

IEEE

Broadcast Technology Society



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NEWSLETTER

From The Editor

In case you have not heard, after 11 years John Tollefson has stepped down as editor of the BTS Newsletter and I am honored to have been asked to take his place. John has served as editor of the Newsletter since its inception in 1992 for which we owe him a huge debt of gratitude.

For those who do not know me I am a long time member of IEEE and the BTS. My day job for the past 14 years has been as a consultant (TechWare, Inc.) primarily working on spectrum planning and implementation for DTV and related activities. Prior to that I spent 20 years with the FCC, initially in field offices in Buffalo and Chicago and then in Mass Media's Policy and Rules division in Washington.

Since being editor of a newsletter is new territory for me I am open to suggestions and of course any help would be greatly appreciated.

In this issue we have a message from John Tollefson, and from the Editor of the BTS Transactions on Broadcasting plus reports from our chapter in St. Petersburg, Russia and an interesting article from the IEEE History Center as well as our regular features.

In addition, please note the Call for Papers for the 53rd Annual BTS Symposium to be held in October. This is an excellent opportunity to share your knowledge with your colleagues. Deadline for abstracts is May 19.

Bill Meintel

From the President

Dear BTS Members:

With this first Newsletter of 2003, I am pleased to welcome Bill Meintel as its new Editor, while extending my heartfelt gratitude to its founding Editor, John Tollefson, who has decided to hang up his green eyeshade after ten years of dedicated service. I know Bill will continue the Newsletter's fine tradition, and that he will welcome your contributions and comments.

I also want to welcome our newest AdCom members, Stephen Dukes and Sid Shumate, whom you have elected to three-year terms along with incumbents Walt Ciciora, Tom Silliman, and Valentin Trainotti. Lanny Nass is taking over the books as Treasurer from Alan Rosner. I'm grateful to Alan for his watchful eye and prudent stewardship of our Society's finances for the past two years. And I hope that Lanny's additional responsibilities won't interfere with his continuing to enliven each issue of the Newsletter with Brain Teasers!

The start of another year is a good time to reflect on the state of our Society and to talk about some of our plans for 2003. At our January AdCom meeting, we began preparing for the formal five-year reviews of our Society and our publications by the IEEE Technical Activities Board, which will occur in November. One worry we do not have this year is our financial condition – unlike several other societies that find themselves in the red and on IEEE's financial watch list. Our financial good health is due in large measure to the revenue we derive as a partner of the International Broadcasting Convention (IBC). This revenue enables us to

subsidize our fixed costs of membership, thus keeping our dues low. Our publications are also in good shape now, unlike the situation we found ourselves in at the previous review, when the Transactions suffered from the lack of adequate peer review of its content. I am pleased not only with the quality of its content, but also with its increasing diversity as we actively solicit contributions related to non-terrestrial broadcast technologies, such as Internet multicasting and direct-to-home satellite broadcasting, while expanding the number of papers on cable television technology.

However, I am concerned that membership in BTS continues to decline. While we experience some churn each year, adding new members even as some current members choose not to renew, the overall trend has been downward for the past half-dozen years after peaking in the mid-1990s. This year, we plan to reach out to the members we've lost over the past two years, to try to determine the reasons and to guide us in adapting better to the changes in our industry and our members' changing needs. The IEEE Corporate Research group will be conducting random surveys of members of all societies later this year, and we will have an opportunity to customize some of the questions asked of our members. We'll keep you informed of these activities as they progress. In the meantime, please convey your concerns, comments, and suggestions directly to us.

Best regards,

Tom Gurley
President

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From the Past Editor

A big WELCOME to Bill Meintel, your new Editor of the Broadcast Technology Society Newsletter. Bill has given me, as your former editor, the opportunity to contribute to the newsletter, and I certainly appreciate being able to write without the responsibility of editing.

When we restarted the Newsletter in 1992, our goals were to provide information on IEEE and the Society to all of us as members and to provide a forum for discussion of issues. Over these past 10 years, many people have contributed to the Newsletter which has made the editing job a real pleasure. But beyond my happiness, the newsletter

has fulfilled its mission, and many people have commented on the positive role the newsletter has.

As we move forward, please provide Bill the good support you have given me. Contributions from everyone are what make the newsletter interesting and informative. Our membership in IEEE and the Broadcast Technology Society is worth far more than the cost, and the newsletter plays an important role in the value. Take advantage of your membership and the newsletter.

John Tollefson

Newsletter Deadlines

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

Issue	Due Date
March, 2003	January 20, 2003
June, 2003	April 20, 2003
September, 2003	July 20, 2003
November, 2003	October 20, 2003

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Remembering Tom Mann

Broadcast Engineer and Past IEEE Transactions on Broadcasting Editor-in-Chief

The Broadcast Industry mourns long time veteran Thomas L. Mann, 53 who died of an apparent heart attack December 19, 2002 at his home in California.

Tom was best known to the IEEE Broadcast Technology Society as the IEEE Transactions on Broadcasting Editor-in-Chief from 1997-1999. During that time, he also served on the Society AdCom.

Tom's many accomplishments in broadcasting began at the age of 15 when he built a working radio station and transmitter in his family's garage. Most recently, Tom founded the consulting firm Weyrcliffe-Century. Before that, Tom served as Vice-President of engineering and new technologies for the USA Network, Director of Engineering at KCAL-TV, Managing Director of operations and engineering at WRC-TV and the NBC Television Network in Washington, D.C. During a tenure with Cavell, Mertz, & Davis he built the first three commercial digital television stations permitted by the United States FCC.

Tom is survived by his partner, Matthew Rahman, his sister, Barbara Mann and nephew, Andrew Rapisarda of Richmond, Va.

A contribution in memory of Tom Mann can be made to the Wildwood Conservation Foundation. The foundation's website is at www.wildwoodfoundation.org.

THE IEEE TRANSACTIONS ON BROADCASTING

The IEEE Broadcast Technology Society has a proud tradition of publishing the quarterly IEEE Transactions on Broadcasting for the past 49 years. This journal serves the broadcast technology profession worldwide by publishing original, high-quality papers that present significant contributions to all aspects of broadcast technology.

The issues are published in March, June, September, and December of each year and are distributed to all members of the Society. This journal is also distributed through subscription services to universities, colleges, commercial businesses, and government organizations. Each issue consists of approximately 100 pages of technical papers and correspondence relating to research and advances in broadcast technology.

Technical Content

The scientific material published in the Transactions relates to the topics that are within the Field of Interest of our Society as defined in our Constitution that states:

The field of interest of the Broadcast Technology Society (BTS) shall encompass devices, equipment, techniques, and systems related to broadcast technology, including the production, distribution, transmission, and propagation aspects.

This field of interest encourages us to publish high-quality technical papers about existing and newly emerging technologies of the broadcast engineering profession. These technologies include digital radio and television transmission, using terrestrial, cable, satellite, and Internet; AM, FM, and TV antenna systems and measurements; RF radiation standards and, testing. Also of interest are papers on new developments in broadcast transmission engineering such as digital broadcast system propagation methodologies, human exposure to electromagnetic radiofrequency radiation, and automation of broadcast facilities operation.

Authors Invited

Readers are encouraged to submit manuscripts to the IEEE Transactions on Broadcasting. To qualify for publication, these materials must be previously unpublished and not be under consideration elsewhere. Authors need not be a member of the IEEE or of the IEEE Broadcast Technology Society but they are encouraged to join the Society to further expand their participation and knowledge in broadcast engineering.

Contributions may be Transactions Papers, Brief Papers or Letters. The distinction is not one of quality, but rather of nature. A Transaction Paper is a well-rounded treatment of a problem area. It is a presentation of significant research, development, or application of broadcast technology. Transactions Papers include contributions from authors that describe useful new results, ideas, or innovations that advance the state-of-the-art of broadcast technology engineering, systems, and applications. Brief Papers concisely addresses one or two points related to a problem. Brief Papers are intended for the rapid publication of new and significant research results. Letters are usually one or two pages. Letters serve to disseminate significant remarks, ideas, or suggestions of interest to broadcast engineers. Letters can also be used to provide comments on previously published papers. In addition, the IEEE Transactions on Broadcasting will publish Tutorial Papers from time to time. The March 2003 issue, 110 pages, presents four Transactions Papers, four Brief Papers, and a detailed Tutorial and Technical Paper titled "DTV Repeater Emission Mask Analysis."

Peer Review

The IEEE Transactions on Broadcasting employs the peer-review system in the processing of manuscripts for publication in order to ensure that this publication retains its position as the premier source of archival literature used worldwide for the development of

broadcast technology and the profession. The IEEE Broadcast Technology Society has established a Publications Committee chaired by the Vice President of the Society to provide guidance and oversight of the peer review process. The Editor-in-Chief and all Associate Editors for the Transactions are members of this Committee. In addition, the IEEE BTS Publications Staff personnel who provide support to the Editors, reviewers, and authors are members of this Committee. The Committee generally meets monthly by a one hour teleconference call to review the status of the papers in the peer review process, to assign new papers, to the Associate Editors, and to finalize the table of contents for the forthcoming issue of the Transactions. This teleconferencing arrangement is efficient and effective for coordinating the activities of the Editors, BTS Publications Staff, and the IEEE Staff.

Reviewers' suggestions for the revision of the manuscript are forwarded to the author by the BTS Publications Office staff. The final decision as to the publication of the manuscript is based on the opinions expressed by the reviewers plus the judgment of the Associate Editor who is managing the peer review process.

Reviewers Needed

The quality and timeliness of each manuscript selected for publication rests on the evaluation and grading provided by each reviewer. The expertise and time volunteered by the reviewers to carefully evaluate manuscripts and offer comments to the authors provides the fundamental foundation for the IEEE Transactions on Broadcasting to maintain a high level of technical quality and timeliness in its publication. At this time, the BTS Publications Committee has a roster of highly qualified and experienced Associate Editors in terrestrial radio and television and cable television technologies. We welcome new reviewers who are able to share their expertise in these fields of broadcast engineering. We are also

seeking authors, and reviewers in the newer technologies of satellite radio and television broadcasting and in Internet technologies that are rapidly converging with traditional broadcasting.

If you are interested in participating in the IEEE Transactions on Broadcasting as a reviewer, please contact the Editor-in-Chief directly at t.kuligowski@ieee.org. Please indicate your area of expertise or experience and include a CV or resume.

Electronic Access

IEEE Xplore provides full-text access to IEEE transactions, journals, magazines and conference proceedings published since 1988 and all current IEEE Standards. The **IEEE Xplore** service enables IEEE Broadcast Technology Society members to electronically access papers published in the IEEE Transactions on Broadcasting beginning with the March 1988 issue and continuing with all subsequent issues. I recommend that you visit

the **IEEE Xplore** web site and browse the listing of prior issues and papers published in the IEEE Transactions on Broadcasting.

If you have not logged onto IEEE Xplore previously, go to: <http://ieeexplore.ieee.org> and navigate via the links to the IEEE Transactions on Broadcasting. Or you can use a link to directly access the IEEE Transactions on Broadcasting which is: <http://ieeexplore.ieee.org/Xplore/RecentIssue.jsp?Punumber=11>.

Types of access to **IEEE Xplore** materials are as follows:

- **IEEE BROADCAST TECHNOLOGY SOCIETY MEMBERS:** Search and access abstract/citation records and full-text documents of the IEEE Transactions on Broadcasting.
- **FREE TO ALL:** Browse and access tables of contents and abstracts of IEEE transactions, journals, magazines, conference proceedings and standards.
- **IEEE MEMBERS:** Browse or search to access any IEEE ab-

stract/citation record as well as articles from IEEE Spectrum Magazine. Access your personal online subscriptions using your active IEEE Web Account. If you do not have one, go to "Establish IEEE Web Account" to set up an account.

- **CORPORATE, GOVERNMENT AND UNIVERSITY SUBSCRIBERS:** Search and access abstract/citation records and full-text documents of the IEEE online publications to which your institution subscribes.

I hope you will find the **IEEE Xplore** service useful to you and your professional needs.

If you need more information, have questions, or suggestions for improving the IEEE Transactions on Broadcasting, please let me know. I welcome your feedback.

Theodore J. Kuligowski
Editor-in-Chief
t.kuligowski@ieee.org

Technical Meeting of IEEE BT/COM/CAS St.Petersburg Chapter (Russia)

Dmitry Tkachenko, **Chapter Chairman**

On January 30, a technical meeting of St.Petersburg IEEE BT/COM/CAS Chapter took place in St. Petersburg (Russia) at the premises of the MART company which is a major manufacturer of TV and radio broadcast transmitters in Russia. There were 14 attendees at the meeting including members of the Chapter and some other interested colleagues.

Participants of the meeting shared with the colleagues the main results of their work in the last year and talked about plans for the year 2003. The meeting was opened by Dr. Artamonov, who is the Deputy Director of the MART company and one of the organizers and most active members of the St.Petersburg IEEE BT/COM/CAS Chapter. Dr. Artamonov informed participants about the work on development of Russian standards

for digital television. It is expected that the package of digital TV standards will include 23 documents covering all relevant fields (terrestrial, cable and satellite transmission, studio equipment, measurements, receivers, transmitters, etc.). A number of Russian companies and research institutes take part in this work. The work is coordinated by Mr. Pavlov, the Head of TV and Radio Department of Russian Ministry of Communications.

The General Director of TeleMedium company Mr. Volobuev talked about experience of his company which started commercial DVB-T broadcasting in St.Petersburg area on July 16, 2002. On February 3, 2003 the company starts digital TV broadcasting with enhanced video and audio quality including 16:9 screen ratio video and 5-channel Dolby sound that will give opportunity to watch these

channels at the Home Theaters so that consumers feel the real difference in comparison with analog TV quality.

The Head of Digital TV and Radio Laboratory of St.Petersburg Radio Research Institute LONIIR Dr. Sinilnikiov talked about participation of his institute in the Russian State Program on distribution of digital TV signal to all territory of Russia via satellites. Due to huge territory of Russia the only transmission system which could cover all the territory of the country is a set of satellites. It is expected that digital TV signal will be distributed via satellite broadcasting in the DVB-S format, then at the local satellite receiving stations it will be re-transmitted by terrestrial TV transmitters in the digital (DVB-T) or analog (SECAM) format. It is necessary to have many thousands terrestrial transmitters in order to cover the populated areas of the

country, but in unpopulated regions consumers will be able to receive satellite programs directly with their dish antennas.

The Head of Department of SupertelDALS company Dr. Lukinov delivered information about recent development of this company - transmitters of digital DVB-C TV signal for head-end stations of cable TV networks. The price of this equipment is twice lower in comparison with equipment of foreign companies imported to Russia. These head-end stations may feed cable networks with up to 100 thousand receivers.

The Head of Video Systems Department of St.Petersburg Institute of Cinema and Television Prof.

Glasman informed colleagues about the most interesting trends in technology that he noted at the IBC2002 conference and exhibition that took place in Amsterdam in September 2002. In opinion of Prof. Glasman, one of interesting trends is transmission of video via IP networks, but usual IP networks do not ensure the necessary quality of service if we use simple encapsulation of video data into IP packets. A possible solution here is introduction of some extensions to Internet protocols that would meet the requirements of video transmission.

The meeting was closed by the Chairman of the Chapter Dr.Tkachenko who shared with

colleagues the information about 52-nd Annual Broadcast Symposium that took place in Washington D.C. on October 9 – 11, 2002. Colleagues with interest learn the information about topics of Symposium and papers delivered at the Symposium. The most of attention was attracted by such topics as work on enhancements in the field of 8-VSB digital TV technologies and introduction of IBOC technology for radio broadcasting in the USA.

The meeting was followed by a friendly reception where colleagues had opportunities for informal discussions. It was solved to have the next meeting of the Chapter at the next quarter of 2003.

2002 Annual Report of the St. Petersburg IEEE Joint Chapter of the Broadcast Technology, Communications and Circuits and Systems Societies (IEEE ST.PETERSBURG BT/COM/CAS CHAPTER, RUSSIA SECTION).

I. Activity of the Chapter in Cooperation with other Organizations In 2002.

1. The Fourth International Conference "Broadcast & Communications Russia" (Moscow, Exhibition Center "Sokolniki", 13-15 February 2002). More than 100 papers were delivered at the conference and more than 1500 visitors attended it. The Chapter was responsible for coordination of all main issues concerning preparation of this conference except for financial and business matters. Chapter Chair Dr. Dmitry Tkachenko was the Technical Program Chair for this conference.
2. Presentations on future trends of Communications were made by the Vice-President of the IEEE Communications Society Dr. Alexander Gelman both in St.Petersburg Electrotechnical University and in St.Petersburg State Technical University on 1-2 April 2002. About 20 – 30 participants (including students) attended these presentations in each place.
3. Tutorial and overview on "Video test & measurement equipment - analog and digital" and "Basic

- presentation of Tektronix solutions on testing & monitoring MPEG/DVB-compliant communication channels" were delivered by the representative of Tektronix company Mr. Florin Vasiliu on 22 April 2002 at the MART company in St.Petersburg. An active member of the Chapter Dr. Alexander Artamonov organized this event for the members of the Chapter and other interested persons. About 25 specialists attended this presentation
4. A meeting with the IEEE members and the conference organizers was held at the Second International Conference "Television: Transmission and Image Processing" (St.Petersburg State Electrotechnical University, 21 – 22 May 2002). The Vice-President of the IEEE Communications Society Dr. Alexander Gelman and the Chairman of the International Association of Broadcasting Manufacturers Martin Salter attended this meeting. The conference program included about 50 papers.
 5. The Third Telecommunications Symposium "Mobile Communi-

- cations - Advanced Technologies and Services" (St.Petersburg, 5 - 7 June 2002). 22 papers were delivered at the Symposium. Active members of the Chapter Prof. Mstislave Sivers and Dr. Alexander Pasmurov were key organizers of this Symposium.
6. Together with other St.Petersburg IEEE Chapters the members of the Chapter took part in the seminar on Microelectronics delivered by Prof. Vijay Arora (Division of Engineering, Wilkes University, USA) on 13 June 2002 in St.Petersburg Electrotechnical University. The seminar contained 4 presentations and the meeting of the IEEE members.
 7. The First IEEE International Conference on Circuits and Systems for Communications was held in St.Petersburg on 26 – 28 June 2002. The conference was sponsored by the IEEE Communications Society (due to help of Prof. Trevor Clarkson) and technically co-sponsored (including the financial support) by the IEEE Circuits and Systems Society (due to help of Prof. Rui de Figueiredo). The

conference officially carried the IEEE logo and the Program Committee selected about 80 % of 140 submitted papers from 28 countries. The most of work on preparing and organizing the conference was made by the Vice-Chair of the Chapter Prof. Alexander Korotkov, who was the Chair of Technical Program Committee. The conference was headed by 2 Co-Chairs - Prof. Rui de Figueiredo (University of California, Irvine, USA) and Prof. Vagan Shakhguldian (Moscow Technical University of Communications and Informatics, Russia). Among participants and speakers of the conference were President of the IEEE Circuits and Systems Society Prof. Josef Nosssek, IEEE Region 8 Director-Elect Prof. Anthony Davies and other IEEE officers and volunteers.

8. The IEEE meeting and Welcome Reception for the IEEE members and participants of the First IEEE International Conference on Circuits and Systems for Communications was organized by the Chapter due to the financial support of the IEEE Communications Society on 26 June 2002 in St.Petersburg. About 100 conference participants and IEEE members attended the meeting and the reception.
9. Together with other local IEEE Chapters, the Chapter took part in the joint seminar on Power

Electronics of St.Petersburg IEEE Chapters and scientific network NORFA that was held on 18 November 2002 in the St.Petersburg State Electrotechnical University. The seminar contained 3 presentations and meeting of the IEEE members.

10. The Chapter Chair Dr. Dmitry Tkachenko took part in the meetings of the IEEE Broadcast Technology Society (BTS) Administrative Committee on 9 April 2002 (Las-Vegas, USA) in the framework of the NAB exhibition/conference and on 9 October 2002 in the framework of the IEEE Broadcast Symposium (Washington D.C., USA). These trips were financially supported by the IEEE BTS. Both meetings gave the opportunity for the Chapter to be more involved in the IEEE activity and to establish new contacts with other Chapters and BTS officers and volunteers. The technical information from mentioned conferences was very valuable for sharing with Russian colleagues.

II. Future Events with Participation of the Chapter.

1. The Fifth International Conference "Broadcast & Communications" (Moscow, Exhibition Center "Sokolniki", 10-13 February 2003). The conference sessions are prepared in association with International Broadcasting Con-

vention (IBC) which organizes a well-known broadcast exhibition and conference in Amsterdam. The conference sessions will be organized in 3 tracks. One day of the conference (11 February 2003) will represent a special session "IBC Presents an International Perspective of Global Broadcasting Issues" that will fully consist of IBC speakers.

2. . The Fourth Telecommunication Symposium "Mobile Communications - Advanced Technologies and Services" (St.Petersburg, 9-11 June 2003).
3. The Conference of Saint Petersburg IEEE Chapters (St.Petersburg, 10 - 12 June 2003).
4. Possible participation in organizing a special session on Broadband Systems at the International Symposium on Signals, Circuits and Systems (Iasi, Romania, July 2003).
5. Participation in the Regional Chapter Chairs Conference of the EAME Region Chapters of the IEEE Communications Society (Rimini, Italy, 22 - 23 September 2003).
6. A number of seminars on implementation of Digital TV and Radio are going to be held in St. Petersburg at the premises of the MART company and to be reported to the IEEE Broadcast Technology Society.

Who's Who

In the continuing series of **Who's Who on the BTS Advisory Committee** we introduce E. Lanny Nass, newly appointed Treasurer of the Broadcast Technology Society.

Lanny is Spectrum Manager for Viacom Inc., with an office in Washington, DC. He is involved with the management of all FCC licenses, the oversight of FCC compliance, and providing engineering consulting services for all divisions and subsidiaries of the corporation.

Prior to joining Viacom, (previously Westinghouse and CBS) in 1996, he was employed at the Ad-

vanced Television Test Center (1994 - 1996), Charlotte DTV Field Test Project (1994), and Director of Engineering for WKBN Broadcasting Corporation, licensee of a television, and several AM and FM radio stations in Ohio and Michigan and Sygnet Communications, licensee of a cellular and paging system in Northeast Ohio and Western Pennsylvania (1982 - 1994). He was also owner and operator of a commercial sound reinforcement company in Youngstown, Oh.

Lanny attended Youngstown State and Kent State Universities in

Ohio. He is a member of the AFCCE, IEEE, IEEE BTS Advisory Board and a member of SBE. He is also an Assistant Editor of the BTS Newsletter and "Compiler" of the Brain Teaser column. He is a holder of a U.S. patent to incorporate GPS into cellular phones for the purpose of determining exact location for hand-off as well as 911 services.

Lanny resides with his wife and "her" 3 cats in Woodbridge, Virginia. He is an instrument rated private pilot and holder of amateur radio license N8IZR. He also enjoys skiing and home remodeling projects.

IEEE Broadcast Technology Society

AdCom Meeting Minutes - Draft

16 January 2003

National Association of Broadcasters

Washington, DC

Participants:

Rich Biby
Jules Cohen
Charles Einolf
Thomas M. Gurley
David Harris
(part-time by phone)
William Hayes
Theodore Kuligowski
David Layer
William Meintel
E.Lanny Nass
Sid Shumate
Tom Silliman
Alan Rosner
April Nakamura

Not Present:

Mark Krivocheev
Valentin Trainotti
Walter Ciciora
Robert Baker
Tim Carroll
Dmitry Tkachenko
Eric Wandel
Susan Crawford

Meeting Called to Order 10:30 AM

1. Review and Approval of Previous Meeting Minutes

Minutes of October 9, 2002, Meeting Approved

2. President's Report

Key Issues:

a. BDO Seidman Report

i. There is concern among IEEE volunteers over the level of complexity and cost that seems to exist in the IEEE infrastructure. The BDO study was initiated by TAB because most IEEE income is derived from TAB, and there have been cost overruns in recent years that have diminished reserves. Several areas of improvement were recommended, and changes are being implemented. Lack of trust was possibly the overriding problem found.

ii. Cost of Membership

(1) IEEE feels dues should cover the cost of Membership. A TAB committee has been breaking down these costs. (See Topic 5.)

b. BTS Issues

T. Gurley enumerated several key issues for consideration by the AdCom at this meeting:

i. Travel expense budgeting

ii. Relationship with CES

(1) ATSC representation

(2) Transaction Scope overlap

iii. Newsletter Editor search

iv. Upcoming Society and Publications Reviews

The Society is scheduled to have its 5 year review at the November 2003 TAB meetings.

There will also be a Publications review.

v. Strategic Planning

There is a recognized need to establish goals for committees and representatives to other organizations.

vi. CCIP (Committee on Communications and Information Policy)

This year, the committee will focus on issues related to Spectrum policy. We should have active representation on the committee during the year as this is an issue that affects the interests of the BTS Membership.

vi. Standards

Need volunteers to revive dormant projects.

vii. Membership

Outreach to lost members;

Identify reasons and improve retention and growth numbers.

viii. Tutorials

We will host tutorials at both NAB and possibly IBC.

T. Gurley announced the sad piece of news that Tom Mann passed away 18 December. He was an Editor of the Transactions on Broadcasting in past years. He worked for Jules Cohen at one time and had been in engineering management at a number of television stations. He was director of engineering for USA Broadcasting.

3. T. Gurley and the AdCom expressed sincere gratitude to Alan Rosner for his two years of service as the Society Treasurer during particularly trying times. A warm welcome was extended to Lanny Nass who has accepted the position of Society Treasurer.

4. Treasurer's Report (Lanny Nass):

a. Treasurer's report was delivered with all main points listed in a hand out: As of November 30, 2002, total BTS assets were \$63K; liabilities were \$10K; net worth was \$53K. Reserve is down \$172K from last year's reserve of \$225K. Net worth of BTS LLC was \$164K, nearly all of which is now being transferred to BTS. Figures do not reflect recent partial income realized for IBC2002 of approximately \$54K.

b. Alan Rosner asked that AdCom keep in mind that there are two entities related to BTS Finances (BTS & LLC, through which the IBC revenue flows). The result of the system is that the Society deficit-spends all year and gets the money back at the end of the year. Most of the IBC income is put into the LLC the year AFTER the conference, so the money from IBC does not reach the BTS budget until the following year.

c. Note the Cost of Membership spreadsheet encourages unbundling of publications but does NOT include information regarding other sources of income.

- d. Alan Rosner extended his personal thanks to Lanny Nass for taking over the position of Treasurer.
 - e. Information on the close of the 2002 BTS Symposium budget is not yet available.
 - f. The balance in the report does not include the year-end income from IBC. That amount is attached in a separate spreadsheet.
 - g. Travel Budget
 - i. Our travel expenses are allocated across several categories. This year, we budgeted \$60K for the "AdCom and Other" category, and we spent \$80K. A good portion of that was spent on travel. Since we can't be assured that IBC revenue will always cover us, this is something that should be addressed.
 - (1) Yiyan Wu would like to travel to Broadcast Asia to deliver a paper in 2003. This has been conditionally approved. Last year, the entourage to staff the membership booth at BA cost approximately \$10K, but the travel group is expected to be smaller this year. Dr. Wu has been asked to provide a budget.
 - (2) Mike Bennett has requested to travel to NAB.
 - h. The 2003 budget shows:
 - i. Membership Committee Budget: \$7.4K
 - ii. Total Committee and Other: \$95K
 - iii. There has been an increase from \$68.9K to \$95.3K.
 - iv. A large category that was increased was the "AdCom" Committee Expense line.
 - v. The other categories stayed the same except: \$4K increase for the Standards Committee and \$6K for possible ATSC dues.
 - vi. The specific events such as Broadcast Asia come out of Membership Committee and Other and are more visible in the accounting. This year, we've tried to be very accurate so that in future years, we can create a budget that accurately reflects the costs that are being assessed to that area.
 - i. Travel Funding

Travel funding has always been approved on an ad-hoc basis. The IEEE travel policy leaves the payment of the expenses up to the Society. T. Gurley began a discussion as to whether some guidelines should be developed, or whether approval for travel should continue on an ad-hoc basis.

 - i. The question was raised regarding what kind of return does IEEE expect to see for the travel to the future meetings? Is the participation of an AdCom committee member at a meeting sufficient? How much money should be expended to support the IBC revenue?
 - ii. It was determined there should be some basic rules to establish types of travel and what is expected for that time spent on travel. Are there intangible benefits, membership growth, potential income? J. Cohen suggested that it would make sense to establish some criteria for what justifies travel to a specific event. B. Meintel suggested that there should be a follow up report in addition to a justification before travel.
 - iii. Bill Hayes: A policy would also give a sense of continuity to the decisions of travel funding. It would not be a subjective standard.
 - iv. Sense of the Board: If IEEE is paying for you to go there, IEEE business is what you're there to do. There should be requirements clearly laid out before the travel occurs.
 - j. A Motion was made that the President develop a travel request form that people requesting BTS travel reimbursement submit before travel. Motion Seconded (C. Einolf). Friendly Amendment (T. Silliman): Add to the form that a formal report be submitted after the trip to summarize the travel. J. Cohen suggested the form should include the traveler's justification of the travel. There would be an understanding that this would become a procedure over time with a list of criteria developed.
 - i. Alan Rosner: A. Nakamura should look at all IEEE travel regulations to make sure that we comply with all requirements.
 - k. Motion Approved unanimously as: "BTS develop a travel request form that includes the travelers' justification for the travel and includes a trip report after the travel."
- 5. Cost of Membership/Business Simplification Process**
- Peter Staecker has headed up this committee and will continue to chair this committee after he becomes TAB treasurer. At the request of the AdCom, Alan Rosner will continue to serve on this committee. Peter submitted a series of PowerPoints which addressed the following items:
- a. Societies were asked to cover the cost of membership. IEEE informed BTS that the cost of membership was \$45 and our dues were \$15. The BTS AdCom rejected a plan to increase the cost each year until the membership dues were \$45, and kept our dues at \$15. We were not the only Society that wanted to be able to subsidize membership.
 - b. At its June 2002 meeting, TAB approved the following motion: "That TAB endorses the concept that, in general, member fees and prices should at least cover the relevant variable costs. To that end, each S/C will annually be provided with the appropriate variable costs and shall consider them seriously in setting member fees and prices." This asks Societies to cover the *incremental* cost of membership. The costs of membership are divided into incremental costs and fixed costs. The total dues revenue should consider the reduced rates paid by special members. These costs should be guidelines and not mandates. Individual Society business models will be respected.
 - c. A spreadsheet showing the costs of membership was distributed. The good news is that our Society incremental cost of membership is \$14.74 per member, and our dues are \$15. Therefore, we cover our incremental cost of full-dues paying

members. Our fixed costs are not covered with dues, nor are our subsidized members. As a note, we have 13% of our membership in the Life member category, who pay half dues.

- d. The items that we may need to address in the future are increasing the dues to account for the Life members, and possible increases in the IEEE Xplore® cost. It looks like IEEE Xplore® costs will be about \$5K based on usage of other similar Societies.
- e. Questions that were raised included: How much would the dues need to be increased to make the dues cover the Life members. J. Cohen stated that he is a Life member, but he pays the voluntary contribution every year. He questioned whether that contribution is credited to BTS.
- f. This is an item to keep in mind during the upcoming months as we prepare the 2004 budget.

6. Business Rules Simplification

There are a series of items that could greatly reduce cost:

- a. Encourage Web-Renewal
- b. Do away with Membership Card or create a one time or permanent card.
- c. Standardize across societies what reduced rates are (for students, pubs) etc.

7. Publications Committee Report (C. Einolf)

- a. Committee meets monthly via teleconference.
- b. Website: Recently updated to match IEEE website. Suggestions and comments are welcome.
- c. Newsletter: John Tollefson has resigned after establishing and 10 years of single handedly producing the newsletter. The AdCom extends its sincere appreciation for his ten years of service.
- d. Transactions EIC Report from Ted Kuligowski:
- e. 2002
 - i. The page budget was 408pp and exactly 408 pages were printed. Three of four issues were in the mail on time.
 - ii. In 2002, we received 80 papers. The two previous years, we received 74. The number of out-of-scope papers was previously 30%, and this year is running at 13%, but that number will soon go up as decisions are finalized. The largest issue was 130 pages, and an article from the December issue attracted attention from several trade publications and newspapers.
- f. 2003
 - i. There are 8 papers approved for the March 2003 issue.
 - ii. The budget for 2003 adds one paper of 12 pages per issue. We hope to add some papers in the cable and Internet area.
 - iii. Projected publication dates are Feb. 25, May 22, August 21, and November 20. .
 - iv. The success of this work has been the result of the publications office in Piscataway, with help from Kathy Colabaugh in particular. The office sends out reminders and handles the administrative needs.
 - v. There are currently 8 editors. Dr. Wu from Motorola was not able to continue as an Asso-

ciate Editor due to his daily workload. We would like to increase the number of Associate Editors from academia and continue to broaden the scope of the papers. A concerted effort has been made to clear out the old backlog. The Symposium presenters have been invited to write a paper.

- g. Other Transactions issues: Three of the papers in the December issue dealt with reception. The Consumer Electronics Society AdCom expressed concern that the papers should have been published in their Transactions. They asked if they could reprint those papers in the Transactions on Consumer Electronics and if, in the long term, our societies could coordinate publication of papers of interest to members of both.
 - h. The sense of the BTS AdCom is that we do refer papers to other transactions when we find that they are out of the scope of our transactions. However, two of the papers in question reflected work conducted by a broadcaster and, in general, broadcasters have a keen interest in reception as an integral part of the end-to-end system. It might be useful for each of the transactions to publish a cross reference to papers of interest in other IEEE Transactions.
 - i. We might also explore joint publication of some papers. This is possible within the boundaries of the IEEE publications rules and an interesting prospect to consider in the future.
 - j. T. Gurley noted that he is very pleased with the Transactions in the quality of the papers and the broadening of the scope particularly in the Cable area.
- #### 8. Society Review
- a. In connection with the TAB meetings in Seattle in November, the Society will undergo the five-year Society Review and a Publications Review. The 1999 Review was distributed to the AdCom and Ted was asked for his help with the 2003 Review. The 2003 Template was included in the AdCom Handout. The book with all responses should be submitted to IEEE by October 2003. Other than the NAB AdCom meeting, the only AdCom meeting between now and then is the June 2003 meeting. T. Gurley pointed out that additional travel expenses will be incurred in connection with these reviews.
 - b. Ted Kuligowski agreed to be the Chair of the Society Review Committee Team.
 - i. The 1999 Society Review went pretty well. The report was submitted and the reviewers encouraged BTS to write a Society manual for future use. This is something we should put together for this year's Society Review.
 - ii. The Publications Review was difficult in 1999. The transactions was nearly subject to closure. A number of action items were established. In response, Associate Editors were added and peer review was initiated.
 - iii. After the review, we should receive a response within one month's time.

9. Jules Cohen: COMAR meeting

- a. The most recent meeting of COMAR was held December 13, 2002, at IEEE Headquarters in Piscataway, New Jersey.
- b. One of the main activities of the committee relates to Technical Information Statements: once they are submitted they are reviewed by EMBS and published in the EMBS Transactions. (EMBS is the sponsor of COMAR).
- c. Electromagnetic Sensitivity has been claimed by a number of individuals but laboratory tests have shown that such individuals cannot identify when they are in the presence of electromagnetic fields. A COMAR paper has been written which acknowledges the belief by some of the existence of electromagnetic sensitivity, but provides no support for its existence.
- d. Two COMAR meetings are held each year, one of which is held in conjunction with the annual meeting of the Bioelectromagnetics Society.

10. ATSC Report: Y. Wu was unavailable but submitted a report.

- a. Y. Wu attended the most recent ATSC board meeting on Dec. 10. ATSC is working with CableLabs to harmonize the DASE and OCAP interactive TV standards, so set-top boxes can work with both terrestrial and cable DTV applications.
- b. IEEE representation in ATSC: IEEE has a permanent seat on the ATSC board. In the past, there was one dues payment for IEEE's membership in ATSC, and BTS and CES alternated year-to-year which Society paid and represented IEEE on the board. Voting was always coordinated between the Society that had the board seat and the other Society. ATSC changed dues policy so that the dues were based on the revenue of IEEE as a whole. Our payment for 2003 would have been \$6200. ATSC agreed that for the purpose of dues payment, it would base the dues on the revenue of each Society, provided that each Society join separately. This would make the dues \$1500/year/Society. The governance issues were left for IEEE to resolve. CES suggested three options. 1: CES neither joins nor is represented in ATSC; 2: Both Societies join but appoint a single representative to the board; 3: Only BTS joins, but CES reimburses us for half of dues and expenses in return for our also representing them. Based on an e-mail poll of our AdCom since its last meeting, we told CES that Option 1 and Option 3 were preferred, and that Option 2 was problematic. We were concerned that it would create an "IEEE identity" issue between BTS and CES acting individually at the committee level but with "one voice" of IEEE at the board level. We are awaiting a decision from CES as to which option they prefer.

11. CCIP and NTDC (R. Biby)

- a. The CCIP is a part of IEEE-USA which acts as a lobbying committee. Dr. Judy Boggess of Cornell is the CCIP representative who deals with spectrum policy. In 2003, spectrum policy is one of the potential areas that the committee will ex-

plore, and it appears to be their Number 1 priority. This may be an issue of interest to our entire Society. J. Cohen pointed out that computer interests have historically dominated CCIP, and that broadcaster participation in the committee was important to provide balance between computer and broadcasting interests. The computer industry has a strong interest in securing additional spectrum for wireless networks such as Wi-Fi.

- b. New Technology Directions Committee: R. Biby agreed to remain on the committee, which is supposed to look over all IEEE technologies and see if any technology is not being covered by one of the Societies. They have identified display technology as something that is not uniquely addressed by a Society but that is of interest to a number of Societies. They have proposed a "Display Technology Council". One of the BTS Standards sub-committees is "Display Measurements". So, we have a significant interest in participating in this Council, should it be formed.

12. Member and Chapter Development:

- a. BTS is sending out a letter and survey to the members who didn't renew. This letter didn't go out in the fall, so we should send out the letter early this year and include those who have not renewed their 2003 membership. We need 10 questions for use on the Survey. Suggestions should be submitted to April Nakamura as soon as possible.
- b. A monthly spreadsheet is sent out to show member renewals. On the latest spreadsheet, as of December 27th, about 230 members have renewed IEEE membership, but have not renewed their BTS membership. This is getting near 10% of our membership already. We need to find out why people are not renewing their membership.
- c. It has been suggested that membership fluctuates with industry controversy. Membership increased in the first half of the 1990s, when DTV was being evaluated and rules were being put into place, and has steadily decreased since that time..

13. Education Committee:

- D. Harris reported by phone the activities he plans to undertake this year:
 - a. Create a Database of educators in accredited BT programs nationwide.
 - b. Look into curriculum issues that can be addressed (especially laboratory experiments).
 - c. Promote the interests of BTS in faculty and in students
 - d. Reactivate student paper contest.
 - i. The Clyde M. Hunt Memorial Student Paper Award was awarded one year but has not been given since. It would be great to re-activate that. It takes only a handful of faculty members to get students active in submitting a paper. There are people out there who could develop an interest in broadcasting if they are directed the right way. We may even find stu-

dents who are interested in non-traditional forms of broadcasting

- ii. Establishing internships and summer positions at BT firms and in manufacturing.
- iii. Education Chair for SBE (the Society of Broadcast Engineers) is interested in working with BTS and starting some joint projects. SBE is mainly interested in technical schools and technical programs.

14. **Standards Report (W. Hayes)**

- a. RF Standards
 - i. The committee is working on two Active PARs and has added a few people recently.
 - ii. It is in the process of acquiring two standards from CEA that have been withdrawn.
 - iii. Last meeting was at the end of December.
- b. Audio/Video Standards (Alan Godber)

In the absence of Mr. Godber, T. Gurley reported on activities of which he was aware:

 - i. There are several subcommittees and projects which have been dormant for a long time.
 - ii. Two or three PARs were going to expire 12/2002. A. Godber has requested extensions but he does not have committee chairs for these PARs.
 - iii. T. Carroll handles the Audio Measurements Standards. That group is currently pursuing a Lip Sync error measurement.
 - (1) There were a few simple methods that he was planning to document for the standard. However, more companies are now involved and a SMPTE committee needs to complete its work before this standard can get underway. Tim expects to be working on the Standard by the spring.

15. **IBC 2002/2003 (W. Hayes)**

- a. Tutorial: A tutorial is planned for one of the days and W. Hayes has been working with Cisco on a tutorial. Thales and Harmonic have been invited to work with Cisco. A preliminary title is "Video Networking Seminar, Technologies and Architecture for Other than Broadcast" W. Hayes will pull all of the ideas together for a proposal that he will submit to Conference Chair Martin Salter by the end of the month.
- b. IBC Update (Report submitted by Mike Bennett)
 - i. The floor space sales are basically on track. 30K of 33K square meters budgeted have been sold.

16. **NAB Convention (D. Layer)**

- a. The successful camera display from last year will not be available this year.
- b. The engineering conference will be in N109-N111, which is near last year's booth loca-

tion. However, the booth location for this year is not definite. The worst that will happen is we'll get the same spot as last year, but we are trying to move over to the even closer spot where the SBE booth was located. We can expect a 10x10 booth. A meeting room request has been submitted to NAB for the AdCom meeting scheduled for Tuesday night.

- c. The IEEE has received a half-day for the tutorial on VSB Enhancements, but T. Gurley and D. Layer are considering requesting additional time to add some more material related to robust-mode transport stream issues.

17. **BTS Symposium**

- a. Budget information from 2002 Symposium is not yet available. This will contain expenditures and costs for IEEE services.
- b. The 2003 Symposium dates and location are not yet set.
 - i. 1-3 October conflicts with NAB Radio Show, 8-10 October conflicts with SMPTE/WEBE, 28-30 October is the Iowa DTV seminar
 - ii. The Shoreham was very popular and Jennifer Turso of IEEE CMS seemed to feel she would be able to arrange the Shoreham for us.
 - iii. 15-18 October is the date that we prefer, 22-25 October also acceptable.

18. **Elections (D. Layer)**

- a. Ballot closes 17 January
- b. Five members-at-large were listed as candidates.

19. **Awards (D. Layer)**

- a. There is a strong desire to offer a best transactions paper award for this year. The publications committee will be asked to choose a paper for this award.
- b. D. Layer will contact David Harris about the student paper award.
- c. Siukola award ballots were submitted at the Symposium.
- d. Fellows nominations: Of the 6 IEEE Fellow nominations the Society has submitted in the past 3 years, 5 have been approved. This is a very high percentage.
- e. Call for Papers for the Symposium will be sent out as soon as a Symposium location and date are established.

20. **Other business: None**

- 21. **Next meeting:** Paper review meeting will be scheduled in June, the NAB meeting will be held Tuesday, April 8, from 5-8 in the conference room determined by NAB.

22. **Meeting Adjourned 3:56 PM**

Standards Corner

Bill Hayes

It is no secret that one of the key benefits that members of the IEEE Broadcast Technology Society reap is access to the knowledge of the engineers and scientist that contribute to the Transactions on Broadcasting. There is also certainly a benefit to the networking with other members that is available when attending various meetings and conferences. However, the purpose of the IEEE and its various societies is to create standards that will be used by the industries represented. Unfortunately, most members tend to sit on the sidelines and watch what happens and really don't participate in the processes. That is unfortunately a sad truth not just with BTS but with many of the professional membership organizations.

Since becoming the chairman of the RF Standards Committee I have had opportunities to discuss participation in various projects with a number of BTS members. Probably the most common reason for not wanting to become involved in standards committee work is the commitment of time. The perception is generally that if I raise my hand to volunteer some time, it will quickly snowball and I will end up working until all hours, I'll be on the committee forever, my kids will grow up and I'll miss it, my spouse will divorce me because we don't talk anymore and my friends in the industry will hate me because I helped create a standard that makes their work more difficult. Perhaps I'm over dramatizing a little but you get the point.

In RF Standards, we are working on four projects at this time. Two of the projects are DTV power measurements and DTV spectrum measurements. The May 1, 2002

deadline has passed and a number of DTV stations are on the air or will be very soon. Interestingly enough, there are no formal standards for how we measure the in-band power in DTV transmitters. There are a number of methodologies being employed and I am not arguing that any one is wrong but there are a number of subtleties in the methods that if not recognized and handled properly can lead to improper operation of a transmitter. The same is true in the measurement of DTV spectrum use and mask compliance. This one is probably even more complex and subject to interpretation since the vendors that manufacture the measurement equipment have adopted slightly different methodologies for measuring mask compliance. Again I am not pointing at any one vendor and saying their method is wrong or better for that matter, but they are different and if the end users don't understand the methodology and process, it is quite easy to think a station is in mask compliance when in reality it is not and it is possible for a station to think it is out of compliance when it is not. Standards in these areas provide an unambiguous method for measuring compliance using approved methodologies that will insure that the signal leaving the facility is as good as it can be.

I did mention four projects. The other two are ones that we are working on adopting from the EIA and they are the standards for analog television transmitters and analog precision demodulators. I know that throughout our industry there is an ongoing chant that analog is dead, long live digital. Before we seal the casket and start shoveling in the dirt however, recognize one simple fact, life is analog and before we forget everything we

know about it we should separate the wheat from the chaff. After the Reed-Solomon coding, the data randomizing, and discrete cosine transforms are done, the last thing we do to our digital signal for broadcast is run it through a really big digital to analog converter so we can broadcast it. It would seem that there is still a lot of value in understanding the analog past. Also, I'm not fully convinced that in 2006 all NTSC analog stations will be shutting down. I suspect that we'll live with our analog transmitters for some time. Some of us will even end up purchasing new analog transmitter which we will convert to digital when analog goes away. I suspect that we'll still want to be able to monitor and measure the performance of those devices while they are in operation. That is why the RF Standards committee has begun the process of reviewing these standards and conforming them to IEEE requirements.

So, what can you as a BTS member do? Get involved in the standards process. If you're not interested in the RF area, the BTS has a very active audio and video standards committee as well. Your participation will be welcomed and in addition to contributing to the process that is the foundation of the organization to which you belong, you'll also learn a lot you didn't know and truly understand a lot that you thought you knew. I promise it is not a life sentence, but it is something that many of us enjoy and will do for the rest of our lives. If you have an interest in getting involved contact either Alan Godber (agodber@earthlink.net) or myself (hayes@iptv.org) and we'll be glad to help you find a place on the team.

Visit our web site at:

<http://www.ieee.org/organizations/society/bt/index.html>

Room 204 - The IEEE History Center Assists in National Historic Landmark Research

Beginning in March of 2001, the IEEE History Center has been assisting the National Park Service select a technology-related site appropriate for nomination to go through the rigorous screening process which will — the Park Service and the IHC hope — result in a landmark which pays tribute to the importance of the history of technology. Because technology's nature is to develop, and modifications are frequent to the equipment and buildings where technology is developed, it is difficult to find a site intact enough to satisfy the very rigorous requirements for historical integrity. Having begun with a list of more than 230 sites of historic importance, the History Center was forced to eliminate most of them because little or nothing of the building or equipment remains. The shortlist of candidate sites included the site of Marconi's transmission at the Navy Yard, Washington, DC, the Victor factory and RCA buildings including Zworykin's Lab, Camden, NJ; the RCA Princeton Lab, Princeton, NJ; Marconi sites at Camp Evans, Wall, NJ; the Western Union office in New York, NY, the Alexanderson alternator, Schenectady, NY; Zworykin's iconoscope lab, Pittsburgh, PA; Farnsworth's San Francisco lab, and the Marcellus Hartley Dodge laboratory at Columbia University where Armstrong did much of his FM radio work.

Digging through archives, municipal records, and in some cases by visiting the sites on foot, the staff found that even many of the short-list sites were found to be too altered to meet the criterion. Nothing remains of the Marconi masts except the footings; of the five buildings remaining from the huge RCA city-within-a-city in Camden, NJ, several are being turned into condominiums, and none of them was the building Zworykin's lab was actually in, it having been de-

molished long before. Gradually, the Armstrong labs emerged as the strongest intact candidate site.

Working with the gracious help of the Columbia architects, who provided original plans of Philosophy Hall building, Robie Lange of the Park Service's National Historic Landmark Survey and IHC staffer Robert Colburn spent a day matching old photographs with plans, reading Armstrong's papers, and investigating the building themselves hoping to identify positively "the cluttered basement lab" where the regenerative circuit, the superheterodyne receiver, and the superregenerative receiver were conceived and developed. It was with a feeling of some awe that they - guided by the architects - entered Room 204, and began to match the old photographs with the room as it is now. Despite being used currently as a maintenance room, the space itself has not been seriously altered, and it is pretty certain from photographs showing Armstrong demonstrating equipment, that 204 was his lab during the 1920s. The Hartley Labs comprised more than one room, however, and it is known from the description of some of the experiments that multiple rooms were used. These rooms have been renumbered and walls have been moved since that time. More sleuthing remains to be done to determine which specific FM advances occurred in which rooms. Pupin's magnificent dark-panelled office is still there.

The next step will be to prepare a nomination, and we hope that, in time, the site of the Marcellus Hartley Lab will become a National Historic Landmark.

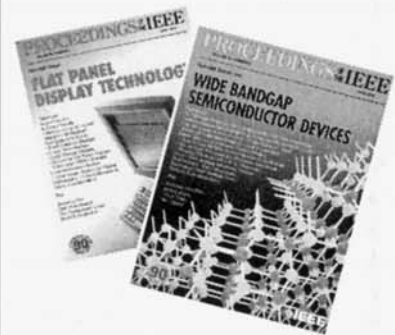
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Brain Teaser

By Lanny Nass

Solve the following:

eeeeeeeeee
knee
lights lights
poFISHnd
13579 AZ

Email answers to elnass@cbs.com

Answers to the teasers in the last issue are:

- Question 1:* Since the ship is afloat, the water level in relation to the ship stays the same. Therefore, 6 feet are above the water at the end of the period, just as at the beginning.
- Question 2:* Three hours and three minutes. Once the amoeba in the first jar has reproduced itself (a process that takes three minutes) that jar is at the same point at which the second jar started. The only difference is that it is three minutes behind.
- Question 3:* The purpose of the 4th chime on the NBC set of chimes was intended as an alert for national emergencies.

Contributions to this column are always appreciated!

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