 Field trials and test results</td><td>4.5 Rate control</td></tr> <tr> <td>1.6 Content management</td><td>4.6 Retrieval and indexing</td></tr> <tr> <td>1.7 Service deployments</td><td>4.7 3-D and multi-view video</td></tr> <tr> <td>1.8 Future services of Broadcasting</td><td>4.8 Content protection and watermarking</td></tr> <tr> <td colspan="2">2. Multimedia devices</td></tr> <tr> <td>2.1 Display technology</td><td>5.1 Channel modelling and simulation</td></tr> <tr> <td>2.2 Acquisition technology</td><td>5.2 Channel coding, modulation, multiplexing</td></tr> <tr> <td>2.3 Set-top box and home networking</td><td>5.3 Signal processing for transmission</td></tr> <tr> <td>2.4 Mobile, portable, and handheld devices</td><td>5.4 Propagation and coverage</td></tr> <tr> <td>2.5 Program guides and navigation</td><td>5.5 Congestion control</td></tr> <tr> <td>2.6 New human-device interaction</td><td>5.6 Traffic and performance monitoring</td></tr> <tr> <td colspan="2">3. Multimedia quality: Performance evaluation</td></tr> <tr> <td>3.1 Performance evaluation</td><td>5.7 Networking and QoS</td></tr> <tr> <td>3.2 Objective evaluation techniques</td><td>5.8 Next generation of Broadcasting system</td></tr> <tr> <td>3.3 Subjective evaluation techniques</td><td>5.9 Convergence of broadcasting and Broadband Wireless</td></tr> </tbody> </table> <p>Prospective authors are invited to submit extended abstracts of about 1000 words by e-mail to btsbmsb@ieee.org. Each abstract must include at least two key words chosen from the topics mentioned above.</p> <p>Please indicate that the abstract is submitted to the IEEE International Symposium on Broadband Multimedia Systems and Broadcasting 2014, and include the corresponding author's full name and contact information including: Affiliation, address, e-mail and phone number.</p> <p>Important dates: Submission of extended abstracts: December 16th, 2013 Notification of acceptance: February 28th, 2014 Submission of camera-ready paper: April 25th, 2014</p>	1. Multimedia systems and services	4. Multimedia processing	1.1 Mobile TV	4.1 Audio technology	1.2 IPTV & Internet TV	4.2 Video coding and processing	1.3 DTV and broadband multimedia systems	4.3 Content adaptation and scaling	1.4 VoD, interactivity, datacasting	4.4 Error resilient and concealment	1.5 Field trials and test results	4.5 Rate control	1.6 Content management	4.6 Retrieval and indexing	1.7 Service deployments	4.7 3-D and multi-view video	1.8 Future services of Broadcasting	4.8 Content protection and watermarking	2. Multimedia devices		2.1 Display technology	5.1 Channel modelling and simulation	2.2 Acquisition technology	5.2 Channel coding, modulation, multiplexing	2.3 Set-top box and home networking	5.3 Signal processing for transmission	2.4 Mobile, portable, and handheld devices	5.4 Propagation and coverage	2.5 Program guides and navigation	5.5 Congestion control	2.6 New human-device interaction	5.6 Traffic and performance monitoring	3. Multimedia quality: Performance evaluation		3.1 Performance evaluation	5.7 Networking and QoS	3.2 Objective evaluation techniques	5.8 Next generation of Broadcasting system	3.3 Subjective evaluation techniques	5.9 Convergence of broadcasting and Broadband Wireless
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 - "Key Issues Facing Broadcasters Today" by Bob Zitter, Consultant, formerly Chief Technology Officer of HBO

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